

**“It’s essential, and it’s expensive”:
investigating Australian households’
everyday experiences of fruit and
vegetable procurement**

By

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ABSTRACT

Fruit and vegetable consumption is important for health and sustainability outcomes. Less than 5% of Australian people consume the recommended daily intake for both fruit and vegetables. Interventions in Australia have not successfully increased fruit and vegetable consumption over the long-term. As such, new approaches to fruit and vegetable research, policy and promotion are needed. In recent years, fruit and vegetable procurement has been identified as a potentially important social practice that determines how food is consumed in domestic settings. However, there is a paucity of research investigating this in Australia. Furthermore, food retail environments and life course events and experiences, are known to influence how foods are used in domestic settings, but research specific to fruit and vegetables, and the Australian context, is lacking. This thesis addresses these research gaps by exploring how Australian people understand and experience fruit and vegetable use, focussing on the practice of procurement, and considering how food retail environments and life course factors influence this.

The thesis starts with a preface, detailing my relationship with the research topic, and the resulting thesis content. Following this, I present a scoping review of Australian peoples' perceptions of fruit and vegetable characteristics, and evidence summaries about the influence of food retail environments and life course events and experiences on fruit and vegetable use. A novel research methodology, aligning with constructivist epistemology and interpretivist theoretical perspectives was developed to address the three research aims, which were developed based on findings from the literature review. A case study research project was designed, including four individual phases of data collection which incorporated multiple methods of data collection from ethnography and food systems research. Participants were conveniently recruited in Queensland and Western Australia. Data were analysed inductively in the first instance using Braun & Clarke's (2006) thematic analysis, followed by post-hoc application of social practice theory and life course perspectives.

Twelve households participated, consisting of 18 individuals. Findings showed that participants devalued fruit and vegetables compared to other foods. Their experiences in food retail environments conditioned their expectations for future fruit and vegetable procurement, which had implications for fruit and vegetable use more broadly. Negative and positive experiences with fruit and vegetable procurement influenced participants' motivation to use fruit and vegetables, impacting how they performed fruit and vegetable planning, storing, preparation, and eating practices. Exploring the practices that lead to fruit and vegetable consumption through a novel methodology highlighted the complex and multifaceted ways in which Australian people understand and experience fruit and vegetable use.

These findings contributed to the development of a theory explaining how food retail environments impact fruit and vegetable use, highlighting the novel contribution of the research to this field of research. Furthermore, findings suggest that increasing fruit and vegetable consumption is not as simple as telling people to 'eat more'. Considering fruit and vegetable use through the lens of social practice theory provided insight into how fruit and vegetable policy and promotions can be enhanced to achieve better outcomes for the Australian population. As such, the thesis concludes with a discussion of key recommendations for future research, policy and practice, based on the research findings. These recommendations include: shifting public health messaging about fruit and vegetables from health-related concepts towards hedonic attributes; increasing the quality of fruit and vegetables available for procurement in Australian supermarkets; educating the Australian public about what can realistically be expected of fresh fruit and vegetables procured from Australian food retail environments; and enforcing healthy supermarket retail practices through government policy and action, among others.

DECLARATION

I certify that this thesis:

1. does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university
2. and the research within will not be submitted for any other future degree or diploma without the permission of Flinders University; and
3. to the best of my knowledge and belief, does not contain any material previously published or written by another person except where due reference is made in the text; and
4. if generative artificial intelligence has been used in my thesis it has been duly acknowledged with details to identify the extent to which generative artificial intelligence informed the final thesis (see Appendix 6).

Signed.....Ellen Wynn.....

Date.....28/11/2025.....

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PREFACE

This research is shaped by my personal understanding and experiences, which expanded throughout the course of my PhD candidature. This preface aims to articulate my positionality, highlighting key influences on my perspectives and providing insight into how these may have shaped the research. By bringing attention to these factors, I invite readers of this work to critically consider alternative interpretations and how the research findings may or may not be transferrable to other contexts. This process is relevant to the measures of rigour incorporated into the research project, which are reported in detail in Chapter 3 (Methodology).

Reflection on candidature

My journey through PhD candidature was challenging and unpredictable. The project reported in this thesis is by no means the project I had sought to conduct in the early stages of my candidature. Despite numerous challenges and unforeseen changes, I am proud of the work I have produced and its relevance to the people it is intended to serve. The interest received from participants and the broader public reinforce the applicability of this research to daily life, affirming its value beyond the confines of academia.

Finding my research topic

My interest in the topic of fruit and vegetable use arose from my experiences as both a dietitian and a person who uses fruit and vegetables daily. I have always loved fruit and vegetables, and have always sought to incorporate them into my diet. I recall being 18 years old, and sharing accommodation with a person 10 years older than me who told me I was “too young to be buying that much fruit and veg” and that I should have been “eating nothing but 2-minute noodles” at that age. Through my training and work as a dietitian I learned to value fruit and vegetables beyond this inherent liking, acknowledging the role that they play in healthy and sustainable diets, which I discuss further in Chapter 1. While working as a community dietitian, I observed a gap between my clients’ desires to eat fruit and vegetables, and their ability to achieve this. This led me to research why this might be, ultimately leading me to learn about the structural barriers to healthy eating. My personal

frustrations with the food system further motivated my inquiry. Despite my professional knowledge about the Australian retail food system and how it works, I found it challenging to make informed choices that aligned with my own goals and desires, especially related to fruit and vegetable procurement. Specifically, I found it difficult to achieve my goals of procuring locally grown, sustainable, seasonal and ultimately, tasty fruit and vegetables within the retail food environments that I had access to at the time. I found it increasingly difficult to find the information required to make informed choices, and wondered how anyone not considered an 'expert' in food, nutrition and retail systems could be expected to do the same. These initial frustrations and investigations informed my exploration into how Australian people perceive fruit and vegetable characteristics, which is reported in Chapter 2. The gaps identified through this investigation then informed the design of the project as reported in this thesis.

Beliefs & worldview

The research is underpinned by my deep drive to improve things. I have always sought to make things better, more efficient, and more effective, and this led me to question how the Australian retail food system could be improved. I believe that people have unique understandings, ideas and beliefs about the world that influence how and why they do the things they do. I remember conducting my first qualitative research project in 2019, as part of my Honours research program, and being thrilled to learn that there was a whole host of researchers and academics who acknowledged this, after spending years learning from researchers and academics situated within positivist worldviews. These core beliefs and experiences informed my choice to approach this research with a constructionist worldview and interpretive theoretical perspective.

While my initial queries were focussed on the systemic shortcomings of the Australian retail food system, my openness and willingness to understand allowed me to consider the strengths of the food system, as they were highlighted in existing research (reported in Chapters 1-2). This supported more nuanced understanding of the relationship between individual experiences, and the social and environmental factors that impact these experiences. Such deep understanding allowed me to develop useful and meaningful insights that can be used to inform more effective fruit and vegetable policy and promotion

interventions, which could not have been obtained had I approached the research with a more restrictive view of knowledge and understanding. I am certain that my beliefs and understandings about the world, and the findings contained within this thesis will continue to evolve as my life continues. However, I recognise the importance of my experiences as a dietitian, researcher, child, adult, and a performer of 'fruit and vegetable use', for shaping them as they are now.

My own experience as a performer of 'fruit and vegetable use' throughout candidature

I recall eating carrots, pulled directly from a 10kg bag stored in the fridge as a child (I was one of five children, we needed a lot of carrots). I always loaded my plates with salad, and my sibling and I always requested that 'Nanna' bring her famous 'noodle salad' to any birthday or special event. I am creative in the kitchen and have always loved cooking and eating food. My relationship with fruit and vegetable procurement however has been tumultuous, and even questionable at times (I dabbled in 'dumpster diving' for food for a short period of time during my undergraduate degree). Throughout my PhD candidature, I experimented with my fruit and vegetable procurement a lot. This was sometimes related to my desire to eat more fruit and vegetables; sometimes related to my curiosity about modes of procurement; and sometimes a necessary response to major life shifts that altered how I used fruit and vegetables in my day-to-day life. As such, I have now trialled almost every avenue of fruit and vegetable procurement reported in this thesis, excluding meal delivery services and food pantries. These experiences provided me with a personal knowing that facilitated deeper conversations with participants and thus contributed to the production of rich, contextual data.

While I have settled now into a comfortable routine of procuring fruit and vegetables fortnightly from my local markets, I know, in part because of the findings from this research, that this routine will undoubtedly change as I move away from where I am currently living to explore new places and experiences. The shifts in my own procurement led to alterations in how I approached other practices of fruit and vegetable use. Through considering my own practices reflexively, I was able to guide participants into conversations about their own shifting practices, leading to more contextualised research findings than if I had not considered changes over time. That is, by reflecting on my own experiences, I was able to

design and conduct a highly adaptable research project, that followed participants where they needed to be followed, rather than attempting to fit them into a model of research that was not relevant or applicable to their situation. In summary, I both influenced, and was influenced by the research process and outcomes. The reflexive processes built into the research project allowed me not only to view and consider these influences, but to respond to them in meaningful ways that supported enhanced research processes and outcomes.

Summary

My worldview aligns with that of constructionism. The research contained within this thesis has been interpreted through my own worldview, which is grounded in my experiences as a child, adult fruit and vegetable user, dietitian and researcher. Throughout the research process, I maintained a reflexive stance and critically examined my own biases and assumptions. My personal experiences, despite informing the design, conduct and interpretation of the research, were carefully differentiated from participant data through multiple strategies of rigour, which are discussed in Chapter 3 (Methodology). This process ensured that findings were grounded in participant perspectives, rather than being a direct reflection of my own internalised ideas and beliefs about the world. My evolving understanding of the food system, developed through both my own experiences, and the findings from this research, strengthens this thesis' conclusions, demonstrating a commitment to robust and transparent research practice.

PUBLICATIONS AND PRESENTATIONS DURING CANDIDATURE

PRESENTATIONS:

Wynn E., Tonkin E., Wilson A., Webb T., “Policy opportunities: understanding social and structural influences on fruit and vegetable use”. Oral Presentation, presented by Ellen Wynn

Wynn E., “What do we really know about fruit and vegetable use? Exploring the need for deeper understanding in fruit and vegetable research, policy, and programs”. World Critical Dietetics Conference, 2023. Oral Presentation, presented by Ellen Wynn

PUBLICATIONS (not related to thesis content):

Wynn E., Palermo C., Delbridge R., & Wilson A. (2022). Long-Term Outcomes of a Community of Practice for Dietitians Working in Aboriginal and Torres Strait Islander Health: A Multimethod, Follow-up Study. *Journal of Continuing Education in The Health Professions*, 42(1), e60-e68. <https://doi.org/10.1097/CEH.0000000000000370>

Wynn E., Delbridge R., Palermo C., & Wilson A. (2023). The role of Communities of Practice in improving practice in Indigenous health and education settings: A systematic review. *Focus on Health Professional Education: A Multi-Professional Journal*, 24(2), 1–26. <https://doi.org/10.11157/fohpe.v24i2.589>

Under Review:

Theron C., **Wynn E.**, Brady J., Wilson A., A comparison of dietetic qualitative research in Australia and Canada

Wynn E., Gray O., Brady J., Wilson A., Educator perspectives and experiences of teaching social justice to allied health students: a scoping review

Jansen O., **Wynn E.**, Brady J., Wilson A., Social Justice in Australian and Canadian dietetics regulatory documents: a content analysis

PRESENTATIONS (not related to thesis content):

Jansen O., Brady J., **Wynn E.**, Wilson A., “Social Justice in Dietetic Regulation and Governance: An International Comparison”. ICND 2024: 19th International Congress of Nutrition & Dietetics. Poster

Wynn E., Thomas E., White A., Grivell N., Harrison N., Reynolds A., “By students, for students: improving the PhD experience through student-led initiatives”. Quality in Postgraduate Research Conference 2024. Oral Presentation, presented by Ellen Wynn & Emma Thomas

Butler A., **Wynn E.**, Lee YS., Cosentino A., Walsh K., Carpenter-Mews R., “Enhancing the graduate research experience by amplifying and empowering student researcher voices”. Quality in Postgraduate Research Conference 2024. Oral Presentation, presented by Ellen Wynn, Yun Seh Lee & Amy Butler

Wynn E., Palermo C., Delbridge R., Wilson A., “Long term outcomes of a Community of Practice for dietitians working in Aboriginal health”. Dietitians Australia Conference 2022. Oral Presentation, presented by Annabelle Wilson

CHAPTER 1 INTRODUCTION

This chapter serves as an introduction to the thesis. It first starts by justifying the research topic (fruit and vegetable use) and situating it within current public health discourse and food choice literature and theory. The chapter concludes with an overview of the thesis structure.

1.1 Fruit and vegetable intake for healthy and sustainable diets

Fruit and vegetables are an important component of healthy and sustainable diets as they provide vital nutrients (e.g. fibre, vitamins, and minerals), and have lower environmental impact compared to ultra-processed and animal foods (Australian Bureau of Statistics, 2018; Hendrie et al., 2022; Wallace et al., 2020; Willett et al., 2019). Public health advocates have recommended dietary intake of approximately 800g of fruit and vegetables per person, per day, to support reduced rates of obesity and cardiovascular diseases, among other health conditions at a population level (Wallace et al., 2020). However, despite development and adoption of national dietary guidelines in over 100 countries globally, fruit and vegetable consumption continues to be far below the targets specified for health benefits (Wallace et al., 2020).

Australian people consume far below the recommended amount of fruit and vegetables compared to what is recommended in health and sustainability guidelines (Australian Bureau of Statistics, 2018; Chapman et al., 2016; Hendrie et al., 2022; Hill et al., 2020; Livingstone et al., 2020; Nijmeijer et al., 2004; Wellard-Cole et al., 2023). Similarly to global recommendations, the Australian dietary guidelines recommend that adults consume 5-6 serves of vegetables (approx 375-450g) and 2 serves of fruit (approx 300g) daily (National Health and Medical Research Council, 2013). Despite these recommendations, only 4.1% of Australians eat the recommended serves of both fruit and vegetables daily, and less people are eating the recommended amount over time (5.4% in 2018) (Australian Bureau of Statistics, 2022a). Similarly, only 4.3% of children ate the recommended serves of fruit and vegetables daily in 2022, compared with 6.0% in 2017-18 (Australian Bureau of Statistics, 2022a). Furthermore, the average Australian adult in 2011-2013 ate approximately 72% of the recommended daily intake of fruit (1.33 serves/approx 200g) and 64% of the

recommended daily intake of vegetables (3.83 serves/approx 300g) compared to a model of the Planetary Health Reference Diet (Hendrie et al., 2022).

Continued low intake of fruit and vegetables also has considerable implications for population health and healthcare expenditure. Increasing vegetable intake by 10% across the population, would reduce government expenditure on cancer and cardiovascular disease treatment by approximately \$100 million per year, with further benefits on expenditure related to prevention of other diet-related diseases, such as obesity, diabetes, musculoskeletal conditions, and mental health conditions (Deloitte Access Economics, 2016; McKinna et al., 2020). Furthermore, recent modelling has shown that increasing consumption of vegetables in Australia by half a serve per day (approx 40g) would generate an additional \$634 million per year in vegetable sales, of which approximately half would be returned to vegetable growers, supporting sustainable vegetable production into the future (McKinna et al., 2020).

Combined, these factors highlight that continued low intake of fruit and vegetables across the Australian population will have negative implications not only for population health, but also for planetary health, economic growth of the horticulture industry, and government healthcare expenditure. As such, there is a need to explore new ways to increase fruit and vegetable intake among the Australian population, with consideration for emerging recommendations related to sustainable food production and consumption, along with existing health-related recommendations. The following section explores fruit and vegetable promotion in Australia, to provide insight into what has been done, and how we can build on these interventions to improve fruit and vegetable intake among the Australian population.

1.2 Promoting fruit and vegetable consumption in Australia

Several public health interventions and campaigns to increase fruit and vegetable intake have been implemented over the past 20 years in Australia (McKinna et al., 2020; Rekhy & McConchie, 2014). While national campaigns such as 'Go for 2&5' (2002-2011) have had small successes in increasing fruit and vegetable consumption in the first three years in some states, there is little evidence of long-term, sustained improvements in intake over

time (Pollard et al., 2008; Rekhy & McConchie, 2014). Researchers have suggested that this may be due to campaigns focusing on health messaging, instead of consumption-based outcomes (e.g. taste, fulfillment), and limited collaboration between the horticulture industry, government, and the food retail sector (Rekhy & McConchie, 2014).

Globally, most interventions that seek to increase fruit and vegetable consumption target individual behaviour change strategies such as: increasing knowledge and awareness about the health benefits of fruit and vegetables; providing education about the fruit and vegetable recommendations stipulated in dietary guidelines; or increasing motivation to eat fruit and vegetables (often through promoting health benefits) (Bagheri et al., 2021; Brug et al., 2008; Golden & Earp, 2012; Moore et al., 2013; Rekhy & McConchie, 2014; Wolfenden et al., 2021). These types of interventions are thought to overestimate individual peoples' autonomy, and fail to acknowledge the social, environmental and political factors that influence how people interact with food in their day-to-day lives (Adams et al., 2016; Friel et al., 2015; Glanz et al., 2015). As such, they are unlikely to result in long-term positive behaviour change (Glanz et al., 2015; Rekhy & McConchie, 2014; Wolfenden et al., 2021). Furthermore, it has been argued that most people already understand that fruit and vegetables are healthy and that some are also aware that eating them can benefit environmental sustainability goals (Hoek et al., 2021; Lea et al., 2005; Moser et al., 2011; Pearson, 2001). This suggests that no amount of 'consumer education' about the healthiness, or environmental sustainability of fruit and vegetables will change peoples' actual fruit and vegetable use. As such, interventions that target factors of fruit and vegetable use beyond individual peoples' control are likely to be beneficial in steering the Australian population's fruit and vegetable use towards health and sustainability targets. The following sections investigate how individual, socio-cultural, environmental and political levels factors influence fruit and vegetables choices globally (Section 1.3), and how these factors influence fruit and vegetable consumption in Australia (Section 1.4).

1.3 Factors influencing fruit and vegetable choices at multiple levels of influence

Food choices are highly complex, and can be influenced by individual, environmental, social, cultural and policy factors (Devine et al., 1998; Evans, 2012; Furst et al., 1996; Glanz et al.,

2015; Hoek et al., 2021; Neuman, 2019). The socio-ecological model of health has been used comprehensively in food behaviour research, particularly in school settings, to investigate factors that influence food choice at multiple levels (de Villiers & Faber, 2019; Godrich et al., 2018b; Moore et al., 2013; Upreti et al., 2021). Socio-ecological models focus on the nature of people's transactions within their physical and sociocultural environments (Glanz et al., 2015; Stokols et al., 2003). Most behaviour interventions that seek to increase healthy food consumption focus on individual-level strategies such as increasing education or knowledge about healthy eating (Bagheri et al., 2021; Brug et al., 2008; Golden & Earp, 2012; Moore et al., 2013). By considering the influencing factors on health behaviour at multiple levels, socio-ecological models ensure that environmental and policy-level factors are effectively incorporated into health behaviour interventions, thus increasing their effectiveness (Glanz et al., 2015).

Several researchers have applied socio-economic models and perspectives to research about fruit and vegetables globally. While there are many versions of socio-ecological models, and several adaptations, most researchers investigating fruit and vegetable use apply a version of McLeroy et al.'s (1998) Ecological Model for Health Promotion. This model describes five primary levels of influence, and hence target points for health promotion strategies. The five levels include: 1) intrapersonal factors, 2) interpersonal factors, 3) institutional factors, 4) community factors, and 5) public policy factors. Intrapersonal factors (hereon referred to as individual factors) refer to individual characteristics that are unique to individual people, such as knowledge, attitudes, and developmental history (McLeroy et al., 1988). Interpersonal factors (hereon referred to as socio-cultural factors) refer to the impact of formal and informal social and cultural structures and groups on individual and group choices and behaviours (McLeroy et al., 1988). Institutional factors refer to the social institutions to which we belong, and includes the rules and regulations relevant to these institutions (McLeroy et al., 1988). Community factors refer to the relationships among organisations and institutions, and the broader environment in which we live and act (McLeroy et al., 1988). Institutional factors and community factors are hereon combined and referred to as 'environmental factors'. Policy factors refer to local, state and national laws and policies that govern the social institutions, rules, and regulations of modern society (McLeroy et al., 1988). The following sections describe how fruit and vegetable use is

influenced by factors at these levels of influence, according to studies that have applied socio-ecological models or perspectives globally.

Individual factors have been found to have both positive and negative influences on fruit and vegetable use globally. Studies investigating fruit and vegetable use from a socio-ecological perspective have identified taste preferences, habits and routines, knowledge and skills to be particularly important for fruit and vegetable use (Bagheri et al., 2021; Godrich et al., 2018b; Graham et al., 2013; Larson et al., 2012; Nagawa et al., 2018; Robinson, 2008). One of the most commonly investigated individual factors is knowledge. Low fruit and vegetable knowledge, particularly related to the ‘importance of eating fruit and vegetables for health outcomes’ has been identified as a barrier to fruit and vegetable consumption (Bagheri et al., 2021). High fruit and vegetable knowledge and food literacy have been found to positively influence fruit and vegetable use, though with mixed findings (Godrich et al., 2018b; Graham et al., 2013; Nagawa et al., 2018). For example, Graham et al., (2013) found that fruit and vegetable knowledge was associated with increased fruit and vegetable preparation, but not consumption, with social and environmental factors having a stronger influence on consumption. Furthermore, Godrich et al., (2018b) found that food literacy and nutrition knowledge were perceived by adults to facilitate children’s fruit and vegetable intake, but only to the extent that this knowledge was translated into behaviour.

Socio-cultural factors have been found to have mixed influences on fruit and vegetable intake dependant on the unique social and cultural context of the population group being studied. For example, cultural tradition, expectations and norms were found to be important for influencing African American people’s fruit and vegetable use (Robinson, 2008), but not for Ugandan adolescents (Nagawa et al., 2018). Social influences have been identified to be highly important for influencing fruit and vegetable use. Perceived healthy eating habits, attitudes towards healthy eating, and fruit and vegetable consumption of friends and family, have all been found to positively influence fruit and vegetable consumption (Graham et al., 2013; Larson et al., 2012; Nagawa et al., 2018). However, lack of support from friends and family, and perceived social norms around fruit and vegetable consumption have been found to limit fruit and vegetable consumption in Iran (Bagheri et al., 2021), and parental role modelling can have both a positive and negative influence on children’s fruit and vegetable consumption in Australia (Godrich et al., 2018b).

Environmental factors are often investigated through concepts of availability and accessibility in fruit and vegetable research. Increased availability and accessibility of fruit and vegetables in homes, schools and neighbourhoods have been identified as positive influences on fruit and vegetable use (Godrich et al., 2018b; Graham et al., 2013; Larson et al., 2012; Nagawa et al., 2018; Robinson, 2008). However some researchers have identified that increased access does not always increase consumption (Nagawa et al., 2018), and that perceived barriers to accessing fruit and vegetables does not necessarily limit consumption (Graham et al., 2013). Increased density of fast-food outlets in neighbourhoods and homes has been linked to lower consumption of fruit and vegetables (Bagheri et al., 2021; Godrich et al., 2018b; Larson et al., 2012). Similarly, advertising and media related to discretionary foods have been found to be barriers to fruit and vegetable consumption (Bagheri et al., 2021).

Policy factors are seldom explored in relation to fruit and vegetable use, likely due to the complexity of investigating the impact of these factors on individual behaviour. When investigating the role of policy-level factors, many researchers investigate public perceptions of fruit and vegetable-related policies and strategies. For example, Godrich et al. (2018) discussed the potential positive impact of reducing availability of energy-dense, nutrient-poor foods on Australian children's fruit and vegetable consumption. Similarly, participants in Bagheri et al.'s (2021) study felt that fruit vegetables were at risk of being contaminated by high levels of toxic compounds, due to lack of regulation of fruit and vegetable production, storage, and supply processes which they subsequently thought limited their fruit and vegetable intake (Bagheri et al., 2021).

Summary

These studies show that factors at multiple levels of influence can impact how fruit and vegetables are used. Considering these multiple levels of influence supports deeper and more nuanced understanding of fruit and vegetable use beyond individual characteristics such as knowledge and skills. These studies highlight the importance of considering the unique social and cultural context of the population under investigation, and paying attention to how the social world influences ideas, beliefs and attitudes towards fruits and vegetables. Furthermore, there appears to be more nuance to the concept of availability

and accessibility of fruit and vegetables than the way it is often reported in academic literature suggests. Increased investigation of factors beyond those at the individual level of influence are required. To my knowledge, there is only one study that investigates factors influencing fruit and vegetable consumption in the Australian context, and across all four levels of influence (Godrich et al., 2018b). This study is limited to perceptions about children's fruit and vegetable intake in rural and remote areas of Australia. Therefore, there is a need for a multi-level exploration of factors influencing fruit and vegetable use in Australia to inform more effective policy and promotion interventions. The following thesis section (1.4) does this by applying a socio-cultural perspective to extant literature, and investigating how factors at multiple levels of influence impact fruit and vegetable consumption in Australia.

1.4 Influences on fruit and vegetable choices in Australia

This thesis section explores what is already known about how fruit and vegetable consumption is influenced by factors at individual, socio-cultural and environmental levels of influence in Australia. Much of the research about fruit and vegetable use in Australia focuses on issues of 'consumption' which can refer to any act of fruit and vegetable use, from purchase to eating. Due to the way researchers have framed 'consumption' in the articles discussed in this section, I have interpreted 'consumption' to refer to 'eating' fruit and vegetables, as this is the main outcome the researchers appear to be discussing. Where researchers have specified other activities of fruit and vegetable use, for example preparation, I have explicitly provided this information in the text. While policy interventions can be beneficial for increasing fruit and vegetable intake, these influences are specific to the context in which they are applied, and it is not within the scope of this thesis to explore these factors directly. Instead, this thesis will provide insight into how future policy interventions may be applied or targeted to contextual drivers and barriers of fruit and vegetable consumption in Australia. As such, this section explores individual, socio-cultural, and environmental factors, but not policy factors.

Individual factors include personal characteristics and attributes that can influence food choices, such as knowledge, attitudes, beliefs and values (McLeroy et al., 1988; National Cancer Institute, 2005). Several Australian studies have investigated the influence of

demographic and socio-economic factors on fruit and vegetable consumption. Drivers of fruit and vegetable consumption include being female, older in age, including fruit/vegetables in all meals, and having higher levels of fruit and vegetable related knowledge or skills (Australian Bureau of Statistics, 2022a; Godrich et al., 2018b; Hill et al., 2020; Livingstone et al., 2020; Nour et al., 2017; Pollard, 2008). Barriers to fruit and vegetable consumption at the individual level include: perceived lack of time, a perception that the Australian Dietary guidelines are unachievable, food preferences and habits, concerns about perishability, limited knowledge and skills related to fruit and vegetable preparation, perceived lack of hunger, and 'laziness' (Chapman et al., 2016; Farragher et al., 2016; Glasson et al., 2011; Godrich et al., 2018b; Livingstone et al., 2020; Pollard, 2008; Wellard-Cole et al., 2023). Australian people who believe that they already eat enough fruit and vegetables, or have 'incorrect' beliefs about the adequacy of their current vegetable intake are also less likely to eat vegetables (Chapman et al., 2016; Pollard, 2008; Pollard et al., 2008; Wellard-Cole et al., 2023). There also appears to be a general preference for fruits over vegetables among both adults and children in Australia, with 64% of children and 44% of adults meeting the recommended daily intake for fruits, compared to 4.6% of children and 6.5% of adults meeting the recommended daily intake of vegetables daily (Australian Bureau of Statistics, 2022a).

Socio-cultural influences include the social environment in which people make choices, and includes factors such as social identity, relationships, support, role modelling, group and social norms, and cultural values and expectations (Cohen et al., 2000; McLeroy et al., 1988). Socio-cultural drivers of fruit and vegetable consumption in Australia include being married, cohabiting, and living with children (Farragher et al., 2016). However, lack of time, and parental food literacy, along with competing demands from work and family commitments, are significant barriers to fruit and vegetable consumption in Australia (Glasson et al., 2011; Godrich et al., 2018b; Livingstone et al., 2020; Pollard, 2008).

Environmental influences include the quality and accessibility of fruit and vegetables, and the physical structures in which they are used such as neighbourhood environments, supermarkets and households (Cohen et al., 2000). The environmental level also includes factors of availability (e.g. number of food retail locations within a neighbourhood, or fruits and vegetables available within these locations) and accessibility (e.g. transport options to

get to a food retail location, reachability of a product on a shelf within a food retail location). Schools have been identified as a driver of fruit and vegetable intake for children in Australia due to their ability to provide fruit and vegetables through school meals (Godrich et al., 2018b). Living in areas of higher socio-economic advantage and having increased access to non-mainstream fruit and vegetable retailers such as market gardens and roadside stalls have also been identified as drivers of fruit and vegetable intake (Godrich et al., 2018b). Environmental barriers to fruit and vegetable intake include cost, availability of fruit and vegetable retailers in neighbourhoods, availability of produce that aligns with people's expectations, and limited in-store variety of produce offered (Chapman et al., 2016; Glasson et al., 2011; Godrich et al., 2018b; Livingstone et al., 2020; Pollard, 2008).

This section explored what is already known about how individual, socio-cultural, and environmental factors influence fruit and vegetable consumption in the Australian context. The studies included in this section show that there are numerous factors outside of individual people's control that can influence fruit and vegetable use in both positive and negative ways. However, despite acknowledgement that environmental and socio-cultural factors play an important role in determining Australian people's fruit and vegetable consumption, public health advocates continue to call for individual-focussed strategies to change fruit and vegetable behaviours (Hill et al., 2020; Morgan & Worsley, 2011). That is, they focus on trying to increase knowledge about fruit and vegetables, and place the responsibility of making 'healthy choices' onto individual people, rather than altering the social, political and structural systems that influence people's ability to make these choices. This is problematic because individually-focussed interventions have had little success at increasing and sustaining fruit and vegetable consumption in Australia in the long-term (Rekhy & McConchie, 2014).

Furthermore, where environmental factors are investigated, it is unclear how these factors influence consumption, in part due to a lack of definition in current research about what 'consumption' refers to. That is, barriers such as cost, availability of fruit and vegetable retailer, availability of produce, and in-store variety of produce relate more to activities of 'purchasing' or 'procuring', than 'eating' fruit and vegetables. Recent research approaches have identified that there are a number of practices that lead to fruit and vegetable consumption, such as planning, procurement and preparation of fruit and vegetables

(Castelo et al., 2021; Maller, 2015; Neuman, 2019; Shove et al., 2012; Warde, 2016). These practices are influenced by individual, socio-cultural, environmental and political factors in unique ways, and are often not within the ability of individual people to change due to lack of power and control over social, environmental and political systems and structures (Adams et al., 2016; Hunt et al., 2023). The following sections explore how viewing fruit and vegetable use as a set of practices (i.e. beyond 'consumption') can provide deeper insight into how and why people use fruit and vegetables the ways they do.

1.5 Fruit and vegetable use as a social practice

Food choices are conditioned by the contexts in which they occur (Delormier et al., 2009). Investigating these choices from an individual behaviour perspective does not consider these contexts, and over-exaggerates the role of rational decision making in people's every day food choices (Delormier et al., 2009). Despite several researchers and academics acknowledging this in recent years, qualitative research regarding food and diet choices continues to be dominated by individualistic approaches, contributing to the proliferation of interventions that do not address broader determinants of food choice (Bagheri et al., 2021; Brug et al., 2008; Golden & Earp, 2012; Hunt et al., 2023; Moore et al., 2013; Rekhy & McConchie, 2014; Wolfenden et al., 2021). In recent years, researchers have applied social practice theory to food studies to make sense of these issues (Burgess & Evans, 2016; Evans, 2011; Evans, 2012; Keegan & Breadsell, 2021; O'Neill et al., 2024; Wertheim-Heck & Raneri, 2020; Wertheim-Heck & Spaargaren, 2016; Wertheim-Heck et al., 2014; Wright-Pedersen et al., 2023; Wright-Pedersen et al., 2024). There are many versions of social practice theory in existence (Castelo et al., 2021; Maller, 2015; Neuman, 2019; Warde, 2016). Recent theoretical applications have resulted in versions of social practice theory that are informative for empirical research about food-related practices, and therefore useful for informing health interventions (Maller, 2015). As such, the following sections focus on these adaptations of social practice theory, to provide insight into how these research approaches might facilitate better understanding of the issues leading to low fruit and vegetable consumption in Australia.

The versions of social practice theory discussed in this section have primarily been developed for the purpose of studying sustainability and consumption in everyday life

(Maller, 2015). These adaptations vary in how they define and conceptualise social practices, however many agree that social practices are entities constituted by meanings about how and why to do things, materials, and competences (Castelo et al., 2021; Maller, 2015; Shove et al., 2012). These elements are explained in detail in Chapter 3 (Methodology).

Social practices are developed, modified and maintained by their *performance* by people (Maller, 2015). As such, the study of social practices must look at both the practice and its constituent elements (e.g. eating fruit and vegetables), and the *performance* of this practice. Investigating only the performance of a practice, as is often done in cognitive and behavioural approaches to health research, overlooks the materials within the social, environmental and political world that shape how and why performances are carried out in the ways they are (Maller, 2015). As such, applying a social practice theory perspective to health and sustainability research avoids blaming people for their actions, and focuses instead on the interactions between individual, social, environmental and political factors that drive human behaviours (Borrello et al., 2020; Khoso, 2023; Maller, 2015; Standal & Westskog, 2022; van Kesteren & Evans, 2020; White et al., 2022; Wright-Pedersen et al., 2024). These approaches therefore highlight the limitations of peoples' autonomy in triggering desirable behaviour changes (Hunt et al., 2023; Karademir Hazır, 2024; Revilla & Salet, 2018). Furthermore, considering fruit and vegetable use as a series of practices can provide understanding about the everyday doings, social connections, and collectively-routinised activities that encompass fruit and vegetable use (Neuman, 2019). Such approaches to fruit and vegetable research are likely to provide opportunities to achieve social change through practice-based, rather than individual-based interventions (Castelo et al., 2021; Neuman, 2019).

Researchers investigating food use through a social practice theory lens have identified procurement¹ as an important social practice for public health interventions to target, as it

¹ Procurement in this context refers to the ways in which people bring food into their homes. For fruit and vegetables, this can include purchasing (which involves monetary transfer in receipt of physical goods), growing and harvesting fruit and vegetables at home, and receiving them as gifts, among others.

has been found to influence how food is incorporated into meals and eaten within the home (Dobernig et al., 2016; O'Neill et al., 2024; Rai, 2022). Procurement of fresh foods such as fruit, vegetables, meat, and dairy influences other domestic food practices, such as planning and preparation, which also has implications for food waste (Dyen et al., 2018; Evans, 2011; Evans, 2012; Keegan & Breadsell, 2021; O'Neill et al., 2024; Ozanne et al., 2022; N. Sirola et al., 2019). There is an emerging body of literature that explores fruit and vegetable procurement as a social practice, however this research is specific to issues of food safety in Vietnam, and thus not generalisable to the Australian context (Wertheim-Heck & Spaargaren, 2016; Wertheim-Heck et al., 2014). Regardless, findings from this research suggest that Vietnamese people procure fruit and vegetables from wet markets, primarily because they are easy to access (environmental factor), and they feel they can trust the retailers they procure from (social factor) (Wertheim-Heck & Spaargaren, 2016; Wertheim-Heck et al., 2014). The emergence of supermarkets in these areas (environmental factor), and changes in affluence over time (individual factor, likely impacted by political factors) influenced the meanings associated with fruit and vegetable procurement, which subsequently altered where and how people procured fruit and vegetables in their day-to-day lives (Wertheim-Heck & Spaargaren, 2016).

Other research studies have explored growing fruit and vegetables at home as a social practice, from the perspective of food waste research. One of these studies found that growing fruit and vegetables often increased food waste, as fruit and vegetables grown at home competed with foods procured from supermarkets to be 'used up' in domestic households (Dobernig et al., 2016). While others found that growing fruit and vegetables at home altered the meanings associated with fruit and vegetables, with those grown at home being perceived as higher value than those procured elsewhere, sometimes decreasing food waste (Keegan & Breadsell, 2021). While applications of social practice theory to fruit and vegetable research are relatively new, these studies suggest that investigating fruit and vegetable use through a social practice theory perspective can provide important insight into *how* and *why* people use fruit and vegetables the ways they do. As highlighted in this section, social practice theory can provide insight into the role of social and environmental factors that are otherwise overlooked in fruit and vegetable research. Such an approach is

likely to identify novel opportunities for fruit and vegetable policy and promotion interventions that overcome the challenges described in Section 1.2.

1.6 Summary

The literature discussed in Sections 1.1-1.7 highlight that fruit and vegetable consumption is important for both health and sustainability outcomes, but despite government and public health efforts to increase consumption, less than 5% of Australian people consume the recommended daily intake of both fruit and vegetables, and intake is decreasing over time. Research, policy, and promotion interventions seeking to increase fruit and vegetable consumption overwhelmingly focus on individual behaviours and influences without considering the environmental factors that drive food choices on a broader scale. As such, these interventions have not been successful in achieving long-term sustained increases in fruit and vegetable consumption.

Social practice theory provides a unique opportunity to investigate fruit and vegetable practices beyond individual behaviour, and may be useful for identifying novel research, policy and promotion areas that are not currently being addressed in Australia. Recent research has identified food procurement as an important practice that influences both consumption and food waste. While there is an emerging body of literature investigating fruit and vegetable procurement, it is specific to unique geographic locations, practices and contexts and to my knowledge, there is no published literature which investigates how and why people procure fruit and vegetables in Australia. Therefore, the following chapters focus on the practice of fruit and vegetable procurement in Australia, and the factors that influence how and why people perform this practice in the ways they do.

The following section provides an overview of the thesis structure, including how the literature discussed in this introduction chapter has informed the development of the initial research stages (literature review – Chapter 2), and how this has been reported throughout the remainder of the thesis.

1.7 Thesis structure

This section provides an overview of the thesis structure, including how the research gaps, aims and process are related (Figure 1).

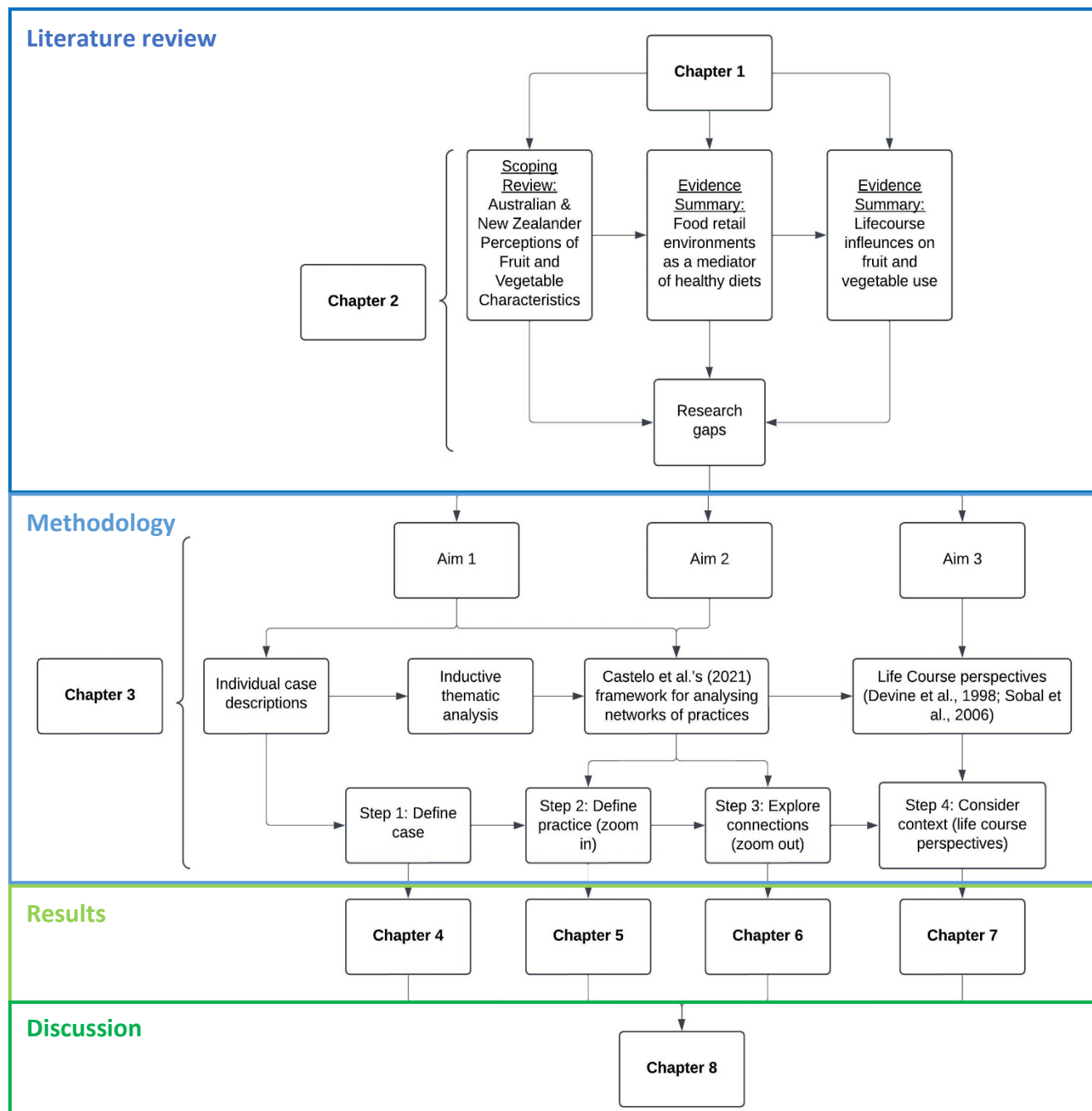


Figure 1: Overview of research process and subsequent thesis chapters.

1.7.1 Part 1: Literature review (Chapters 1 and 2)

This thesis is separated into four primary sections, as shown in Figure 1. This figure is repeated in part throughout the thesis to provide readers with a reminder of the overall story that the thesis reports, and how the different components relate to each other. It also directs the reader to the specific section of the thesis that is being discussed, to ensure clear meaning throughout. Chapters 1 and 2 describe the relevant background to the research project, and explore the extant literature regarding fruit and vegetable procurement, which is the primary focus of this research. At the end of Chapter 2, research gaps are identified and summarised. This led to the development of research aims:

Aim 1: explore how Australian people understand and experience fruit and vegetable procurement, and determine how food retail environments influence this

Aim 2: determine how fruit and vegetable procurement influences other practices of fruit and vegetable use (such as planning, preparing and eating)

Aim 3: determine how life course events and experiences influence development and modification of fruit and vegetable practices for Australian adults

1.7.2 Part 2: Methodology (Chapter 3)

Chapter 3 describes the research methodology. It first starts by stating the research aims, which were developed based on the research gaps identified in Chapters 1-2. Following this, I provide an overview of the epistemology (constructionism) and theoretical perspective (interpretivist theoretical perspective) that informed how I viewed knowledge and subsequently what I consider to be relative and 'real' regarding the research outcomes. Following this, I describe the methodology of the research, using case study research to scaffold the remaining elements of the research process (methods and analysis). The methods section describes the specific tools and methods used to collect and analyse data. Social practice theory and life course perspectives were used in analysis, and are described in detail in the analysis section of the methodology chapter. Chapter 3 ends with a description of the methods of rigour applied throughout the research process to ensure the research outcomes were credible and dependable, followed by a brief statement about ethics.

1.7.3 Part 3: Results (Chapters 4-7)

The results from the research project are reported in Chapters 4-7. Chapter 4 provides an overview of demographic data relevant to the participants and households who were involved in the research, and presents 'individual case descriptions' of each household. Individual case descriptions relate to research aim one, through providing insight into how the individual households who participated approached fruit and vegetable use, and how their unique contexts influenced this. Chapter 5 and 6 report findings generated through the application of social practice theory. In Chapter 5 I 'zoom in' on the practice of fruit and vegetable procurement to determine how food retail environments influenced participants' understanding and experiences of the practice (Aim 1). In Chapter 6, I 'zoom out', and follow fruit and vegetable procurement to 'where it leads', to explore how fruit and vegetable procurement influences, and is influenced by other practices of fruit and vegetable use (Aim 2). Finally, in Chapter 7, I apply life course perspectives (Devine et al., 1998; Devine et al., 1999; Sobal et al., 2006) to provide insight into how participants developed and modified their fruit and vegetable practices across their lives (Aim 3).

1.7.4 Part 4: Discussion (Chapter 8)

The final chapter provides a discussion of the primary findings from the research project related to each of the three research aims. Following this, I discuss the strengths and limitations of the research. The thesis ends with a summary of key implications and recommendations for future fruit and vegetable research, policy and promotion.

1.8 Chapter Summary

This chapter has provided important background information about the importance of fruit and vegetable consumption, and the need for novel research that investigates how and why people procure fruit and vegetables in the ways they do. It has also provided an overview of the thesis structure, including how elements of the thesis are linked. The following chapter explores literature relevant to the practice of fruit and vegetable procurement. Perception of fruit and vegetable characteristics is an individual factor that is known to influence procurement of fruit and vegetables, as highlighted in this introduction. As such, Chapter 2 starts with a scoping review of published literature (Section 2.2) which investigates Australian and New Zealander people's perceptions of fruit and vegetable characteristics. The scoping review highlights two key areas influencing Australian peoples' perceptions of fruit and vegetable characteristics - food retail environments, and life course events and experiences. These concepts are explored in further detail through evidence summaries in Sections 2.3 and 2.4, to inform development of the research questions which are reported in Chapter 3.

CHAPTER 2 LITERATURE REVIEW

Figure 2 shows an overview of the positioning of this chapter in the broader thesis, including how its contents contributed to identification of the research gaps.

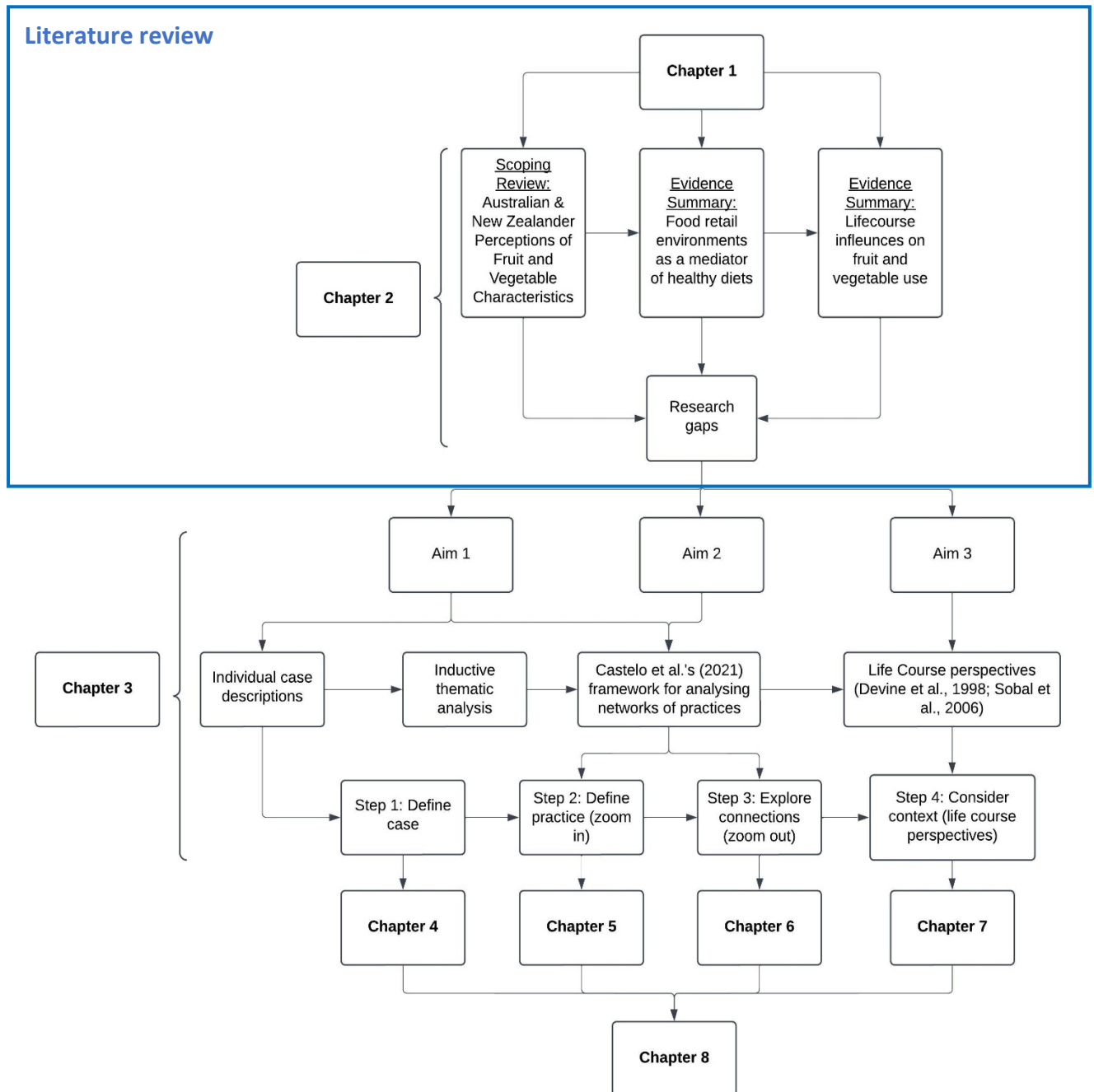


Figure 2: Chapter 2 structure and relevance to thesis

2.1 Chapter overview

This chapter explores literature relevant to the practice of fruit and vegetable procurement. The purpose of this chapter is to identify gaps in our understanding of fruit and vegetable use in Australia which will inform the research approach used in this thesis. The first section reports the findings from a scoping review which I conducted in the early stages of my candidature. The scoping review investigates how Australian people perceive fruit and vegetable characteristics, to determine if and how this influences their procurement and use of fruit and vegetables more broadly. It also identifies the extant literature investigating fruit and vegetable use in Australia, and highlights where further research may be beneficial. The scoping review identified two potential influences that may impact how Australian people consider and interact with fruit and vegetables. These include food retail environments and past experiences with fruit and vegetables. As such, the final two sections (Section 2.3 and 2.4) of this chapter provide evidence summaries of these two concepts, as shown in Figure 2. These final two sections provide insight into how these factors influence fruit and vegetable use, and support the identification of relevant research gaps which informed the design of my research project.

2.2 Australian and New Zealander people's perceptions of fruit and vegetable characteristics: A scoping review

2.2.1 Introduction

Understanding how people perceive fruit and vegetable characteristics has been proposed to support identification of novel ways to influence fruit and vegetable use (Ballco & Gracia, 2022; Furst et al., 1996; Grunert, 2010; Kyriacou & Roupael, 2018; Raaijmakers et al., 2018; Sijtsema et al., 2002; Steenkamp, 1989). The public health discipline is primarily responsible for designing and implementing fruit and vegetable interventions in Australia (McKinna et al., 2020; Rekhy & McConchie, 2014). However, there is often a disconnect between knowledge about health and nutrition held by public health researchers, and knowledge about marketing and consumer behaviour held by business, marketing and economics research disciplines (Glanz et al., 2012; McKinna et al., 2020). As a result, interventions have historically not been effective at changing fruit and vegetable intake, and they are not well received by the public, even when social marketing is attempted on a broad scale (McKinna

et al., 2020; Rekhy & McConchie, 2014). Therefore, investigating what is known about Australian people's perceptions of fruit and vegetable characteristics, including how different research disciplines have explored this issue, may be beneficial for determining how fruit and vegetable interventions can be improved upon in the future. Therefore, the scoping review reported in this section (2.2) explores the extant literature about Australian and New Zealander² peoples' perceptions of fruit and vegetable characteristics. The review utilises concepts from consumer behaviour literature to categorise and make sense of Australian and New Zealander people's perceptions of fruit and vegetables, to allow for cross-disciplinary understanding and theoretical development. As such, a secondary aim of the scoping review is to determine how different research disciplines approach investigations about fruit and vegetable perceptions.

Defining fruit and vegetable characteristics

Researchers often study perceptions of specific food characteristics to guide development and modification of new products, and to target marketing campaigns to influence food sales (Kyriacou & Roupael, 2018; Pearson, 2010; Sijtsema et al., 2002; Steenkamp, 1989). To differentiate specific characteristics, researchers often categorise them into two primary categories: cues and attributes. 'Cues' are characteristics that can be experienced by human senses prior to buying or using a product, and 'attributes' are characteristics that cannot be observed or experienced prior to using products (Steenkamp, 1989). Figure 3 provides examples of 'cues' and 'attributes' relevant to fruit and vegetables.

² New Zealand was included in this review as food standards for both Australia and New Zealand are developed by the same statutory authority (Food Standards Australia New Zealand) and they have similar grocery markets. Appendix 1 contains additional information about why New Zealand was included in this review.

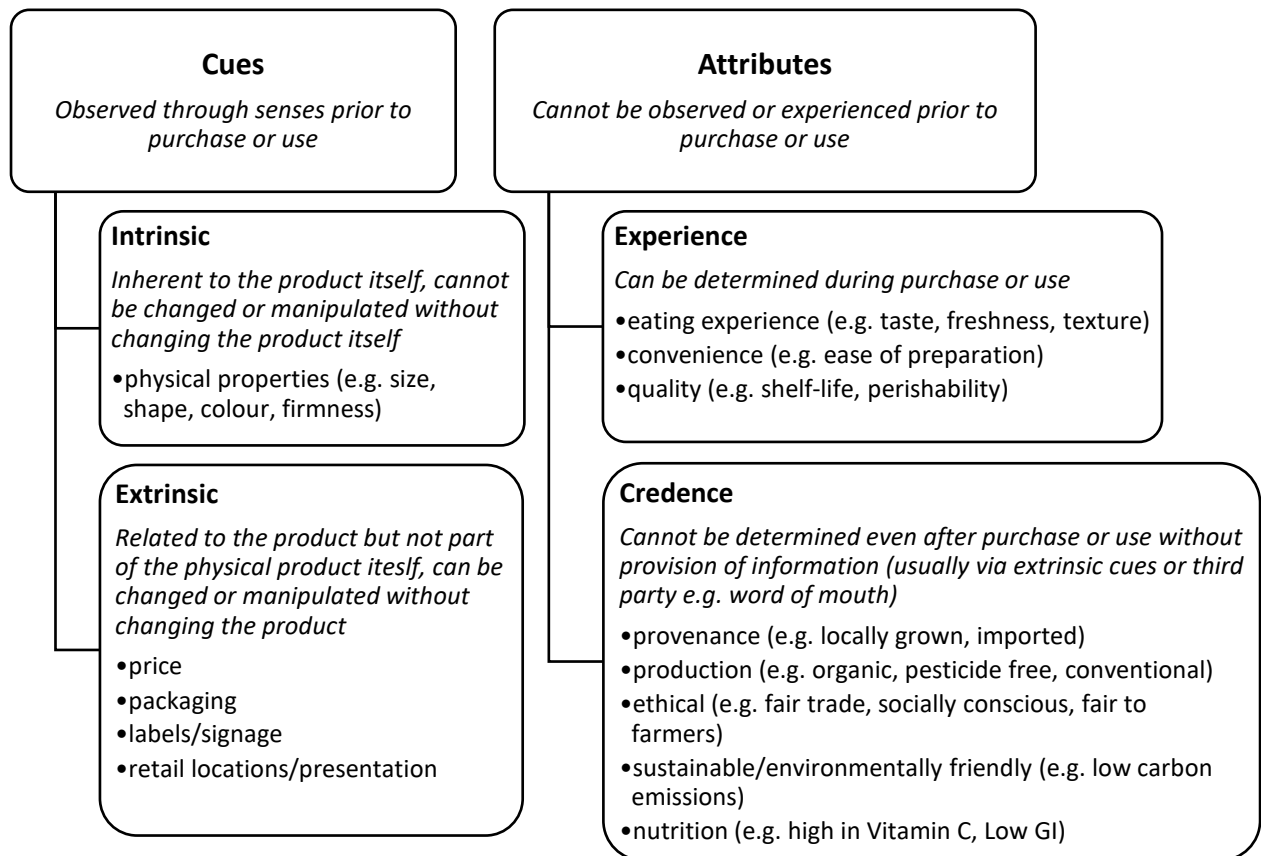


Figure 3: Examples of fresh fruit and vegetable characteristics (cues and attributes) as categorised in this review (Steenkamp, 1989, Oude Ophuis & Van Trijp, 1995).

Cues

Cues are generally experienced by human senses, such as touch, smell and sight. They are regularly used to guide selection of fruit and vegetables during procurement, as they can convey information about how likely products are to meet expectations for taste, quality and ripeness (Ballco & Gracia, 2022; Furst et al., 1996; Grunert, 2010; Steenkamp, 1989; Steenkamp, 1997). Fruit and vegetable cues can be intrinsic (part of the physical fruit or vegetable) or extrinsic (related to the fruit or vegetable but not physically part of it).

Intrinsic cues are inherent to the physical properties of fruit and vegetables. As such, they cannot be altered or manipulated without changing the fruit or vegetable itself (Steenkamp, 1989). For example, size, colour, shape, absence of visual defects (e.g. bruises/blemishes) and firmness are all examples of intrinsic cues. The only way to remove or change any of these cues is by physically changing the fruit or vegetable itself (e.g. by swapping it for

another, or cutting/peeling/processing). Extrinsic cues are *not* physically part of fruit and vegetables, and can include things like stickers, labels, prices, packaging, presentation and display (Oude Ophuis & Van Trijp, 1995). Extrinsic cues provide information about fruit and vegetables prior to purchase, use and consumption. However, unlike intrinsic cues, they can be very easily manipulated, as they are not part of the physical fruit or vegetable itself (Oude Ophuis & Van Trijp, 1995). As such, extrinsic cues receive a lot of attention in consumer behaviour literature, as they are easier to change and can influence how people think about fruit and vegetables during procurement or sale (Kyriacou & Roupael, 2018; Oude Ophuis & Van Trijp, 1995).

Attributes

Fruit and vegetable attributes cannot be experienced or observed prior to purchase, use, or consumption. There are two main types of attributes relevant to fruit and vegetables. *Experience* attributes are characteristics that people can sense or experience while eating, using or otherwise interacting with products (Steenkamp, 1989). These include flavour, taste, freshness, convenience, and texture, among others. *Credence* attributes are much more complex, and cannot be experienced by people without provision of external information (Steenkamp, 1989). Credence attributes relevant to fruit and vegetables include growing, production, transport, and storage methods; nutritional quality; and moral or ethical considerations related to the fruit or vegetable production, harvest or sale. Credence attributes are closely linked to extrinsic cues because extrinsic cues are often used to convey information about credence attributes. For example, fruit and vegetable labels, prices and signage are often used to convey information about credence attributes such as provenance, production methods or nutrition quality, to influence purchasing (Kyriacou & Roupael, 2018; Oude Ophuis & Van Trijp, 1995).

Linking cues and attributes to fruit and vegetable use

Perceptions of fruit and vegetables combine with purchase motives, values, and, individual, environmental, and contextual factors to determine decisions and behaviours related to fruit and vegetable use (Figure 4) (Ballco & Gracia, 2022; Furst et al., 1996; Grunert, 2010; Sijtsema et al., 2002; Steenkamp, 1989). Understanding how Australian and New Zealander

people perceive fruit and vegetable attributes therefore contributes to developing insights into how they understand and experience fruit and vegetable use more broadly. However, searches for systematic and scoping reviews on this topic yielded few results. Therefore, the objectives of this review were to determine:

1. *How research about Australian and New Zealander people's perceptions of fruit and vegetable characteristics is conducted and reported across different research disciplines.*
2. *How Australian and New Zealander people perceive fruit and vegetable characteristics*
3. *If there are any factors that commonly influence Australian and New Zealander people's perceptions of fruit and vegetable characteristics¹*

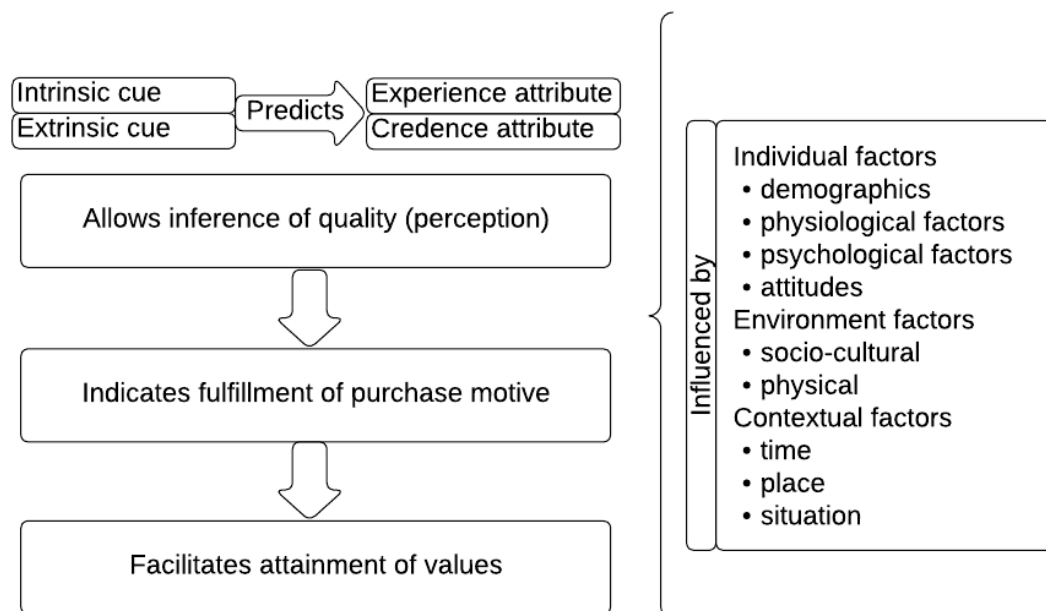


Figure 4: Consumer perception model adapted from Grunert (2010), Sijtsema et al. (2002), and Steenkamp (1989).

2.2.2 Methods

Detailed methods for this scoping review, including search terms can be viewed in the scoping review protocol (Appendix 1). Original research and systematic reviews published in academic journals, and grey literature identified through Google searches were considered for inclusion in this review. Searches included terms related to perceptions, fruit and vegetables, Australia and New Zealand, and ‘consumers’ or ‘purchasers’ of fruit and vegetables. Database searches were conducted in Scopus, Web of Science, Informit Data, Emerald Insight, EconLit, Medline, CINAHL, Business Source Complete, and PsychINFO to ensure that a broad range of discipline-specific research could be obtained. A research librarian assisted with development of search terms and identification of suitable databases. ProQuest Dissertations & Theses, and Google searches containing key terms were also used to identify any remaining literature not identified through database searches. Inclusion and exclusion criteria are provided in Figure 5. Initial searches were conducted in April-May 2022. Search alerts for google scholar were set up and monitored from April 2022 to the end my PhD candidature (July 2025) and the database search was repeated in Scopus in October 2025, as this is where the majority of articles were identified from in the first round of searching (Figure 7). No new articles were identified from the search alerts or the repeated database search in 2025. Due to the extensive handsearching required to identify articles from horticulture industry websites, these searches were not repeated. While it is possible that some articles may have been missed in this sample, it is unlikely that additional articles would significantly change the outcomes of the review, or the research contained within this thesis.

| Inclusion | Exclusion |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Research regarding perceptions of minimally ³ processed fresh or raw fruit and vegetable characteristics in Australia and New Zealand including people defined as consumers, purchasers, eaters or similar | Articles that study Australian or New Zealand fresh fruit and vegetables in foreign or international markets |
| Research where a second party's perspective on perception of fresh fruit and vegetable characteristics is provided (e.g., a mother talking about her child's perception of intrinsic fruit cues) | Articles reporting on purchaser/consumer perceptions of characteristics from the perspective or opinion of a third party (e.g., fruit grower, retailer) |
| Articles that directly measure, explore, or investigate perception, interpretation or understanding of fresh fruit and vegetable characteristics | Articles that report on any fruit or vegetable that is not considered fresh, raw or minimally processed, including products that are: <ul style="list-style-type: none"> • Canned • Frozen • Dried • Pre-cooked • Fermented, brined, or pickled. • Part of a meal (e.g., vegetable soup, fresh fruit salad pack with yoghurt and muesli) • Moderately-highly processed beyond what has been defined as minimally processed but still considered 'fresh' or 'raw' (e.g., cold-pressed juice, smoothie, cold soups) • Primarily consisting of fresh fruit or vegetables but containing non-fruit/vegetable ingredients (e.g., Caesar salad) |
| Research regarding both adult and child participants, provided the article meets above criteria | |

Figure 5: Inclusion and Exclusion Criteria

³ Fresh fruit and vegetables are subject to less labelling requirements than more processed fruit and vegetable products with longer shelf-lives. Frozen, dried, canned, and more processed fruit and vegetable products with longer shelf-lives were excluded, to ensure that the review findings focussed on fresh fruit and vegetable characteristics broadly, and did not become limited to or focussed on perceptions of food labelling information (Lea, Worsley & Crawford, 2005; Sumonsiri & Barringer, 2014).

Article screening & data synthesis

I screened all identified articles at both title and abstract, and full-text stage. My PhD supervisors acted as second reviewer for approximately 50% of these articles at each stage. Conversations were held between myself and my three supervisors to resolve any conflicts and ensure that screening was consistent at regular intervals. Eligible articles were imported into NVivo 13 (Lumivero, 2020) where I inductively coded the findings relevant to the review objectives line by line. This process resulted in development of 6 primary code categories including: 'product' (type of fruit/vegetable), 'characteristic' (intrinsic/extrinsic cue or experience/credence attribute), 'perception' (the participants' perception(s) as reported in the article), 'perception category' (themes inductively developed based on my interpretation of the data and how it related to perception theories described above), 'formed through' (any related information provided about how the perception may have been formed) and 'influenced by' (any related information provided about contextual or influencing factors specific to the study and/or perception). This process allowed me to synthesise the data from included articles in a way that went beyond perceptions themselves, to explore how they were developed and influenced by otherwise ignored factors such as those described in Thesis Sections 1.3-1.5. Figure 6 shows an example of how data was synthesised in this review. In this example, the participant believes that vegetables sold in supermarkets do not taste as good as produce from her father's garden. This was synthesised under the following categories: vegetables (product) sold by supermarkets (extrinsic cue), are perceived to have reduced flavour compared to home-grown and taste plastic-y (perception). This perception is referring to taste, and thus was categorised under 'eating experience' as the main perception category. The authors did not describe how this perception was formed, however the data provided alongside this excerpt showed that the participant was female, and had past experiences eating home-grown vegetables (influenced by). The complete data synthesis table is provided in Appendix 2.

| <p><i>"I've been brought up on organic veggies, 'cause my dad grows his own veggies and things, so I know that's fresh. And I notice the difference now that I'm living out of home, and buying my veggies from the supermarket. It just hasn't got that flavor...and it's very plastic-y. (Focus Group 8; female)" (Lea et al., 2005, p. 801)</i></p> | | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------------------|---------------------------------------------------------------|---------------------|----------------|---------------------------------------------------------------------|
| Citation | Product | Cue | Perception | Perception category | Formed through | Influenced by |
| Lea et al., 2005 | Vegetables | Retailer (supermarket) | Reduced flavour (compared to home grown) and tastes plastic-y | Eating experience | Not described | Individual factor: - Past experience - Demographics (females) |

Figure 6: Data synthesis process example

2.2.3 Results

The results for this review are reported according to the three review objectives.

Research across different disciplines (Review Objective 1)

This section describes the findings relevant to Review Objective 1: *Determine how research about Australian and New Zealander people's perceptions of fruit and vegetable characteristics is conducted and reported across different research disciplines.* Figure 7 shows a summary of the article retrieval and screening process used in this review. Thirty-two articles were included based on the inclusion and exclusion criteria, of which 50% (n=16) were published in academic journals, and 50% (n=16) were published within horticulture industry or government reports. Table 1 provides a description of the included studies including the type of publication; which discipline group(s) the research was conducted or reported by; the fruit and vegetable product and characteristics studied; and, how the research was conducted. To reduce reader burden, citations for the papers discussed in this section have been provided in Table 1 however will not be included in the following sections of text.

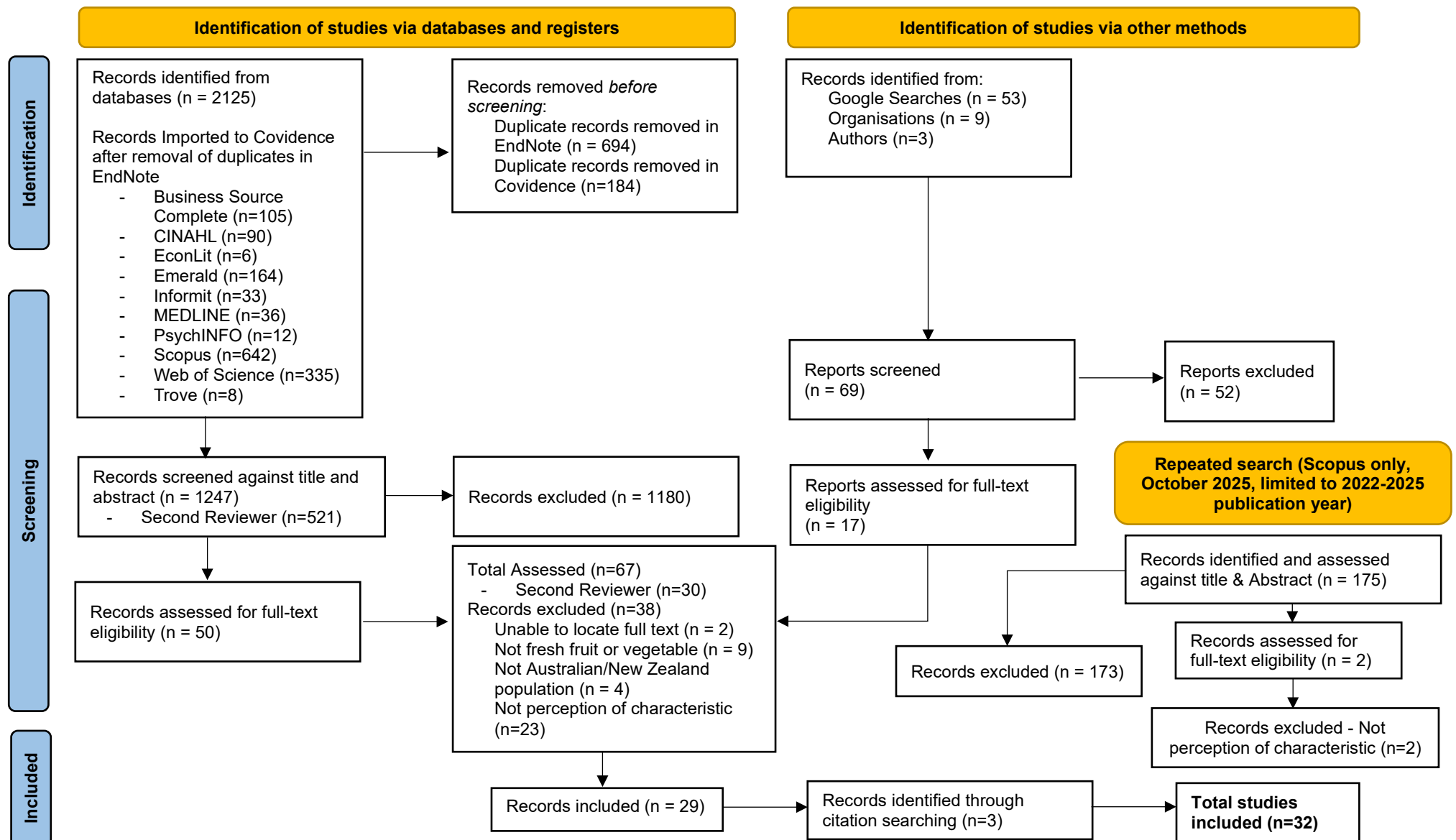


Figure 7: Article search and screening results, Adapted From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: 10.1136/bmj.n71. For more information, visit: <http://www.prisma-statement.org/>

Table 1: Description of studies included in scoping review

| Citation and description | Type | Discipline | Context | Fruit/ vegetable studied | Characteristic studied | Methodology/Methods |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------|----------|----------------------------|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Henderson et al., 2012 Location: Urban Australia (Syd, Mel, Bris) Population: Adults Sample size: n=43 (Female 67%) | Govt. report | Hort. Industry | Purchase | Sweet potato | N/a - exploratory | Qualitative (n=43) Focus group (n=26) Shop along In-depth interviews (n=17) Means-end chain approach Grounded theory Recruitment via market research company |
| McKinna, 1980 Location: Urban & Regional Australia (Vic) Population: Adults Sample size: n=40-60 (Female 100%) | Govt. report | Economics | Purchase | Fresh fruit and vegetables | N/a – exploratory | Qualitative (n=40-60) Focus group Recruitment via community organisations and through professional recruiting agency |
| Olsen, 1999 Location: Urban Australia (Syd, Bris) Population: Adults Sample size: n=53 (‘Concentration on females’) | Industry report | Horticulture Industry | Purchase | Tomato | N/a - exploratory | Qualitative (n=53) Focus group |
| McDougall, 2012 Location: Urban Australia (NSW) Population: Adults Sample size: Unclear (Female 100%) | Industry report | Horticulture Industry | Purchase | Lettuce | Appearance Presence of insects Label Production Organic Integrated pest management | Qualitative and quantitative Focus groups Short questionnaires Bagged lettuce stimuli |

| Citation and description | Type | Discipline | Context | Fruit/ vegetable studied | Characteristic studied | Methodology/Methods |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------|----------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| Witham & Colmar Brunton, 2016 Location: Australia (Nationwide) Population: Adults Sample size: Unclear | Industry report | Horticulture Industry | Purchase | 'Several commonly consumed vegetables' | Retailer Processing Packaging Production Organic Provenance Experience Freshness Value Quality Claims Australian grown Ready to eat "exotic" | Qualitative and quantitative Monthly online survey Recruitment via email |
| Hamblin & Colmar Brunton, 2020 Location: Urban Australia (Syd, Mel, Bris) Population: Adults Sample size: n=1032 (Female 51%) | Industry report | Horticulture Industry | Purchase | Nashi pear | Production Provenance Retailer Cost Packaging Display Experience Taste/texture Appearance | Qualitative (n=32) and quantitative (n=1000) Shop along Individual interviews Focus groups Online survey |
| Woodley & Pipicella, 2014 Location: Urban Australia (NSW, Vic, Qld) Population: Adults Sample size: n=36 (Female 75%) | Industry report | Horticulture Industry | Purchase | Cabbage Cauliflower Broccoli Pumpkin Celery Carrots | Appearance Size Packaging Processing | Qualitative Exit interviews (n=150) Consumer workshops (n=10) Fieldwork |

| Citation and description | Type | Discipline | Context | Fruit/ vegetable studied | Characteristic studied | Methodology/Methods |
|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------|------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| Colmar Brunton, 2014 Location: Urban & Regional Australia (NSW, Vic, Qld, WA, SA) Population: Adults Sample size: n=86 | Industry report | Horticulture Industry | Purchase | Fresh vegetables | Packaging | Qualitative Focus groups |
| Mulcahy, 2012 Location: Urban Australia (Mel, Adl, Hob) Population: Adults Sample size: n=938-947 (Female 57%) | Industry report | Horticulture Industry | Purchase | Fresh fruit & vegetables | Production Pest control methods | Qualitative (n=21-30) and Quantitative (n=917) Focus groups Online survey Recruitment via research panel (survey) and hand-chosen (focus groups) |
| FiftyFive5 & HortInnovation, 2020a Location: Urban Australia (Syd) Population: Adults Sample size: n=8 (Female 57%) | Industry report | Horticulture Industry | Purchase & Consumption | Apple varieties Modi Pink lady Fuji Red delicious Royal gala Jazz Kanzi Granny smith | N/a - exploratory | Qualitative (n=8) In-depth interview Sensory exploration of quality attributes |
| FiftyFive5 & HortInnovation, 2020b Location: Australia (Nationwide) Population: Adults Sample size: unclear | Industry report | Horticulture Industry | Purchase | Fresh fruits and vegetables | Production Provenance Local Seasonality Experience Freshness Convenience Claims (label) Health Cost Packaging | Quantitative Online survey (40 weeks, n=300-500 each week) |

| Citation and description | Type | Discipline | Context | Fruit/ vegetable studied | Characteristic studied | Methodology/Methods |
|-----------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------------|------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| Colmar Brunton, 2015 Location: Australia (Nationwide) Population: Adults Sample size: n=3739 (Female 67%) | Industry report | Horticulture Industry | Purchase | Potato | N/a – exploratory | Quantitative Online survey (monthly, n=300 each) |
| Ekman et al., 2014 Location: Urban Australia (Syd, Mel) Population: Adults Sample size: n=<64 | Industry report | Horticulture Industry | Purchase | Fresh fruit and vegetables | Production Integrated pest management (IPM) Organic Retailer Eco label Claims (label) | Qualitative Focus group |
| Ipsos New Zealand, 2014 Location: urban NZ (Auckland) Population: Adults Sample size: n=15 | Industry report | Horticulture Industry | Purchase & Consumption | Papaya varieties Rb1 Skybury Rb Fijian solo Phillipines papaya | N/a – exploratory | Qualitative (n=15) Focus groups Sensory test |
| Goldring, 2019 Location: Urban Australia (Mel, Syd) Population: Adults Sample size: n=38 | Industry report | Horticulture Industry | Purchase & Consumption | Fresh fruits and vegetables | Packaging Processing Retailer | Qualitative Interviews |

| Citation and description | Type | Discipline | Context | Fruit/ vegetable studied | Characteristic studied | Methodology/Methods |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|--------------------------|------------------------|------------------------------------------------------------------|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Adams et al., 2013 Location: Urban Australia (Mel, Syd, Bris) Population: Adults Sample size: n=64 | Industry report | Horticulture Industry | Purchase | Asian greens Capsicum | N/a - exploratory | Qualitative (n=64) Focus group (n=54) Assisted shop (n=10) |
| Dresler et al., 2017 Location: Urban NZ Population: Children Sample size: n=36 (Female 50%) | Journal article - peer reviewed | Public health & Business | Consumption | Fresh fruits and vegetables | N/a - exploratory | Qualitative (n=36) Group interviews Researcher memos and field notes Inductive thematic analysis Realist method Recruitment via child's school |
| Kirchhoff et al., 2011 Location: Urban Australia (Qld) Population: Adults Sample size: n=61 (Female 82%) | Journal article – peer reviewed | Marketing & Economics | Purchase & Consumption | Lettuce Tomato Carrots Capsicum Corn | Claims (label) Health Wellness | Qualitative Laddering interview Means-end-chain analysis |
| Lea et al., 2005 Location: Urban Australia (Mel) Population: Adults Sample size: n=50 (Female 72%) | Journal article – peer reviewed | Public health | Purchase & Consumption | Fresh fruit and vegetables | N/a - exploratory | Qualitative Focus groups Recruitment via community organisations/notices/businesses |
| Makhal et al., 2020 Location: NZ Population: Children Sample size: n=97 | Journal article – peer reviewed | Public health | Purchase & Consumption | Apple Pear Orange Lemon Carrot Capsicum Potato | Appearance Defect Shape Size Colour Blemish | Qualitative (n=97) Field notes (shopping activity) Focus group |

| Citation and description | Type | Discipline | Context | Fruit/ vegetable studied | Characteristic studied | Methodology/Methods |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------------|------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pearson, 2001 & Pearson, 2010 Location: Urban Australia (NSW) Population: Adults Sample size: n=320 | Journal article – peer reviewed | Marketing | Purchase | Fresh fruit and vegetables | Production Organic | Qualitative (n=20) and quantitative (n=300) In-depth interviews (n=20) Questionnaire (n=300) Convenience sample Recruitment via random distribution (mail) to 1000 households Descriptive statistics |
| (Godrich et al., 2019) Location: regional Australia (Tas, South West WA) Population: Adults Sample size: n=243 | Journal article – peer reviewed | Public health | Purchase & Consumption | Fresh fruit and vegetables | Production Regionally grown | Quantitative (n=243) 54-item survey (cross-sectional), Likert scales (importance rating of attributes) Statistical analysis - logistic regression, chi square test, Whitney u Recruitment via community organisations and businesses, online, media promotion |
| Richardson-Harman et al., 1998 Location: Urban & Regional NZ (North Island) Population: Adults & Adolescents Sample size: n=511 (Female 46-66%) | Journal article – peer reviewed | Horticulture Industry | Purchase & Consumption | Fresh fruit and vegetables | Production Pesticide use Fertilisers Genetic engineering Selective breeding Organic Irradiation | Quantitative (n=511) Questionnaire – Likert scales Statistical analysis – logistic regression, unrotated principle components analysis Recruitment via high schools and random distribution (mail) to school enrolment zone |
| Kent et al., 2020 Location: Regional Australia (Tas, South West WA) Population: Adults Sample size: n=243 (Female 73%) | Journal article – peer reviewed | Public health | Purchase & Consumption | Fresh fruit and vegetables | Production Regionally grown | Quantitative (n=243) Survey (%agreement with pre-defined statements) Statistical analysis – chi square test Recruitment via community organisations and businesses, online, media promotion |

| Citation and description | Type | Discipline | Context | Fruit/ vegetable studied | Characteristic studied | Methodology/Methods |
|----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------------------|------------------------|-----------------------------------------------------------------|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Makhal et al., 2021 Location: NZ (South Island) Population: Children Sample size: n=97 (Female 53%) | Journal article – peer reviewed | Marketing | Purchase & Consumption | Fresh fruit and vegetables Banana Pear Carrot Apple | Appearance defects | Qualitative (n=97) Focus groups – semi structured Inductive thematic analysis Recruited via primary school teachers |
| Wood et al., 2017 Location: Australia (Nationwide) Population: Adults Sample size: n=1208 (Female 50%) | Journal article – peer reviewed | Horticulture industry & Marketing | Purchase & Consumption | Potato | N/a - exploratory | Quantitative (n=1208) Online survey (52 item) Descriptive statistics Recruited via market research company |
| Owen et al., 2002 Location: Urban Australia (NSW) Population: Adults Sample size: n=24 | Journal article – peer reviewed | Economics & Horticulture industry | Purchase | Fresh fruit and vegetables | N/a – exploratory | Qualitative (n=24) and quantitative (n=14) Shop along Post-shopping questionnaire Recruitment through community businesses/organisations |
| Henryks & Pearson, 2010 Location: Urban Australia (ACT, NSW) Population: Adults Sample size: n=21 | Journal article – peer reviewed | Marketing | Purchase | Fresh fruit and vegetables | Production Organic | Qualitative (n=21) Semi-structured interview Researcher observation of products Grounded theory, inductive approach, triangulation |
| (Batt & Sadler, 1998) Batt & Sadler, 1998 Location: Urban Australia (WA) Population: Adults Sample size: n=260 | Journal article – not peer reviewed | Marketing & Horticulture industry | Purchase & Consumption | Apples | Labels | Quantitative (n=260) Structured questionnaire Recruitment via intercept interview at shopping centre Statistical analysis – Scheffe’s test, one-way analysis of variance |

| Citation and description | Type | Discipline | Context | Fruit/ vegetable studied | Characteristic studied | Methodology/Methods |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------------------|----------|----------------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| (Batt & Giblett, 1999) Batt & Giblett, 1999 Location: Urban & Regional Australia (WA) Population: Adults Sample size: n=118 (Female 76%) | Journal article – not peer reviewed | Marketing & Horticulture industry | Purchase | Fresh fruit and vegetables | Production Organic | Quantitative (n=118) Questionnaire Statistical analysis – Scheffe’s test Recruited via intercept interview at shopping centres |
| Batt & Lim, 1999 Location: Urban Australia (WA) Population: ‘Purchasers’ Sample size: n=270 | Journal article – not peer reviewed | Marketing & Horticulture industry | Purchase | Fresh fruit and vegetables | Production Hydroponically grown | Quantitative (n=270) Structured questionnaire Recruited via random selection at shopping centre Statistical analysis – Scheffe’s test |

As shown in Table 1, most studies were conducted or reported by the Horticulture industry (n=21), followed by public health (n=5) and business, marketing, or economics disciplines (n=5). For ease of reading, 'business, marketing, and economics disciplines' have been grouped as 'business disciplines' from here onwards. Only five studies were conducted in New Zealand with the remaining 27 studies being conducted in Australia. Most articles (n=22) were published between 2010-2019, a large proportion of which (n=9) were industry reports funded by HortInnovation Australia. Half of the included studies (n=17) did not provide enough detail to determine participant demographics, however of those that did, the majority (n=12) included a population group in which over 50% of participants identified as female. Only four studies included children in the population group, all of which were conducted in New Zealand. Most articles (n=19) focused on purchase contexts, with the remaining articles (n=12) investigating both purchase and consumption contexts, or consumption contexts only (n=1). All studies that focussed solely on purchase contexts were conducted or reported by either the Horticulture Industry (n=15) or Business disciplines (n=4) and primarily investigated perceptions of extrinsic cues. These studies primarily focussed on participants' thoughts and feelings specifically in the context of buying fruit and vegetables, whereas those that investigated both purchase and consumption context primarily investigated characteristics that influenced people's experience of eating (e.g. taste, flavour, texture), or preparing (e.g. convenience) fruit and vegetables. Of the 12 studies that explored both purchase and consumption contexts, four were conducted or reported by the public health discipline, two were conducted or reported by business disciplines, and the remaining six were conducted or reported by the Horticulture Industry.

How do Australian and New Zealander people perceive fruit and vegetable characteristics? (review objective 2)

This section reports the findings related to Review Objective 2: *determine how Australian and New Zealander people perceive fruit and vegetable characteristics*. A summary has been included for each characteristic type (intrinsic cue, extrinsic cue, experience attribute, and credence attribute), followed by a detailed report of perceptions for each individual characteristic, and any findings related to how the perception was formed or influenced.

Intrinsic cues - overview

Intrinsic cues can be observed by human senses prior to purchase, use, or consumption of fruit and vegetables (Steenkamp, 1989). They are highly relied upon by people to guide their expectations of taste and quality, and cannot be manipulated or altered without changing the fruit or vegetable product itself (Ballco & Gracia, 2022; Furst et al., 1996; Grunert, 2010; Steenkamp, 1989; Steenkamp, 1997). Intrinsic cues studied in the included articles were often related to visual appearance and included: size, shape, colour, firmness and presence/absence of bruises or blemishes. Australian and New Zealander people perceived intrinsic cues to guide their expectations for eating or using fruit and vegetables. These perceptions often related to the expected taste, quality, ripeness, enjoyment, convenience, freshness and value of fruit and vegetables. Some people also perceived intrinsic cues to convey information about credence attributes, including production methods, nutrition quality and food safety. The following sections describe these perceptions in greater detail.

Colour

Australian and New Zealander people considered the colour of fruit and vegetables to indicate how ripe, fresh, and tasty the produce would be when they eat it (Adams et al., 2013; Dresler et al., 2017; FiftyFive5 & Hort Innovation, 2020a; Hamblin & Colmar Brunton, 2020; Henderson et al., 2012; Makhal et al., 2020; McDougall, 2012; Owen et al., 2002). 'Bright', 'deep' or 'vivid' colours were considered to indicate that fruit and vegetables would be fresher, riper, tastier, and nutritionally superior to other fruit and vegetables (FiftyFive5 & Hort Innovation, 2020a; Henderson et al., 2012; Ipsos New Zealand, 2014; Makhal et al., 2020), while any colouring perceived to be 'yellowing', 'browning', 'dull', or 'fading', was

thought to indicate some risk to the nutritional quality, food safety, shelf-life, or overall value of the produce (FiftyFive5 & Hort Innovation, 2020a; Hamblin & Colmar Brunton, 2020; Makhal et al., 2020). One study found that most children perceived bruised and blemished produce to be unsafe or unhealthy, but that others perceived these cues to indicate sweet taste or higher nutritional value, which was formed through their previous experiences of baking and eating blemished produce with their grandparents (Makhal et al., 2021). Some individual colours were associated with health benefits. Orange-coloured fruit and vegetables in particular were perceived to indicate presence of vitamins that people linked to eye health (Colmar Brunton, 2014; Henderson et al., 2012). Several articles reported that people perceived visual appearance to be a misleading cue. These perceptions were stated to be formed in response to prior experiences of consuming produce that had been considered visually appealing but upon consumption was disappointing (McKinna, 1980; Olsen, 1999; Owen et al., 2002).

Size and Shape

‘Size’ and ‘Shape’ were perceived to indicate the potential eating experience, nutritional value and method of production of fruit and vegetables. Perceptions of ‘size’ and ‘shape’ varied considerably between different people and participant groups. For example, some children perceived irregularly-shaped fruit and vegetables to be difficult to consume and have a negative taste, while others did not feel that the shape of fruit and vegetables influenced the taste or nutrition quality, or felt that an unusual shape made them more ‘fun’ or desirable (Makhal et al., 2021; Makhal et al., 2020). Adults mostly perceived smaller-sized produce to be more convenient, tastier and less wasteful than ‘regular-sized’ produce (Colmar Brunton, 2014; FiftyFive5 & Hort Innovation, 2020a; Woodley & Pipicella, 2014), while larger-sized produce was perceived to be better value (Ipsos New Zealand, 2014; Makhal et al., 2021), wasteful (McDougall, 2012), less flavourful (Henderson et al., 2012; Ipsos New Zealand, 2014), and likely to be ‘sprayed with something (e.g. chemicals)’ to enhance the size (Olsen, 1999).

Firmness

Australian and New Zealander people perceived firmness to indicate the ripeness of a fruit or vegetable (Hamblin & Colmar Brunton, 2020; Makhal et al., 2021), the time within which it would need to be consumed once purchased (Ipsos New Zealand, 2014) and, to inform

their expectations about eating experience (Adams et al., 2013; Ipsos New Zealand, 2014; Makhal et al., 2021). Children formed their perceptions of the ‘firmness’ of fruit and vegetables through their observation of their parents’ behaviours when selecting fruit and vegetables for purchase (Makhal et al., 2021). Adults associated firmness with an expected eating outcome specifically in the context of selecting vegetables for meals or recipes (e.g. crunch of capsicum in a salad) (Adams et al., 2013).

Extrinsic cues - overview

Extrinsic cues are related to, but not directly part of fruit and vegetables. They can be easily manipulated, altered or changed, without changing the inherent properties of the physical fruit or vegetable itself (Kyriacou & Rouphael, 2018; Oude Ophuis & Van Trijp, 1995).

Extrinsic cues investigated in the papers reviewed included retail location and display; packaging and processing; cost; labels; and claims. These extrinsic cues were perceived to convey information about other extrinsic cues, such as the cost of the fruit or vegetable; the expected experience of eating or using the produce including the expected convenience, freshness and quality; and credence attributes, such as food safety, nutritional quality, and production methods used to grow the fruit or vegetable. Sometimes, extrinsic cues were linked directly to concepts of trust, values, or beliefs, such as the ability of fruit or vegetables to fulfil desires such as being ‘ethically conscious’, ‘environmentally sustainable’, or eating ‘natural’ or ‘exclusive’ foods.

Retail location and display

Australian and New Zealander people formed perceptions of the places and ways that fruit and vegetables were presented to be sold, which influenced their expectations for how their purchase of those fruits or vegetables would, or would not satisfy their expectations for freshness, quality, flavour and cost. People in the included studies formed perceptions about how the location from which they procured fruit and vegetables would support their desire to behave in alignment with higher-order values such as supporting local farmers, buying ethically produced food, eating healthy and nutritious foods, and supporting environmental sustainability.

Perceptions of retail locations including supermarkets, greengrocers, and markets⁴ were often discussed in the included articles, however there was little consistency between the perceptions across different studies. Some Australian and New Zealander people perceived fresh fruit and vegetables sold in supermarkets to be convenient (Ipsos New Zealand, 2014; Lea et al., 2005; Woodley & Pipicella, 2014), hygienic (Ekman et al., 2014; Ipsos New Zealand, 2014), good quality (Ipsos New Zealand, 2014) and cheaper than other retailers (McDougall, 2012; Woodley & Pipicella, 2014). However others perceived fresh fruit and vegetables sold in supermarkets to be less flavoursome (Lea et al., 2005), less fresh (Goldring, 2019; Woodley & Pipicella, 2014), poor quality (Adams et al., 2013), more expensive (Ipsos New Zealand, 2014), unfair to farmers (Mulcahy, 2012), stored for long periods of time (Goldring, 2019), and wasteful (Woodley & Pipicella, 2014). Fresh fruit and vegetables sold by greengrocers were perceived to be bigger in size (Hamblin & Colmar Brunton, 2020), less likely to be processed (Woodley & Pipicella, 2014), less convenient (Hamblin & Colmar Brunton, 2020), cheaper (Hamblin & Colmar Brunton, 2020; Ipsos New Zealand, 2014), more expensive (Goldring, 2019), more environmentally friendly (Goldring, 2019), fresher (Hamblin & Colmar Brunton, 2020; Woodley & Pipicella, 2014), last longer (Goldring, 2019), and of better (Hamblin & Colmar Brunton, 2020), or worse (Ipsos New Zealand, 2014) overall quality than other retailers. Fruit and vegetables sold at markets were perceived to be locally grown, have come ‘straight from the farm’, or, to have been ‘organically produced’ (Ekman et al., 2014; Henryks & Pearson, 2010; Ipsos New Zealand, 2014). Fruit and vegetables available for purchase from markets were also perceived to be more ‘natural’ (Ipsos New Zealand, 2014); more (Ipsos New Zealand, 2014; Witham & Colmar Brunton, 2016; Woodley & Pipicella, 2014), or less fresh (Witham & Colmar Brunton, 2016); more wasteful (Woodley & Pipicella, 2014); and cheaper than fruit and vegetables available for purchase from other retailers (Ipsos New Zealand, 2014; Woodley & Pipicella,

⁴ For the purpose of this review, ‘supermarket’ refers to any mainstream fresh produce retailer. Coles, Woolworths, IGA, Foodland and Aldi are examples of retailers that are considered to be supermarkets in this review. ‘Greengrocer’ has been used to define any specialty or independent (i.e. not a mainstream retailer as defined above) fruit and vegetable store. ‘Market’ refers to any fresh produce market selling fruit and vegetables, including farmers markets.

2014). These varied perceptions show very limited consistency in how Australian people experience food retail locations, highlighting that they may be context-specific.

The **display and presentation** of fruit and vegetables within these environments influenced how people perceived fruit and vegetable characteristics more broadly. For example, supermarket displays that used coloured lighting, ice, or water sprays were perceived to be deceiving and to indicate that produce purchased from these displays would spoil quickly in the home (Colmar Brunton, 2014; McKinna, 1980). Low levels of stock, or empty spaces on shelving or displays were considered to indicate that the produce remaining within the display may be of poor quality, as the 'better quality' fruit and vegetables had already been purchased by other shoppers (Hamblin & Colmar Brunton, 2020). Some people linked certain types of displays to health risks. For example, pick 'n' mix salad bars were considered to be unhygienic, while fruit and vegetable displays in refrigerated units were considered to be fresher, and less likely to be contaminated (Colmar Brunton, 2014). 'Presence of bugs' was investigated in two studies, both of which specifically investigated perceptions of pest-management strategies (Ekman et al., 2014; McDougall, 2012). Some participants believed that presence of bugs in or around a fruit or vegetable displays indicated that the produce was unlikely to have been grown using chemicals such as insecticides, while others perceived presence of bugs to indicate that the produce was contaminated or posed a health risk (Ekman et al., 2014; McDougall, 2012). Perceptions of bugs were reported to have been influenced by participants' demographics, knowledge of vegetable growing practices, and social norms and group pressure (Ekman et al., 2014; McDougall, 2012).

Packaging and Processing⁵

Packaging surrounding fruit and vegetables was perceived to increase convenience (Colmar Brunton, 2014) and cost (Goldring, 2019; Hamblin & Colmar Brunton, 2020), and, maintain freshness and protect fruit and vegetables from damage when purchasing (Hamblin & Colmar Brunton, 2020; Woodley & Pipicella, 2014). Some participants perceived packaging to be deceiving, believing that packaging acted as a visual barrier, reducing their ability to assess the visual appearance of the produce and hence limiting their capacity to make an informed choice about whether to purchase it or not (Hamblin & Colmar Brunton, 2020; McKinna, 1980). People who were driven by values related to environmental sustainability perceived packaging on fruit and vegetables to be wasteful and excessive, however compostable packaging types were perceived to be good for the environment (Colmar Brunton, 2014; Hamblin & Colmar Brunton, 2020). People also perceived packaging to improve the safety of fruit and vegetables, however this was only discussed in the context of the Covid-19 pandemic (Hamblin & Colmar Brunton, 2020).

Pre-packaged forms of fruit and vegetable products were perceived to be wasteful, as people felt they were 'forced' into buying a larger amount of fresh produce than they could realistically use before it spoiled (Colmar Brunton, 2015; McKinna, 1980). People also believed that these products contained lower-quality fruit and vegetables that retailers were trying to 'get rid of' by 'hiding' them behind the packaging that contained the produce (Colmar Brunton, 2014; Dresler et al., 2017; FiftyFive5 & Hort Innovation, 2020a; McDougall, 2012; McKinna, 1980; Olsen, 1999; Woodley & Pipicella, 2014). However, some people also perceived that pre-packaged produce was more convenient, primarily due to a belief that the fruit and vegetables were pre-washed, and 'ready-to-use' (Ekman et al., 2014; FiftyFive5 & Hort Innovation, 2020a; McDougall, 2012; Olsen, 1999; Witham & Colmar Brunton, 2016).

⁵ 'Packaging' refers to the packaging surrounding fruit and vegetables (e.g. plastic wrapping, cardboard boxes, protective sleeves). Processing refers to the methods used to 'process' fruit and vegetables into a new product. 'Pre-packaged' refers to fruit and vegetables sold within packages e.g. 1kg pre-packaged bag of apples, punnet of strawberries, soup-pack vegetables, salad mix lettuce in a bag, which may or may not be processed (e.g. washed, peeled, chopped). 'Pre-cut' refers to fruit and vegetables that have been altered in some way prior to sale e.g. chopped into smaller portions, peeled, grated, sliced etc.), they are likely to be packaged, however when a perception was considered to be related to the packaging on the product as opposed to the fruit/vegetable itself, this was reported under 'packaging'.

Most studies reported that people perceived pre-packaged fruit and vegetable products to be expensive or overpriced compared to fruit and vegetables sold individually (Colmar Brunton, 2014; Goldring, 2019; Olsen, 1999), however one study found that people from low-income households perceived these products to be cheaper than other forms of fruit and vegetables (Goldring, 2019). Pre-cut fruit and vegetables were perceived to be more convenient, and easier to transport and store than whole fruit and vegetables (Witham & Colmar Brunton, 2016; Woodley & Pipicella, 2014). However, they were also perceived to be less fresh (Goldring, 2019; Ipsos New Zealand, 2014; Witham & Colmar Brunton, 2016; Woodley & Pipicella, 2014), and a 'waste of money' or more expensive than whole fruit and vegetables (Colmar Brunton, 2014; Goldring, 2019; Woodley & Pipicella, 2014). Some people also perceived pre-cut fruit and vegetables to be less nutritious than whole forms (Wood et al., 2017).

Cost

Cost of fruit and vegetables was considered to convey information about other attributes and the appropriateness of the fruit or vegetable for different usage occasions. Cheaper, or lower-cost fruit and vegetables were considered to be more suitable for regular, everyday use (Colmar Brunton, 2014), while more expensive fruit and vegetables were considered to be a 'treat' or only suitable for occasional purchase and consumption, usually in alignment with a special social event or occasion (Colmar Brunton, 2014; Hamblin & Colmar Brunton, 2020; Ipsos New Zealand, 2014). One study also identified that people often used 'reduced cost' as a proxy for 'in season', believing that any produce that was sold at a cheaper price than they anticipated was likely to be 'in season' (McKinna, 1980).

Labels and Claims

Labels on fruit and vegetables were often discussed in the context of the claims or certifications that they contained. For example, people perceived fruit and vegetables carrying labels that contained words like 'superfood' to be more expensive (Hamblin & Colmar Brunton, 2020). Health and production related labels and claims were perceived to be untrustworthy, and there was a common belief among people in the included studies that these labels or certifications had been 'paid for' by the producer or retailer, thus

making them unreliable (Ekman et al., 2014; McDougall, 2012; Pearson, 2001). While some people found descriptive labels helpful for making purchase decisions, others found that labels, especially stickers on apples, were annoying or not useful when making purchases (Batt & Giblett, 1999; Hamblin & Colmar Brunton, 2020).

Experience attributes – overview

Taste/flavour of fruit and vegetables was the only experience attribute reported on in included articles and was perceived to indicate how the produce was grown (Ipsos New Zealand, 2014), how fresh it was (FiftyFive5 & Hort Innovation, 2020a), and how likely it was to fulfil peoples' desire to 'eat healthy food' (FiftyFive5 & Hort Innovation, 2020a; Henderson et al., 2012; Kirchhoff et al., 2011).

Credence attributes – overview

Several credence attributes were explored in the articles included in this review. These included: production methods, provenance and nutrition. These attributes were perceived to convey information about: other credence attributes (e.g. food safety and environmental sustainability); expected experience of eating or using the produce (e.g. freshness, quality and convenience); how likely intrinsic cues would be present, (e.g. presence of blemishes on organically grown produce); expectations about the presence of extrinsic cues (e.g. how much the produce would cost); ideals and beliefs about how natural the produce was; values about health, environmental sustainability and ethical food production; and, feelings of trust, mistrust, and guilt.

Production ⁶

Organic production was one of the most often investigated credence attributes. It was the only characteristic for which perceptions were consistent across most of the studies included in the review. Organically grown fruit and vegetables were perceived to be more expensive (Batt & Giblett, 1999; Ekman et al., 2014; Ipsos New Zealand, 2014; Mulcahy,

⁶ 'Production' refers to the way that fruit and vegetables are grown, including different growing methods or approaches (e.g. organic), application of different substances (e.g. chemicals, pesticides, fertilizers).

2012; Olsen, 1999; Pearson, 2001; Pearson, 2010), fresher or better quality (Pearson, 2001; Pearson, 2010; Witham & Colmar Brunton, 2016), more nutritious (Batt & Giblett, 1999), taste better (Mulcahy, 2012; Pearson, 2001; Pearson, 2010) (Batt & Giblett, 1999), and to be less visually appealing (Henryks & Pearson, 2010; Mulcahy, 2012; Olsen, 1999), than conventionally-grown produce. Australian and New Zealander people also believed that organically produced fruit and vegetables were more ethical (Ipsos New Zealand, 2014), better for the environment (Ekman et al., 2014; Pearson, 2001), and better for their personal health (Batt & Lim, 1999; Ekman et al., 2014; Pearson, 2010). Some people did not trust fruit and vegetables labelled or identified as 'organically grown', and were suspicious about the production methods 'really' used (Ekman et al., 2014; Mulcahy, 2012). Other perceptions of production methods included perceptions of chemical use, hydroponic growing methods, Integrated-Pest-Management, and use of irradiation among others, and can be viewed in Appendix 2.

Provenance⁷

Provenance included fruit and vegetables that were identified as being grown at home, 'locally', in Australia or New Zealand (i.e. the 'home country' of the participants), or internationally. Home-grown produce was perceived to be tastier and fresher than store bought produce by children who had previously experienced eating or growing fruit and vegetables at home (Makhal et al., 2021). 'Locally grown' was not clearly or consistently defined across the included studies, however one study found that 'locally grown' was perceived to mean 'grown within my local region' in Australia (Kent et al., 2020). Regardless of how 'locally grown' was defined, fruit and vegetables categorised as 'locally grown' were perceived to be: expensive (Godrich et al., 2019), fresh or recently picked (FiftyFive5 & Hort Innovation, 2020a; Godrich et al., 2019), and, supportive to local farmers and communities (Godrich et al., 2019). Similarly, people in the included studies perceived fruit and vegetables grown in their home country (Australia or New Zealand) to be fresher, support their local farmers and the local economy (Colmar Brunton, 2014; Ekman et al., 2014;

⁷ 'Provenance' refers to the geographical area in which the fruit or vegetable was or was perceived to have been grown.

FiftyFive5 & Hort Innovation, 2020a, 2020b; Hamblin & Colmar Brunton, 2020; Ipsos New Zealand, 2014), and to be safer and more trustworthy than produce grown elsewhere (Colmar Brunton, 2014; Ipsos New Zealand, 2014; Witham & Colmar Brunton, 2016). These perceptions were particularly prominent during or shortly after national events which impacted fruit and vegetable supply, such as the Covid-19 pandemic, the Australian bushfires in early 2020, and a food recall on pre-packaged lettuce following an outbreak of foodborne illness in early 2016 (FiftyFive5 & Hort Innovation, 2020b; Witham & Colmar Brunton, 2016). Imported produce was often discussed in the included studies, and people perceived this attribute to convey information about how the fruit or vegetable was grown (Ipsos New Zealand, 2014), how it would taste (Ekman et al., 2014; Ipsos New Zealand, 2014), and its environmental impact (Colmar Brunton, 2014). For example, people who lived in New Zealand perceived fruit imported from smaller, but nearby countries like Fiji to be produced with minimal chemicals by small, locally owned farms, which they expected to taste better than fruit obtained from other nearby countries such as Australia (Ipsos New Zealand, 2014). Australian and New Zealander people held negative beliefs about produce grown overseas, especially if they believed it was grown in China. People in the included studies perceived this produce to be tasteless, likely to be contaminated, and, subject to unnatural treatments and less strict quality and food safety standards than produce grown in their home country (Colmar Brunton, 2014; Ekman et al., 2014; Hamblin & Colmar Brunton, 2020; Ipsos New Zealand, 2014).

Nutrition

Interestingly, perceptions of nutrition as a credence attribute were mostly investigated for potatoes and sweet potatoes. All perceptions identified for this attribute were related to health values. People (mostly women) associated specific nutrients within vegetables (mostly fibre) with their health values and motivations, such as losing weight, and reducing bowel discomfort (Henderson et al., 2012; Kirchhoff et al., 2011). Nutrition attributes of sweet potatoes such as low Glycaemic Index and carbohydrate content, were associated with health outcomes that people viewed positively such as 'lose weight', while nutrition attributes of white potatoes, such as 'higher carbohydrate content' were associated with health outcomes that people viewed negatively such as 'gaining weight' (Henderson et al., 2012; Wood et al., 2017).

Factors that influence Australian and New Zealander people's perceptions of fruit and vegetable characteristics (review objective 3)

This section summarises findings relevant to data synthesised under 'formed by' and 'influenced by' in this review, and provides insight into review objective 3: *determine if there are any factors that commonly influence Australian and New Zealander people's perceptions of fruit and vegetable characteristics*. Where relevant to perceptions being discussed, these findings have already been reported alongside them in the preceding sections. Several included studies discussed or mentioned factors influencing perceptions of fruit and vegetable characteristics, which can be viewed in Appendix 2. Individual factors including past experience eating or purchasing fruit and vegetables (Dresler et al., 2017; Hamblin & Colmar Brunton, 2020; Henderson et al., 2012; Ipsos New Zealand, 2014; Lea et al., 2005; Makhal et al., 2021; Makhal et al., 2020; Owen et al., 2002), values and beliefs (Colmar Brunton, 2014; Hamblin & Colmar Brunton, 2020; Kirchhoff et al., 2011; Lea et al., 2005; Makhal et al., 2021; McDougall, 2012; Woodley & Pipicella, 2014), knowledge (Ekman et al., 2014), personality (Colmar Brunton, 2014; FiftyFive5 & Hort Innovation, 2020a; Kirchhoff et al., 2011; Woodley & Pipicella, 2014), role in food procurement/preparation (Godrich et al., 2019; McKinna, 1980), purchase preferences (Pearson, 2001; Pearson, 2010), physiological health (Henderson et al., 2012), and income (Goldring, 2019), were identified as potential influences on the perceptions discussed in this scoping review. Socio-cultural factors including social pressure (Ekman et al., 2014; Makhal et al., 2021; McDougall, 2012), and family practices (Makhal et al., 2021; Makhal et al., 2020) were also identified as potential influences on perceptions. Contextual influences such as specific usage occasions (e.g. family BBQ, birthday event, evening meal) (Adams et al., 2013; Colmar Brunton, 2014; FiftyFive5 & Hort Innovation, 2020a; Woodley & Pipicella, 2014), specific household types (e.g. children, couple with no children) (Colmar Brunton, 2014; Henderson et al., 2012; McDougall, 2012; Olsen, 1999) and, local effects of national and international events such as Covid-19 (FiftyFive5 & Hort Innovation, 2020a; Hamblin & Colmar Brunton, 2020), food safety recalls (Witham & Colmar Brunton, 2016), and natural disasters (FiftyFive5 & Hort Innovation, 2020a) were also identified to influence how people perceived fruit and vegetables. Interestingly, perceptions of fruit and vegetable characteristics differed considerably when people were asked to consider them in different environments.

Specifically, different retail environments were identified to influence people's perceptions and expectations of fruit and vegetable characteristics, however researchers seldom provided enough detail or information to draw meaningful insights into how or why this occurred.

2.2.4 Discussion

This scoping review sought to determine how Australian and New Zealander people perceive fruit and vegetable characteristics, how this research is conducted and reported across different disciplines, and if there are any common factors that influence these perceptions. The review provides insights into how Australian and New Zealander people perceive fruit and vegetable characteristics and highlights several gaps in our understanding about fruit and vegetable use more broadly. This discussion will focus on these gaps and the implications for future research, policy and promotion of fruit and vegetables in Australia, in alignment with the overarching goal of this thesis.

The findings from this scoping review suggest that Australian and New Zealander people's perceptions of fruit and vegetable characteristics are highly context dependant. That is, several individual and socio-cultural factors were identified to have potentially influenced the perceptions reported in included articles, which is consistent with the literature reported in Thesis Sections 1.3 and 1.4. However, researchers seldom explored how perceptions were developed, and there was little discussion about how these perceptions influenced people's behaviours or choices related to fruit and vegetable use. This is a known limitation of consumer behaviour approaches to understanding food related behaviours which social practice theory (previously described in Section 1.5) has been proposed to overcome (Caruana et al., 2016; Delormier et al., 2009; Hunt et al., 2023; Karademir Hazır, 2024; Revilla & Salet, 2018). Two studies conducted in New Zealand did expand on these findings to explain how children's perceptions were formed. Specifically, children in these studies formed their perceptions of suboptimal fruit and vegetables primarily through their previous experiences growing, cooking, using and eating them with family, friends and grandparents (Makhal et al., 2021; Makhal et al., 2020). Food choices are embedded within people's unique personal histories, and evolve over time in response to changes that occur across the life course (Sobal & Bisogni, 2009). Therefore, to understand how perceptions

about fruit and vegetables are formed, it is important to consider how past events have influenced people's current understanding and experiences of food choices, and the contextual factors that influence these as they occur (Castelo et al., 2021; Sobal & Bisogni, 2009). Life course perspectives have been applied in previous research to provide insight into how food choices evolve and change over time, and have been useful for developing deeper understanding about fruit and vegetable use beyond individual factors in American populations (Devine et al., 1998; Devine et al., 1999; Sobal & Bisogni, 2009; Wethington & Johnson-Askew, 2009). However, as described previously, factors that influence food choices are highly context dependent, and likely to change across different geographical and socio-cultural settings. Exploring fruit and vegetable use through a life course perspective may provide insight into how Australian people develop their understandings and experiences of fruit and vegetables in response to significant events and transitions. However, to my knowledge, there is a lack of research in Australia that explores how life course events and experiences influence fruit and vegetable use. Determining how and when these events influence fruit and vegetable use may identify novel opportunities for targeted interventions that can influence fruit and vegetable use when habits and routines are in a natural state of change (such as leaving the family home, having children, or gaining fulltime employment), potentially making them more effective in the long term.

An important finding from this review is that food retail environments, such as supermarkets, greengrocers and markets, and the methods of display used within these environments, altered how people perceived fruit and vegetable characteristics. This finding is consistent with existing research which has found that the environment in which food is procured influences how people think about and interact with foods both within that environment (e.g. supermarket/greengrocer), and subsequently within the home (Mattioni et al., 2020; O'Neill et al., 2024). As such, there may be scope to develop and implement interventions that alter the environments in which fruit and vegetables are procured from, for example through manipulating the environments to align with positive meanings people attach to fruit and vegetable procurement to encourage more positive interactions with fruit and vegetables (Mattioni et al., 2020). However, there is a paucity of research that investigates how food retail environments influence thoughts, feelings and experiences of

fruit and vegetable use, and to my knowledge, none in Australia. This highlights a significant gap in the literature, which this research will address in subsequent chapters.

While not the focus of this review, perceptions of fruit and vegetable characteristics often related to themes of 'mistrust', 'deception' and 'dissatisfaction', particularly for extrinsic cues and credence attributes. This raises concerns for fruit and vegetable interventions as mistrust for food retailers and manufacturers can lead to mistrust of entire food systems, potentially impacting fruit and vegetable procurement (Tonkin et al., 2016; Wang et al., 2021; Wu et al., 2021). Many people around the globe are sceptical of food labels and certifications, particularly when they convey information about credence attributes, and often find them to be misleading, untrustworthy, and unreliable (Hoek et al., 2017; Steenkamp, 1989; Tonkin et al., 2016). As identified in this review, this is often because they feel they are being 'manipulated' into making a purchase, and that the retailers are 'paying for labels' they have not necessarily earned through positive growing or selling practices. When people do not trust the sources providing information to them (e.g. food retailers), they often avoid interacting with those sources, ultimately boycotting them in favour of another retailer or producer they feel they can trust (Garner, 2022; Toussaint et al., 2021; Wertheim-Heck et al., 2014). The distrust of Australian food retailers and display methods for fruit and vegetables identified in this review therefore suggest there may be flow-on effects for fruit and vegetable retail more broadly, potentially leading to reduced procurement of fruit and vegetables due to avoidance of distrusted retailers.

2.2.5 Summary: Australian & New Zealander Perceptions of fruit and vegetable characteristics

This scoping review identified a broad range of research about Australian and New Zealander perceptions of fruit and vegetable characteristics. While there is considerable information about how Australian people perceive fruit and vegetable characteristics, there is little information available about how these perceptions are formed, and how socio-cultural and environmental factors influence these perceptions, despite indication that they might. Findings from the review also suggest that food retail environments influence how Australian people think about fruit and vegetables, which lends support to the practice of fruit and vegetable procurement and food retail environments as a key focus of this research. Furthermore, findings suggest that mistrust between the Australian public who

purchase and consume fruit and vegetables, and retailers who they procure them from, could lead to negative perceptions of fruit and vegetables. As such, any future research regarding fruit and vegetable procurement should consider the relationship between the Australian public and retailers and the implications of this relationship for fruit and vegetable interventions. Finally, life course events and experiences may impact how people think about and use fruit and vegetables across the lifespan, however there is little research that explores this in Australia. As such, the following sections of this chapter provide evidence summaries of published literature about the influence of food retail environments on food choices, and how life course events and experiences influence fruit and vegetable use.

2.3 Food retail environments as a mediator of healthy diets

Procurement is a key practice of food use and can influence what and how fruit and vegetables are eaten in domestic settings (Mattioni et al., 2020; O'Neill et al., 2024). In Australia, fruit and vegetable procurement primarily refers to purchase, as most people buy fruit and vegetables from supermarkets (O'Kane & Pamphilon, 2020; Sacks et al., 2024). However, limiting investigations of procurement to purchase overlooks the role of other forms of fruit and vegetable procurement that are not reliant on monetary exchange. For example, people can obtain fruit and vegetables through non-financially bound means, such as receiving gifts or donations, swapping produce, or participating in community supported agriculture, among others. As such, for the remainder of this thesis, 'procurement' refers to any means for bringing fruit and vegetables into the home, such as shopping for, buying, obtaining, accepting, harvesting, or collecting fruit and vegetables.

Global research has identified procurement of food to influence how and what foods are used within domestic households and college settings (Mattioni et al., 2020; O'Neill et al., 2024; Puljiz, 2024; Thomas & Cankurt, 2024; Vanderlee et al., 2018). Furthermore, there is emerging evidence to suggest that where foods are procured from (e.g. market vs supermarket), influences what and how much food is procured, subsequently influencing household food consumption and waste (Mattioni et al., 2020; O'Neill et al., 2024; Puljiz, 2024; Thomas & Cankurt, 2024). Similarly, global research has identified in-store food retail environments (e.g. layout, signage, staff, lighting, displays), and the broader neighbourhood

food retail environment (e.g. density and accessibility of food retail stores) to influence procurement of healthy foods, such as fruit and vegetables (Bagheri et al., 2021; Ni Mhurchu et al., 2013; Thorndike et al., 2017; Wertheim-Heck & Spaargaren, 2016; Wertheim-Heck et al., 2014).

While there is increasing recognition that food retail environments influence food choices, interventions targeting fruit and vegetable retail environments have had mixed effects globally, suggesting that our understanding of *how* these environments influence food choices may be limited (Friel et al., 2015; Glanz et al., 2012; Vogel et al., 2019; Wolfenden et al., 2021). Furthermore, there are few studies investigating the role of fruit and vegetable interventions in food retail environments in Australia (Briggs, 2024). As such, there is a need to determine how food retail environments influence fruit and vegetable use in Australia. Therefore, the aim of this evidence summary is to investigate what is already known about how food retail environments influence food procurement and subsequent use. The literature summarised in the remainder of this section is relevant to food in general, and not specific to fruit and vegetables, as there is a paucity of literature which investigates the influence of food retail environments on fruit and vegetable procurement specifically.

Food environments are highly complex and can be described as *'the interface that mediates people's food acquisition and consumption within the wider food system'* (Turner et al., 2018, p. 95). *Food retail* environments provide an avenue to buy or procure foods with varying degrees of associated preparation required (Winkler et al., 2020). Food retail environments which serve ready-to eat meals, such as restaurants, fast food outlets, street vendors, vending machines, and work or school cafeterias are examples of food retail environments where very little (if any) preparation is needed to move food from ingredient form to an edible form (Winkler et al., 2020). Food retail environments such as supermarkets, greengrocers and markets require a much greater level of preparation which usually occurs outside of the location in which the food is procured (Winkler et al., 2020). These grocery-type stores are where most people procure fruit and vegetables from, particularly in Australia (O'Kane & Pamphilon, 2020; Sacks et al., 2024). Food service environments which predominantly serve ready to eat meals are hereon referred to as *'food service environments'*, while those that serve predominantly ingredients, under a grocery-like model are referred to as *'food retail environments'*.

This research focuses on grocery-type *food retail* environments, which have a strong influence on diet behaviours and health outcomes (Ni Mhurchu et al., 2013; Turner et al., 2018). Supermarkets in particular have been argued to influence food choices through their ability to condition social practices related to food purchases (Toussaint et al., 2021). Because of this, supermarket entities have been labelled ‘gatekeepers of consumers’, acting as the middleman between food users and food producers (Nakandala et al., 2020; Pulker et al., 2018; Toussaint et al., 2021). Supermarkets hold considerable power over the supply and sale of foods, which gives these institutions considerable control over what foods are available for purchase and how they are sold (Pulker et al., 2018; Wardle & Baranovic, 2009). As such, they play a role in conditioning societal expectations for food taste, quality and prices (Friel et al., 2015; Glanz et al., 2012; Halloran et al., 2014; Pulker et al., 2018; Wardle & Baranovic, 2009). Furthermore, researchers have suggested that supermarkets hold power over the ‘space’ in which people are expected to perform food procurement practices, and that this notion of ‘space’ may work against healthy food choices (Bennett et al., 2024a; Mattioni et al., 2020; Sacks et al., 2024; Willett et al., 2019). These findings are of high importance as most Australian people procure the majority of their food from supermarkets (Sacks et al., 2024). However, there is very little public health research examining the impact of supermarket power on Australian food choices (Pulker et al., 2018). Research investigating the influence of Australian food retail environments on fruit and vegetable procurement is therefore likely to be of benefit to informing more effective fruit and vegetable policy and promotion interventions.

Australia has a unique food retail environment in which three major retailers (Woolworths, Coles, Aldi), alongside Metcash, who supply grocery items to independent supermarkets in Australia, account for 83% of national grocery sales (Australian Competition & Consumer Commission, 2025). Two of Australia’s largest retailers, Coles and Woolworths, hold significant power over the Australian food retail system due to their large product offering, significant store presence in Australian communities, and their ability to offer online shopping and delivery services, which other retailers such as Aldi do not currently offer (Australian Competition & Consumer Commission, 2025). These supermarkets have played a key role in improving food and nutrition security in Australia, and deliver food to the majority of the population (Pulker et al., 2018). However, they have been accused of taking

advantage of customers through utilising their market power to inflate grocery prices more than is necessary or considered reasonable, while simultaneously exploiting grocery suppliers through offering unsustainable prices for goods supplied (Australian Competition & Consumer Commission, 2025; Nakandala et al., 2020; Pulker et al., 2018; Wardle & Baranovic, 2009). In addition to these issues, there is evidence to suggest that Australian food retail systems use marketing and promotion strategies that are not supportive of healthy food choices (Sacks et al., 2024). Advertising of unhealthy foods is of particular concern, and has been identified as a barrier to fruit and vegetable consumption (Bagheri et al., 2021; Gerritsen et al., 2019; Swinburn et al., 2011). As such, researchers have historically called for increased advertisement and marketing to increase fruit and vegetable consumption (e.g. (Morgan & Worsley, 2011; Pollard et al., 2002a). However, according to consumer behaviour research, fruit and vegetables in Australia are mostly sold loose, unlabelled, and in packaging that is lacking sufficient branding to influence sales (Briggs, 2024; Pearson, 2003). As such, fruit and vegetables compete for time, space, and recognition in food retail environments which are not supportive of healthy choices (Kardes et al., 2004). In the Australian context, this dynamic manifests as a food retail environment that is dominated by foods that are considered to be unhealthy, but are readily available, relatively inexpensive, and marketed heavily (Swinburn et al., 2011).

Australian supermarket environments are becoming more health-enabling over time, however they continue to fall short of best practice guidelines (Sacks et al., 2024). For example, a recent report published by Sacks et al., (2024) suggests that collectively, Australian supermarkets have increased corporate reporting about healthy food sales; improved own-brand food product formulation to meet Australian targets; implemented nutrition labelling in alignment with government initiatives (e.g. the health star rating) on own brand products; introduced healthy promotion practices to reduce marketing to children; and removed children's confectionary from checkouts (Sacks et al., 2024). However, the same report identified several priority areas required for Australian supermarkets to act on to align with best practice recommendations. These include increasing healthy food sales targets; implementing strategies to support affordability of healthy foods, and limiting price promotions on unhealthy products; removing unhealthy products such as confectionary from registers; and, reducing exposure of children to

unhealthy food marketing; among others (Sacks et al., 2024). The Australian food retail system currently relies on voluntary action from food retailers to promote healthy foods (Sacks et al., 2024). Given the findings from the report prepared by Sacks et al., (2024), it appears these voluntary actions are not sufficient to align Australian food retail practices with international best practice guidelines. As such, researchers have called for increased government action to facilitate a shift in Australian food retail environments towards being more supportive of healthy dietary behaviours, such as eating more fruit and vegetables (Sacks et al., 2024). However, to do this, researchers must develop a clear understanding of how these environments influence fruit and vegetable use, to inform the evidence base for effective fruit and vegetable policy and program development.

In summary, it is likely that Australian food retail environments influence decision making, and behaviour related to fruit and vegetable procurement, and potentially subsequent use in domestic settings. However, how, and to what extent this occurs in the Australian context is currently unknown, highlighting a significant gap in understanding about how environmental factors influence Australian peoples' fruit and vegetable use. As such, this research seeks to close this gap, through exploring the role of food retail environments⁸ in influencing fruit and vegetable procurement, and any associated practices.

2.4 Life course influences on fruit and vegetable use

Practices of fruit and vegetable use, such as those discussed in Section 1.5, involve many different food choice decisions and behaviours that ultimately determine whether or not fruit and vegetables will be eaten (Sobal & Bisogni, 2009). For example, procurement of fresh foods such as fruit, vegetables, meat, and dairy has been found to influence other domestic food practices, such as planning and preparation, which has implications for food waste processes (Dyen et al., 2018; Evans, 2011; Evans, 2012; Keegan & Breadsell, 2021; O'Neill et al., 2024; Ozanne et al., 2022; N. Sirola et al., 2019). Food choice decisions and behaviours are embedded within peoples' unique personal histories, and evolve over time

⁸ Home gardens are not technically a form of 'food retail environment' however these will also be included in investigations in this thesis as they have been found to have significant influence on fruit and vegetable use in domestic settings (as reported in Section 1.5)

as people adapt and make new food choice decisions (Sobal & Bisogni, 2009). As such, food choice decisions cannot be fully understood without considering the past events that influence people's current ideals and resources for making food choice decisions (Sobal & Bisogni, 2009). Social, spatial and temporal factors influence these decisions as they are made, and therefore must also be considered in such investigations (Castelo et al., 2021; Sobal & Bisogni, 2009).

Life course perspectives have been applied in previous research to provide insight into how food choices evolve and change over time (Devine et al., 1998; Devine et al., 1999; Sobal & Bisogni, 2009; Wethington & Johnson-Askew, 2009). Food choice trajectories are a commonly discussed concept in research which investigates food choice through a life course perspective. Trajectories are stable patterns of behaviour that are modified as people experience life transitions (for example, moving geographical location, having a baby, or changing jobs) (Devine et al., 1998; Wethington & Johnson-Askew, 2009). Findings from the scoping review reported in Section 2.2 suggest that events and experiences across the life course may influence how Australian people perceive fruit and vegetable characteristics. Due to the role of perception in food choice more broadly, it may therefore be beneficial to investigate the influence of life course events and experiences on Australian people's understanding and experiences of fruit and vegetable use. Investigating how fruit and vegetable choices and behaviours are influenced by life course events and experiences may also provide insight into how specific practices of fruit and vegetable use are developed and modified over time. Such information would provide insight into potential ways to target fruit and vegetable interventions to different life course transitions, so that they might be more effective.

Previous research investigating life course influences on fruit and vegetable trajectories in the US identified seven major influences on fruit and vegetable use throughout the life course (Devine et al., 1998). These include food upbringing, roles, health, relocation and immigration, resources, and the food system. These findings are specific to the US context, but regardless provide insight into how life course events and experiences might influence Australian people's understanding and experiences of fruit and vegetable use. The remainder of this section describes these seven life course events, and how they influence fruit and vegetable use in the global context. The information summarised in the following

sections considers the life course transitions defined by Devine et al., 1998, and builds upon them by incorporating findings from more recently conducted research studies. These other studies do not necessarily consider influences *across* the life course, nor do they explicitly apply a life course perspective to their research, however their findings add further depth to the findings originally reported by Devine et al., (1998) thus proving that these initial findings remain relevant and accurate in contemporary society.

Food upbringing refers to the early experiences that people have with fruit and vegetables that influence how people interact with them later in life. People who recall positive experiences of eating fruit and vegetables in childhood have a more positive relationship with fruit and vegetables later in life, and often consume higher amounts of fruit and vegetables across the life-course (Devine et al., 1998; Judd et al., 2014; Makhal et al., 2021; Makhal et al., 2020; Reinaerts et al., 2007; Ventura & Worobey, 2013; Wingert et al., 2014). This is consistent with the findings of the scoping review reported in Section 2.2 of this thesis which suggests that past experiences were a key influence on perceptions of fruit and vegetable characteristics.

Roles and role transitions such as getting married, having children, leaving the family home and gaining or losing employment also influence fruit and vegetable use across the life course. People who have recently married or had children often consume more fruit and vegetables than single people, or couples who do not have children (Devine et al., 1998; Farragher et al., 2016; Kamphuis et al., 2006; Pollard et al., 2002b). Leaving the family home has also been found to reduce fruit and vegetable consumption for young adults (Winpenny et al., 2018), and is often attributed to a lack of food preparation skills (Blichfeldt & Gram, 2013; Byrd-Bredbenner, 2004, 2005; Seabrook et al., 2019). Furthermore, transitioning to retirement has been identified to decrease vegetable consumption of older adults (Ali-Kovero et al., 2020).

Health, wellbeing and illness vary considerably for people across the life course. Having, or being close to people who have health problems can increase or decrease fruit and vegetable consumption, dependant on the specific health issue and the person(s)' understanding and experience of it (Devine et al., 1998). 'Health' has also been identified as an important driver of food choice in both Europe and Australia (Grunert, 2018; Hoek et al.,

2017). However, recent research shows that valuing the health aspects of fruit and vegetables does not necessarily lead to higher fruit and vegetable consumption (Raaijmakers et al., 2018). Concern for 'health' has also been associated with eating a wider variety of vegetables, but not necessarily a greater amount of fruit and vegetables in Europe (Appleton et al., 2017). Furthermore, anecdotal evidence from my practice as a dietitian suggests that the strength of 'health' as a motivator for fruit and vegetable choices is dependant on the relevance of the claim to their personal situation, with people who are already unwell, or close to someone who is unwell, taking a greater interest in eating fruit and vegetables than those with no immediate health concerns. This is echoed in a recent review which found that people with health conditions are more likely to buy, or view associated health claims favourably (Meijer et al., 2023). This suggests that further understanding about the role of health in fruit and vegetable choice decisions across different life stages, with consideration for the immediacy of health concerns is needed.

Relocating both domestically and internationally are major life transitions that influence how people use fruit and vegetables across the life course. Relocating to a new country alters how people relate fruit and vegetables to their cultural identity due to a requirement to adapt to new cultural rules and norms, and a new food system (Costa et al., 2018; Devine et al., 1998; Devine et al., 1999; Gichunge et al., 2016). Relocating domestically also influences fruit and vegetable use through the availability of fruit and vegetables, and the meanings and competences required to procure fruit and vegetables in the different geographic locations. For example, moving to an urban area from a rural area reduces fruit and vegetable intake (Kamphuis et al., 2006). Furthermore, people who live in rural areas have been said to hold more knowledge and understanding about issues related to fruit and vegetable production, ultimately changing the meanings they attach to fruit and vegetable use more broadly (Devine et al., 1998; Godrich et al., 2018b; Kamphuis et al., 2006). However, this may not be relevant to all rural areas, and is likely relevant primarily to rural areas in which fruit and vegetables are often grown. While fruit and vegetable knowledge may be higher for people who have spent extended periods of time in rural areas close to growing regions, socio-ecological barriers such as access and affordability are known barriers to fruit and vegetable use in these areas, and thus could influence fruit and vegetable use for people living in these regions (Carroll, 2024). Relocating both domestically

and internationally also changes the food environment in which people must perform practices of procuring and eating foods. This can increase or decrease fruit and vegetable consumption dependant on the relative density of healthy and unhealthy food outlets in the area (Bagheri et al., 2021; Bivoltsis et al., 2020; Kouritzin et al., 2023).

Resources refer to the perceived knowledge and skills, available times, space and finance, cultural and social skills and, social networks and supports for fruit and vegetable use (Devine et al., 1998). The most often researched resources relevant to fruit and vegetable consumption include knowledge and skills, time, and finance. People acquire different resources at different stages of life. For example, taste preferences are often developed in early childhood, while skills related to purchasing and preparing fruit and vegetables are acquired in early adulthood, or when people leave the family home (Devine et al., 1998; Lea et al., 2005; Uhlmann et al., 2023). Time constraints associated with major life course transitions such as studying, entering the workforce, or having children have significant influences on perceived time available to prepare fruit and vegetables, which has been identified as a barrier to fruit and vegetable intake in several research studies globally (Bagheri et al., 2021; Devine et al., 1998; Dibsall et al., 2003; Judd et al., 2014; Larson et al., 2012; Lea et al., 2005; Pollard et al., 2002b; Radavelli-Bagatini et al., 2021; Wellard-Cole et al., 2023). Similarly, these major life course transitions can influence finance available for fruit and vegetable purchase, among other items required for day-to-day life in modern society. This subsequently alters the meanings people attach to fruit and vegetable consumption, along with their access to and ability to afford to purchase fruit and vegetables (Bagheri et al., 2021; Carty et al., 2017; Devine et al., 1998; Jabs et al., 2007; Kamphuis et al., 2006; Ogundijo et al., 2022). For example, limited finance and time have been identified to alter the meanings attached to food from ‘a way to promote wellbeing’ to ‘a source of energy’, thus potentially reducing the extent to which healthy foods like fruit and vegetables are incorporated into diets (Jabs et al., 2007). Low or limited income is often attributed to lower fruit and vegetable consumption (Ogundijo et al., 2022; Pechey et al., 2015; Lucan et al., 2010; Carty et al., 2017). However, some researchers have questioned the extent to which income alters fruit and vegetable use, finding that increased income does not necessarily increase fruit and vegetable consumption (Dibsall et al., 2003, Kamphuis et al., 2006). This is particularly relevant in Australia, where findings are mixed

across studies comparing income and education levels with fruit and vegetable intake and several studies finding no difference between intake in high and low socio-economic groups (Lewis & Lee, 2020). Interestingly, some researchers have suggested that income may influence fruit and vegetable use differently at different stages of the life course (e.g. young adult vs older adult) (Dibsdall et al., 2003; Livingstone et al., 2020; O'Neill et al., 2024). This highlights a need to determine how personal resources such as time and income are impacted across the life course, and how this subsequently influences fruit and vegetable use in Australia.

Changes to the **food system** over the life course can provide people with exposure to different foods and nutrition information (Delaney & McCarthy, 2009; Devine et al., 1998). Availability of novel foods and materials used to prepare foods can change how fruit and vegetables are used by people in subsequent stages of their life course. For example, the emergence of juicers in the 1990s in America caused a sudden increase in juice consumption, influencing how people consumed fruit and vegetables in the US at the time (Devine et al., 1998). Increased availability of fruit and vegetables during different seasons, in institutional settings, and exposure to conflicting nutrition information and advice have also been identified as influences on fruit and vegetable intake that change across the life course (Devine et al., 1998; Godrich et al., 2018b; Jongenelis et al., 2018).

The literature summarised in this section suggests that these life course events, among others are highly likely to influence fruit and vegetable use in Australia. However, there is limited research that investigates the role of life course events and experiences on specific practices of fruit and vegetable use, especially in the Australian context. Investigating how practices of fruit and vegetable use are influenced by life course events and experiences is likely to provide insight into how interventions can be targeted to specific life stages and transitions as opposed to broad demographic groups, which may be supportive of more impactful interventions. Therefore, life course events and experiences will also be a focus of this research, alongside food retail environments, and practices of fruit and vegetable procurement previously described in this thesis.

2.5 Chapter summary

The purpose of this chapter was to identify gaps in current understanding about fruit and vegetable use in Australia. Firstly, the scoping review revealed a lack of research conducted by the public health discipline about Australian people's perceptions of fruit and vegetable characteristics. This is problematic because public health professionals are primarily responsible for fruit and vegetable policy and promotion interventions in Australia (McKinna et al., 2020; Rekhy & McConchie, 2014). These investigations, primarily conducted by business disciplines and the horticulture industry, focus heavily on extrinsic cues, which can be easily manipulated. While useful for informing fruit and vegetable interventions, they do not investigate how perceptions are formed, or how socio-cultural and environmental factors influence these perceptions, which limits understanding about the ways that Australian people engage with fruit and vegetables on a day-to-day basis. Thematically synthesising the data in this scoping review revealed food retail environments and past experiences with fruit and vegetables to be potential influences on how Australian people think about fruit and vegetables. Secondly, the evidence summaries of literature suggest that food retail environments globally have a strong influence on food choices, and may provide a novel opportunity for more effective fruit and vegetable interventions. However, there is a paucity of literature that investigates how food retail environments influence fruit and vegetable use specifically. Furthermore, there is a paucity of literature which investigates how the Australian food retail environment influences food procurement practices, despite evidence suggesting that they might. Finally, life course events and experiences were identified as important influences on fruit and vegetable use, particularly through altering access to resources such as time, money and skills. This area is under-researched in Australia and as such, there is a need to develop a more comprehensive understanding of the factors and events that shape fruit and vegetable use in Australia across the life course. These gaps informed the design of the research aims, and resulting research project which are reported in the following chapter. Investigating these factors is likely to support development of more effective fruit and vegetable interventions, due to the demonstrated role of these factors in food use more broadly, thereby supporting the overarching goal of this thesis.

CHAPTER 3 RESEARCH DESIGN

3.1 Chapter overview

This chapter describes the process used to conduct the research project reported in this thesis. It describes how the research project was designed and conducted, including the theoretical underpinnings, methodology, and methods guiding the research. The chapter ends by discussing the ethical considerations, and measures of rigour that were used to ensure that the research reported is relevant and reliable. Figure 8 shows how the previous chapters reported in this thesis relate to the content reported in this thesis, and how the methodology reported in this chapter was designed based on the three research Aims developed.

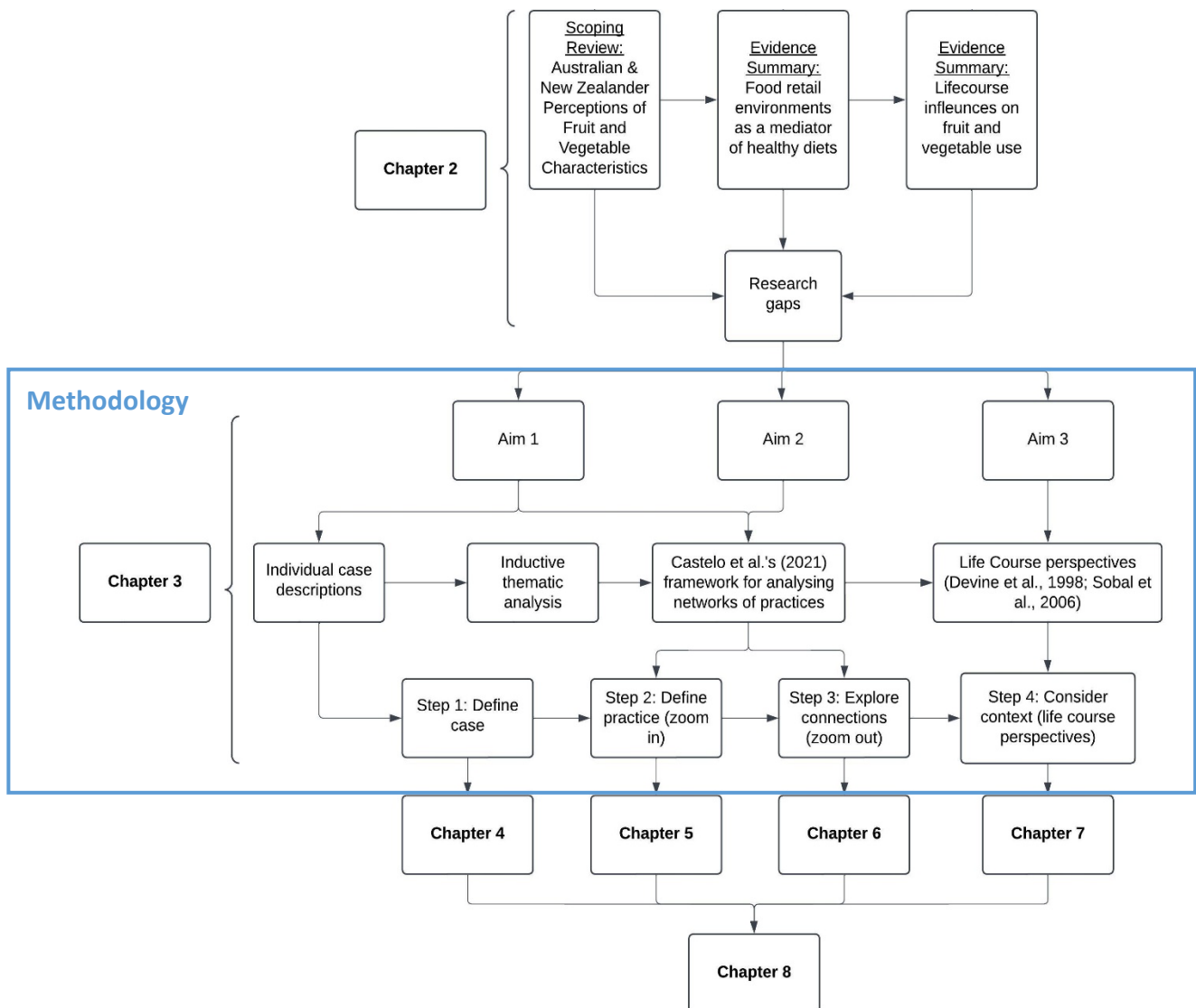


Figure 8: Chapter 3 structure and relevance to thesis

3.2 Research aims

The overarching goal of this research is to explore how Australian people understand and experience fruit and vegetable procurement, and associated practices, to provide insight into potential improvements for fruit and vegetable policy and promotion interventions. To address the research gaps identified in Chapter 2 (see Section 2.5), the following research aims were developed:

Aim 1: explore how Australian people understand and experience fruit and vegetable procurement, and determine how food retail environments influence this

Aim 2: determine how fruit and vegetable procurement influences other practices of fruit and vegetable use (such as planning, preparing and eating)

Aim 3: determine how life course events and experiences influence development and modification of fruit and vegetable practices for Australian adults

3.3 Research Design

In this section I use Crotty's (1998) scaffolding framework to describe the elements of the research design (Figure 9). The framework includes epistemology, theoretical perspective, methodology and methods. Epistemology provides insight into how I view knowledge and reality, including what I believe to be 'possible' or 'legitimate' (Creswell & Plano Clark, 2011; Crotty, 1998). Theoretical perspective refers to the contextual process and grounding of logic and criteria that guide the more specific elements of the research project design (e.g. methodology and methods). Methodology details the theoretically informed processes used to link the methods to the study outcomes. Methods refer to the specific techniques and tools used to collect and analyse data in alignment with the other elements of the framework and the overarching research questions that guided the research project. The following sections describe each of these elements in greater detail.

| Epistemology | Theoretical Perspective | Methodology | Methods |
|----------------|-------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------|
| Constructivism | Interpretivism | Case Study Research | Go-along shop Personal food system mapping Semi-structured interview Guided conversation Thematic analysis |

Figure 9: Scaffolding framework for this research project Crotty (1998)

3.3.1 Epistemology (Constructivism)

Epistemology is the theory of knowledge, and is concerned with how we know what we know, and the scope and limitations of our understanding based on these beliefs (Crotty, 1998). Constructivism is an epistemology that overcomes many of the challenges previously described in Section 1.5 which arise when social research is conducted through a positivist worldview (Crotty, 1998; Dzurec & Dzurec, 1992). Constructivism asserts that knowledge is actively constructed by humans as they interact with the social and structural world around them. As such, it has been described as “...*the view that all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world...*” (Crotty, 1998, p. 42). My research aims are consistent with constructivist epistemology as they focus on peoples’ understanding, experiences, and day-to-day performance of social practices (Sedlačko, 2017; Tueanrat et al., 2021). Unlike positivism, which assumes there is a single objective ‘truth’ to be discovered, and is dominant in food and consumer research, constructivism acknowledges the subjective nature of human experience (Crotty, 1998; Dzurec & Dzurec, 1992). As such, constructivist epistemology informed the research design and conduct reported in this thesis. By adopting this worldview, I acknowledge that participants’ thoughts and experiences of using fruit and vegetables are valid, regardless of their potential (mis)alignment with others’ and my own understanding and experience (Cohen et al., 2000; Crotty, 1998).

3.3.2 Theoretical perspective (Interpretivism)

Fruit and vegetable use can be considered as a series of health behaviours or practices (Evans, 2012; Glanz et al., 2015; Neuman, 2019). Such behaviours and practices require research approaches that facilitate understanding through discovery, and therefore should be inductive in nature (Glanz et al., 2015). To anchor the research process in constructionism, I adopted an interpretivist theoretical perspective. Interpretivism acknowledges that I am a social actor, and that my own personal worldview and experiences influence how I approach the research project and outcomes (Crotty, 1998). This includes how I designed the research project, how I collected data, and how I interpreted the data collected. By considering my data through an interpretivist lens, I rejected generalised theories of human behaviour, such as those described in Section 1.5, and instead championed rich descriptions of participants' understandings and experiences of fruit and vegetable use (Denzin, 2004). This approach allowed me to describe as much as possible participants' understandings and experiences of fruit and vegetable use as *they* interpret it while still acknowledging that my own understanding and experiences influenced how I interpreted that information (Crotty, 1998; Denzin, 2004). Considering social practices through a constructivist-interpretivist theoretical perspective provides texture, depth and nuance to social research investigations, allowing researchers to uncover authentic experiences and understandings of participants in ethnographic research studies (Sedlačko, 2017). As such, the use of an interpretive theoretical perspective supported and enhanced the use of ethnographic methods, which are described in the following section.

3.3.3 Methodology (Case Study Research) & Methods (Ethnography & Food Systems Research)

To provide answers to the research questions guiding this research project, I required a methodology that was highly flexible, situated within participants' natural settings and contexts, and that allowed multiple interactions with participants over time. As such, I used Yin & Campbell's (2018) framework for conducting case study research, and incorporated concepts from ethnography and social practice theory into areas of this framework.

Case study research has been used successfully in other research studies about food practices as it considers social, structural and environmental factors which are known to influence food choices and are otherwise overlooked in more individualistic approaches to research, such as those described in Section 1.5 (Chapman & Beagan, 2013; Lehtinen, 2012; Sabag Muñoz & Marselis, 2016; Sudershan et al., 2008). Yin & Campbell's (2018) framework moves through phases of planning, designing, preparing, collecting, analysing and sharing data in both forwards and backwards directions, as shown in Figure 10 (Collins & Stockton, 2018; Yin & Campbell, 2018). Using this framework allowed me to design a single research project that could fulfill the research aims, while simultaneously allowing me to investigate social practices as they occur in natural settings. This approach also aligned with my interpretive theoretical perspective, as it allowed me to develop with understanding as I interacted and interpreted the data in an ongoing, iterative process, which is necessary for research about food use (Evans, 2012; Glanz et al., 2015; Neuman, 2019; Sedlačko, 2017).

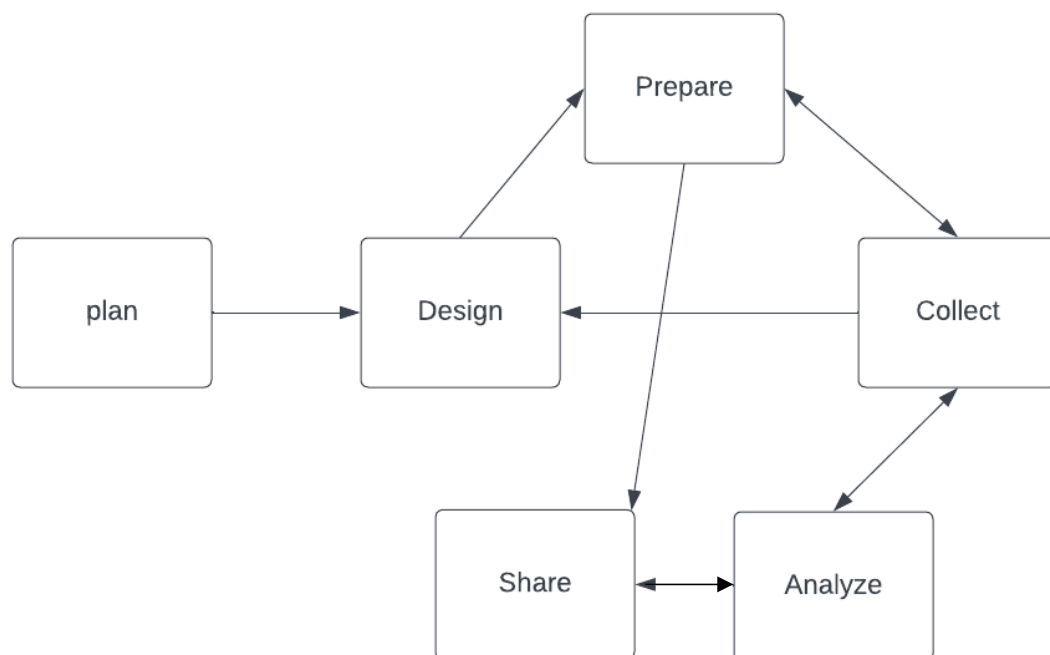


Figure 10: Yin and Campbell's proposed methodology for conducting case study research, adapted from (Yin & Campbell, 2018)

Ethnographic research methods allow researchers to immerse themselves in the social and spatial environments in which food practices are performed and thus have been highly successful in similar research investigations about food practices (Crotty, 1998; Evans, 2011; Evans, 2012; Karademir Hazır, 2024; Kramer & Adams, 2017; Kusenbach, 2003; Mguni et al., 2020; O'Neill et al., 2024; Ozanne et al., 2022; Rai, 2022; Noora Sirola et al., 2019; Wertheim-Heck & Raneri, 2020; Wertheim-Heck & Spaargaren, 2016; Wright-Pedersen et al., 2024). Because the research aims centred around the phenomenon of fruit and vegetable procurement, I also sought to incorporate research methods that aligned with social practice theory, as this was used to guide data analysis (described in detail under 'Analysis', in Thesis Section 3.3.3). To do this, I conducted the research through a 'sensibility' for ethnography, and a 'sensibility' for practice (Sedlačko, 2017). This approach was taken because it addresses the contradiction between adhering to a single theoretical perspective, and the necessary flexibility required to explore phenomena in natural settings (Sedlačko, 2017). That is, to ensure that I was open and adaptable to participants' day-to-day experiences as they occurred naturally, I ensured the research remained flexible and adaptable to the case study research design. However, to ensure that I collected sufficient data to fulfil the research aims, I adopted methods from ethnography and social practice theory, to facilitate data collection and analysis. In this sense, I did not strictly 'do' ethnography or social practice theory, but conducted my research in a way that considered and incorporated these perspectives within a broader, flexible methodology. The incorporation of ethnographic data collection methods allowed me to observe and question participants' experiences through 'going-along' and 'hanging-out' with them as they performed fruit and vegetable practices (Kramer & Adams, 2017; Kusenbach, 2003). Simultaneously, situating myself within participants' environments allowed me to reflect on, and hence better understand my own fruit and vegetable use, thus providing insight into how my worldview influenced my collection and interpretation of the data (Kramer & Adams, 2017). Simultaneously, utilising social practice theory to make sense of the results supported greater understanding of participants' experiences, and addressed the limitations of individualistic research processes identified in Section 1.5, which is discussed further in the 'Analysis' section of this chapter.

The combination of constructivism epistemology, interpretivist theoretical perspective, case study methodology, and ethnographic research methods, was ideally suited to investigating practices of fruit and vegetable procurement for the reasons described in this section (Sedlačko, 2017). The following sections describe the research project design according to Yin & Campbell's (2018) proposed methodology for conducting case study research.

Plan the case study

Figure 11 shows the process of designing the research study according to Yin & Campbell's (2018) proposed framework for conducting case study research. This section refers to the 'plan' component. The figure is repeated throughout the remaining sections in this chapter to highlight which component of the framework is being discussed in each Thesis Section.

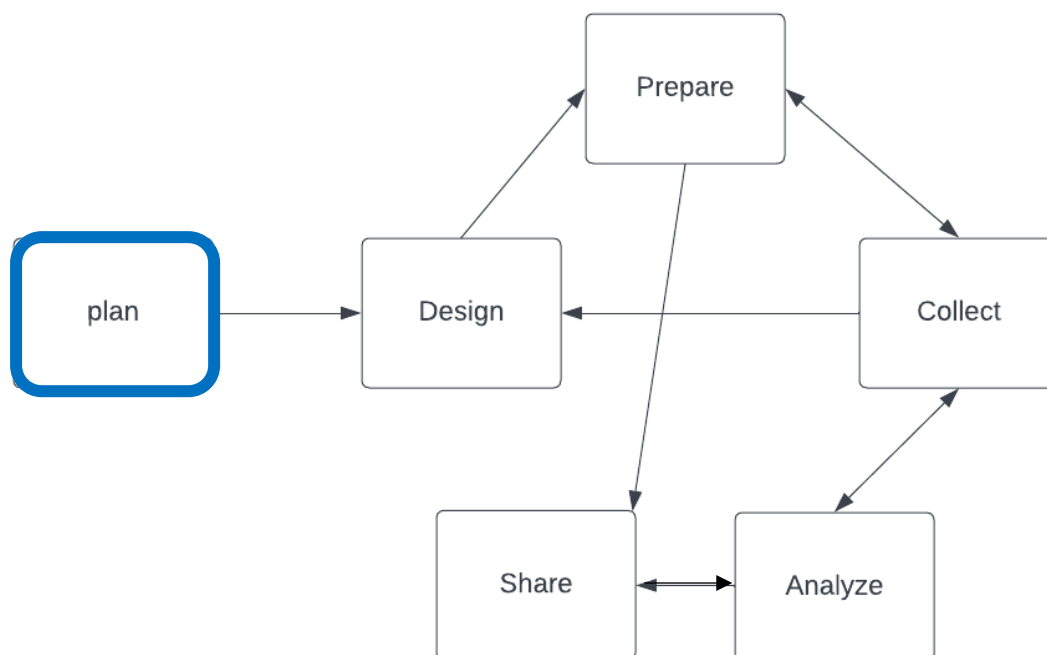


Figure 11: Plan the research project

The first step in designing a case study research project is to identify a gap in knowledge or understanding about a particular phenomenon (Warren & Bell, 2022; Yin & Campbell, 2018). This process is reported in Chapters 1-2, and resulted in development of the research aims:

Aim 1: explore how Australian people understand and experience fruit and vegetable procurement, and determine how food retail environments influence this

Aim 2: determine how fruit and vegetable procurement influences other practices of fruit and vegetable use (such as planning, preparing and eating)

Aim 3: determine how life course events and experiences influence development and modification of fruit and vegetable practices for Australian adults

Design and prepare the case study

The second step of designing a case study research project is to select an appropriate type of case study that aligns with the research questions or gaps identified in the planning phase (Yin & Campbell, 2018) (Figure 12). I chose a multiple case study research design to facilitate collection of data that could be analysed at individual, household, and across-case levels. The following sections describe how I defined and bound the cases in my research project, and how I approached recruitment in alignment with the case study design.

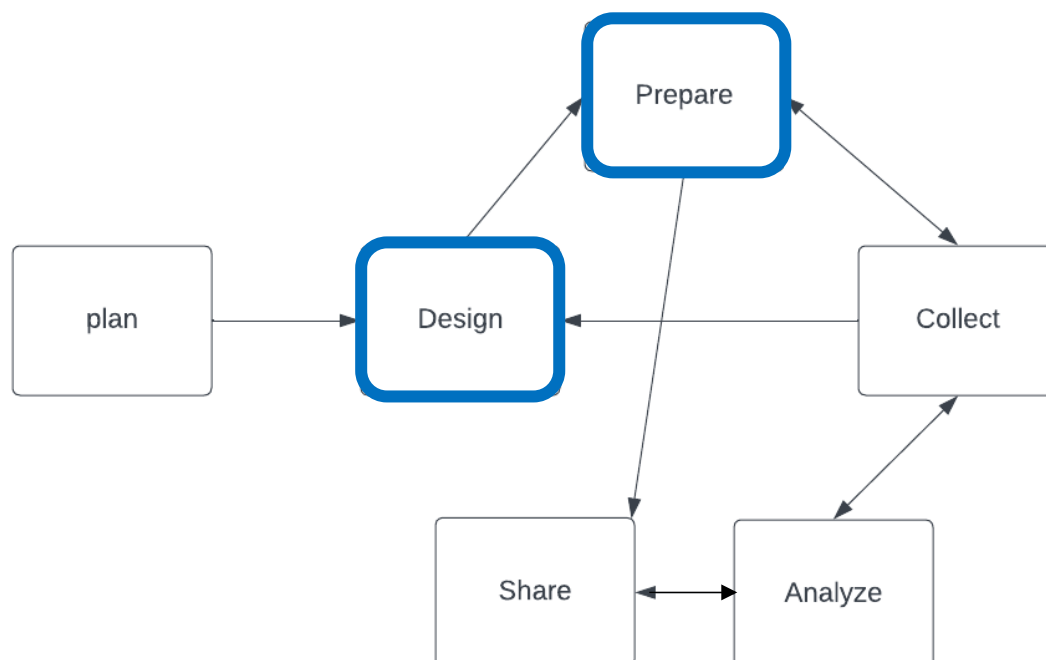


Figure 12: Design & prepare the research project

Defining & bounding the case

‘Defining the case’ refers to the identification and description of who, what, where and when the case study will be conducted (Warren & Bell, 2022). ‘Bounding’ the case refers to defining the boundaries of what will and will not be studied within the defined case (Warren & Bell, 2022). In this research project, the cases under investigation included individual people, their homes, the people they lived with, the places they procured fruit and vegetables from, and the processes through which they determined where, when and how they would use fruit and vegetables. The case study was ‘bound’ to understandings and experiences of fruit and vegetable procurement, and the practices that naturally linked to fruit and vegetable procurement. That is, I started with fruit and vegetable procurement, and ‘followed’ this practice where it led, according to different participants (Castelo et al., 2021; Nicolini, 2012). Individual people were recruited to represent their own understanding and experiences, and snowball recruitment was used to recruit additional people who lived in that participant’s household, to support representation of the household’s understanding and experiences. This allowed me to represent both individual people, and households’ understanding and experiences of fruit and vegetable use. The multiple-case study design included multiple households (individual cases), which allowed me to then compare findings across individual people and households (Warren & Bell, 2022; Yin & Campbell, 2018). Figure 13 shows a conceptual representation of the multiple case study design used in this research project.

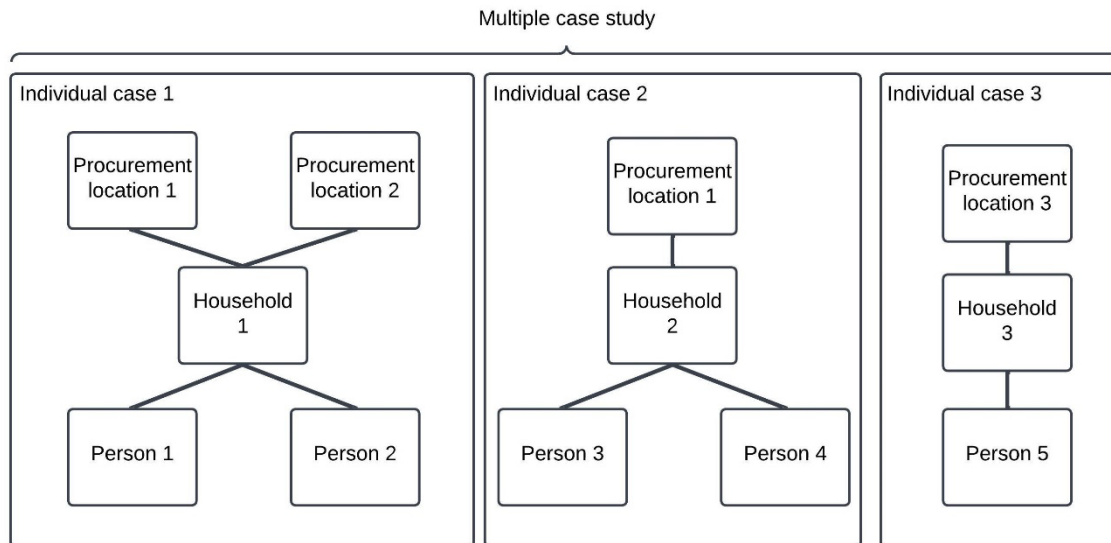


Figure 13: Multiple case study design

Recruitment – Main food purchasers

Recruitment started with people who procured most of the groceries used by their household. Recruitment was limited to locations in Queensland and Western Australia as these locations were convenient and realistic for me to access at the time of data collection as I was living in them at the time. Recruitment flyers were posted both online and handed out in-person. The flyer was initially posted in Facebook community groups, online newsletters and organisations, public and community noticeboards and, businesses willing to display them. I attempted to recruit a diverse sample of participants based on factors that have previously been identified to influence fruit and vegetable use (see Figure 14). Where I was not able to gain a sufficiently diverse sample through flyers, I recruited participants through my own personal and professional networks. This is a common approach in similar research (Devine et al., 1998). I also handed out flyers in-person in settings that were more likely to recruit people to represent certain characteristics. For example, I handed out flyers at a Farmers' Market to recruit a person who procured fruit and vegetables primarily from markets. These more targeted recruitment strategies were utilised to gain access to a sample that could provide a broad range of perspectives on fruit and vegetable procurement. Upon registering their interest in the project, participants were screened based on age, gender, income, immigration status, and where they primarily procured fruit and vegetables from. Selection of screening factors was informed by findings from existing

fruit and vegetable research, which are summarised in Figure 14. The intention behind this screening was to ensure that the limited sample included a sufficiently diverse range of perspectives and experiences.

| Characteristic | Justification from extant literature |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lower income households | Low socio-economic households purchase and eat less fruit and vegetables (Ogundijo et al., 2022; Pechey et al., 2015) |
| Higher income households | People with higher income more likely to shop in alternative food retail stores (Goldring, 2019) People with higher income potentially eat more fruit and vegetables (Kamphuis et al., 2006) |
| Pensioners and welfare recipients | Transition to retirement/pension changes fruit and vegetable intake pattern for both men and women (Ali-Kovero et al., 2020) |
| >65 years old | Increased fruit and vegetable consumption associated with older age (Appleton et al., 2017; Farragher et al., 2016; Nour et al., 2017) Cost more relevant to older adults (51-70 years) than younger (<50 years) (Livingstone et al., 2020) |
| <25 years old | Poorest vegetable variety intake reported for 18-24 years olds compared to 25-34 year olds (Nour et al., 2017) Food/taste preferences identified as a more relevant barrier to FV intake for age group 18-30 years old (Livingstone et al., 2020) Different motivators for FV consumption between young and older adults (Lucan et al., 2010) |
| Women | Women more health conscious, more likely to consume more fruit and vegetables (Farragher et al., 2016; Nour et al., 2017; Pechey et al., 2015; Pollard, 2008) Women more likely to be responsible for purchase and preparation of fruit and vegetables in cohabited households and households with children (Bagheri et al., 2021; Mehta et al., 2020; Rhodes et al., 2016; Storz et al., 2022). |
| Men | Different motivations for FV consumption between men and women (Lucan et al., 2010) |
| Single adult households | Eating alone linked to lower consumption of FV (Pollard et al., 2002b) |
| Multiple adult households | Being married or cohabiting associated with higher FV intake (Farragher et al., 2016; Kamphuis et al., 2006; Pollard et al., 2002b) |
| Single and Multiple adult households with children >12 and <12 years old | Parental intake, education and income positively associated with child and adolescent fruit intake (Godrich et al., 2018b; Pearson et al., 2009b) Time is a more relevant barrier to FV intake for young families who identify with a 'busy lifestyle' e.g. related to working (Livingstone et al., 2020) Early experiences with fruit and vegetables are important for developing positive attitudes and behaviours towards fruit and vegetables throughout the life course (Devine et al., 1998; Makhil et al., 2021; Makhil et al., 2020; Reinaerts et al., 2007; Ventura & Worobey, 2013; Wingert et al., 2014). Children influence food purchase decisions and behaviours (Chadwick et al., 2013; Rhodes et al., 2016; Wingert et al., 2014) Higher fruit intake in childhood than adolescence (Albani et al., 2017) |
| Supermarket users | Most people purchase fruit and vegetables at supermarkets (Carty et al., 2017; O'Kane & Pamphilon, 2020; Sacks et al., 2024). Supermarkets are in a position of control over the food system and influence food choice (Pulker et al., 2018; Wardle & Baranovic, 2009) Mixed perceptions about produce from supermarkets (CHAPTER 2) Less healthy supermarket environment associated with poorer dietary behaviour (Vogel et al., 2019) |
| Greengrocer/market/ other independent alternative food system users | Generally perceived more positively by Australian people (CHAPTER 2) and more desirable (Lea et al., 2005) Proposed to increase availability and accessibility of FV (Godrich et al., 2018b) |
| Online / meal delivery kit/service users | Online food retail, including meal preparation kits and delivery services can support FV intake through convenience (Fernandez & Raine, 2021); mixed findings on success of free fruit and vegetable box delivery service (Carty et al., 2017) |
| Immigrants to Australia from other countries | Mixed findings regarding influence of immigration on Fruit and Vegetable use (Costa et al., 2018; Gichunge et al., 2016) most research investigating food environment interactions and migration status completed in USA populations (Berggreen-Clausen et al., 2022). |

Figure 14: Characteristics targeted in recruitment and sampling

The remainder of this section discusses the justification behind participant screening criteria.

Women with an interest in health are more likely to volunteer their time and energy to research topics related to food use, and remain primarily responsible for the majority of grocery shopping in Australian households (Dowd & Burke, 2013; McGrath, 2023; Torres, 2020). As such, to obtain varied perspectives, it was a priority to recruit participants who did not identify as female and performed the majority of food procurement to determine how this influenced fruit and vegetable procurement practices, if at all. Low-income households are exposed to more negative social determinants of health, which exacerbate poor dietary choices and behaviours compared to national guidelines (Devine et al., 1998; Dibsall et al., 2003). However, as stated in Section 2.4, there is little evidence that proves that income impacts fruit and vegetable intake in Australia (Lewis & Lee, 2021, Livingstone et al., 2020), and globally (Dibsall et al., 2003; O'Neill et al., 2024). Furthermore, data presented by the Australian Bureau of Statistics suggests that low intake of fruit and vegetables in Australia is a population-wide problem (only 4.1% of all Australian adults eat the recommended serves of both fruit and vegetables daily), and therefore not specific to income status (Australian Bureau of Statistics, 2022a). As such, I also sought participants who represented the perspective of people who earned a relatively 'high income' compared to the average Australian income, to provide insight into how this influenced fruit and vegetable use.

Most people procure fruit and vegetables from supermarkets in Australia, despite evidence suggesting that people perceive procuring fruit and vegetables from alternative retailers (e.g. markets, greengrocers, community supported agriculture, convenience services) to be more desirable (Fernandez & Raine, 2021; Lea et al., 2005; O'Kane & Pamphilon, 2020; Sacks et al., 2024). As such, I targeted participants who procured fruit and vegetables from non-mainstream retailers, such as markets, greengrocers, and box delivery services. This allowed me to compare fruit and vegetable procurement in different environments, which was crucial to developing research findings relevant to the food retail environment component of research Aim 1.

The influence of immigration on fruit and vegetable use is somewhat unclear, though often found to be negative due to the requirement of immigrants to adapt to a new food retail system and different availability and types of fruit and vegetables (Costa et al., 2018; Gichunge et al., 2016). Much of the extant literature about the impact of immigration on fruit and vegetable use focuses on US populations (Berggreen-Clausen et al., 2022). As such, it was also important to recruit participants who were not born in Australia, but who procured fruit and vegetables from the Australian food retail system. Gaining access to these participants was particularly difficult through the initial recruitment strategy used, which is a known limitation in research projects similar to this one (Devine et al., 1998). As such, targeted recruitment, including through my own personal network was particularly useful for gaining access to people who represented these experiences. These perspectives would not have been included in the research outcomes without the use of this targeted recruitment strategy due to limited self-selection and interest in volunteering to participate among the public who represented them. These participants were only included where they had indicated an interest and initiated a conversation about participating in my research project. That is, I did not directly ask any members of my personal network to participate in my research project, unless they had indicated an interest in participating through natural conversation.

Recruitment – Household members

The final stage of recruitment used snowball recruitment. Adults who shared the household with the main-food-purchasers already recruited were invited to participate in the research project to provide insight into their role in fruit and vegetable use at the household level.

This was valuable for providing insight into how social factors within households influenced fruit and vegetable use, and assisted in reducing reporting bias of the main-food-purchaser (further discussed in Section 3.4). It also contributed to developing a shared understanding of household, rather than individual perspectives on fruit and vegetable use.

Collect data

The third step in the case study research project was to collect data (Figure 15). To collect data that would sufficiently fulfill all research aims, I developed four separate research phases designed around a research activity. Each research phase incorporated ethnographic research methods such as informal interviewing and observation. Figure 16 shows an overview of the four research phases.

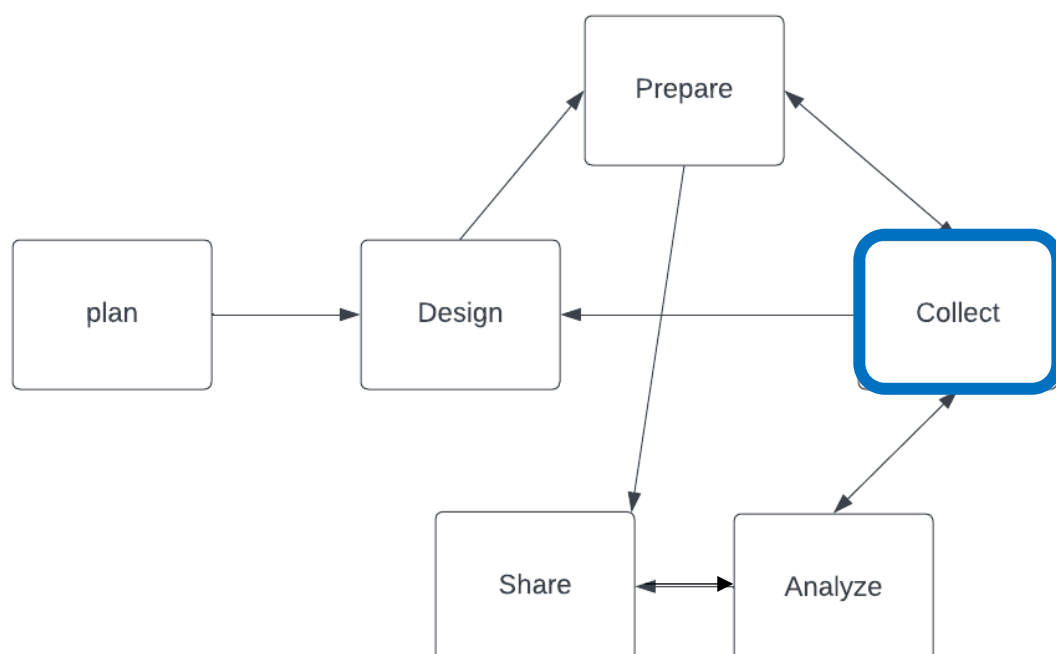


Figure 15: Collect data

Data Collection Phases

In this section, I briefly describe the four individual research phases. Table 2 shows the research phases, including the methods used, data types obtained, and justification in full detail.

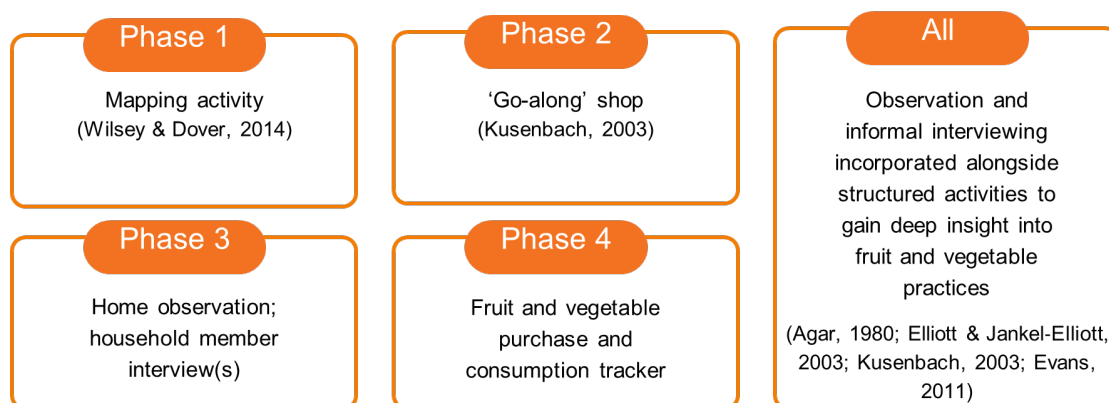


Figure 16: Research phases & research activities

Phase 1 aimed to develop an understanding of how the main-food-purchaser used fruit and vegetables in a broad sense. This involved use of a 'personal food system mapping activity' in which participants were asked to draw a map of the places they procured fruit and vegetables from as they explained what they procured, where, when, and why. The mapping activity was based on existing research methods which have been used to develop a shared understanding about food use between researchers and participants (Connors et al., 2001; Wilsey & Dover, 2014).

Phase 2 focussed on the practice of fruit and vegetable procurement and aimed primarily to develop an understanding of how participants procured fruit and vegetables, and how the environments in which they did this influenced their fruit and vegetable procurement. This was primarily done through 'go along' interviews, in which participants 'talked me through' what they were doing, and I guided conversations around their fruit and vegetable procurement based on my observations (Kusenbach, 2003).

Phase 3 considered how the household environment and people within it influenced fruit and vegetable procurement, and how fruit and vegetable procurement influenced

household use. The primary methods used in phase three were observation and informal interviews with both main-food-purchasers and household members.

Phase 4 explored how people procured and consumed fruit and vegetables over an extended period of time (four weeks). The primary methods of data collection in phase four included a fruit and vegetable tracker activity, in which participants recorded their fruit and vegetable intake and kept their grocery receipts for a week at a time. This allowed me to compare fruit and vegetable procurement to fruit and vegetable consumption over a longer period of time, and to observe how procurement changed over time without my presence influencing their behaviour. Across all research phases, an additional objective was to follow up on any loose-ends, unanswered questions, or emerging theories that had been raised or identified in the preceding phases of data collection. I did this through paraphrasing participants' words and sharing my interpretations with them. This provided them with an opportunity to confirm or correct my interpretation, thus strengthening the quality of data collected, and increasing the credibility of the research outcomes.

Progression through research phases

All main-food-purchasers started the research project at phase one. The order in which they completed subsequent phases was informed by insights drawn from the data already collected. Participants were not expected or required to participate in all phases of the research project. The extent to which they participated was determined by their willingness to participate and the relevance of the subsequent phases to their experiences. For example, one participant indicated that they did not physically 'go out' of the home to procure fruit and vegetables. As such, phase two (go along shop) was unlikely to provide meaningful insights. Therefore, I did not invite this person to participate in phase two, and instead invited them to participate in phase three. Due to the variation in fruit and vegetable procurement and adaptation of the research phases, the questions asked in phase three were modified to provide the insights relevant to the aim of phase two, without requiring the participant to physically perform the phase two activities. Another participant indicated that they procured fruit and vegetables from multiple locations, at different times. As such, the research phases were adapted for this participant so that phase two was completed multiple times, once at each location. This allowed me to gain insight into how

their fruit and vegetable procurement differed in different locations, while remaining relevant to the participants' context and experiences. Data collection started in May 2023 and ended in February 2024. The full data collection guides used throughout data collection for each phase can be viewed in Appendix 3.

Justification of methods used

Researchers seeking to gain insight into food-related practices must move beyond static interviews to consider the multi-sited nature of people's interactions with food (Evans, 2012). Ethnographic research methods allow researchers to immerse themselves in the social and spatial environments in which food practices are performed and thus are well-suited to such research (Evans, 2011; Evans, 2012; Karademir Hazır, 2024; Mguni et al., 2020; O'Neill et al., 2024; Ozanne et al., 2022; Rai, 2022; Noora Sirola et al., 2019; Wertheim-Heck & Raneri, 2020; Wertheim-Heck & Spaargaren, 2016; Wright-Pedersen et al., 2024). 'Doing ethnography' in its strictest sense, was not possible in this project as I was not able to become a member of the activities performed in the 'natural settings' under investigation (Evans, 2012). That is, it would not be appropriate for me to consider myself part of the household I was studying, nor for me to attempt to be part of the fruit and vegetable practices that households performed in an attempt to understand their experiences (Kramer & Adams, 2017). Instead, I utilised ethnographic methods of data collection for their ability to provide insight into how people perform practices in their natural settings, as described in Section 3.3.3 (Crotty, 1998; Kramer & Adams, 2017; Kusenbach, 2003). Ethnographic methods were utilised in research phases one through three and included observation, 'go-along', and informal semi-structured interviews.

Phase four was added to the research project after four months of data collection in response to the data obtained, and emerging findings from my reflexivity journals which indicated that changes to where and how participants procured fruit and vegetables influenced how much fruit and vegetables they ate. While this phase also included some methods from ethnography, it drew more from methods adapted from my professional practice as a dietitian, and included a self-reported fruit and vegetable consumption 'tracker' activity. Participants were specifically instructed to procure and consume fruit and vegetables as they 'normally' would, and I avoided as much as possible influencing them to

buy or eat more, or less fruit and vegetables during the tracker activity. However, self-reported data is at high risk of bias (Schoeller, 1995; van de Mortel, 2008). Furthermore, my experiences of using this activity in my dietetics practice led me to believe that engaging in an activity that highlighted how much fruit and vegetables they were eating could motivate them to eat more, and that this might subsequently change participants' behaviour in the short-term. As such, I worried that such changes would reduce participants' abilities to perform their fruit and vegetable practices as they naturally would, thus confounding my ability to draw insights into their fruit and vegetable practices as they occur in everyday life. Additional questions were added to the informal interview conducted at the end of phase four to provide insight into whether this occurred or not, and where possible, enhance the quality of data collected. Further justification for this approach is provided in Table 2, and the strengths and limitations of using this approach are reported in Chapter 8.

Table 2: Data collection methods and justification

| Phase & Objective | Data collection method, description & citation | Data type & management | Justification |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Phase 1 <i>Objective 1: Develop understanding of participants' social world and how this relates to fruit and vegetable use</i> <i>Objective 2: Identify relevant fruit and vegetable locations to be explored in phase two.</i> | Personal food system mapping - adapted from (Connors et al., 2001; Wilsey & Dover, 2014) Participants draw a map of the locations in which they procure fruit and vegetables using pens and paper to facilitate discussion around how and where they procure fruit and vegetables. | Participant maps scanned and stored digitally | Supports development of shared understanding of how fruit and vegetable retail locations influence procurement (Wilsey & Dover, 2014) Provides insight into (mis)alignment between participant's values and behaviours relating to food use (Connors et al., 2001; Wilsey & Dover, 2014) |
| | Informal semi-structured interviews (Agar, 1980; Elliott & Jankel-Elliott, 2003; Kusenbach, 2003) While drawing map, participants were asked questions about their map (see Appendix 3) | Informal interviews audio recorded and transcribed verbatim | Switched the interview format from 'question and answer' to 'telling their story' through their maps, similar to 'draw and tell' (Goodwin et al., 2023) Allowed me to gain information from participants that I had not considered to ask about, thus contributing to a rich foundation of insights on which future phases of data collection could be built. |
| Phase & Objective | Data collection method, description & citation | Data type & management | Justification |
| Phase 2 <i>Objective 1: Understand how participants procure fruit and vegetables</i> <i>Objective 2: Determine how retail environments influence fruit and vegetable procurement.</i> | 'go-along' method (Kusenbach, 2003) Observation and informal interviews were combined in a 'hybrid' method of data collection that followed participants as they performed fruit and vegetable procurement in their natural settings. | Go-alongs audio-recorded and transcribed verbatim. Photos taken during go-alongs stored digitally to provide context for later analysis. | Allows researchers to gain insight into participants' subconscious thoughts or behaviours that they might not comment on without prompting (Evans, 2012; Kusenbach, 2003) Allowed me to interpret data and gain feedback from participants in real time to gain further insight into the thoughts and feelings behind the actions observed |

| Phase & Objective | Data collection method, description & citation | Data type & management | Justification |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Phase 3 <i>Objective 1: Determine how fruit and vegetable procurement influences other practices of fruit and vegetable use</i> <i>Objective 2: determine how households, and the social and spatial environments within, influence practices of fruit and vegetable use</i> | Observation Participants were observed performing fruit and vegetable practices in the home e.g. (preparing the evening meal. Some participants gave 'fridge tours' in which they explained their methods for preparing and storing fruits and vegetables | photos, field notes and memos stored digitally. | prompted further discussion about fruit and vegetable use, and provided additional insight into how their household dynamics influenced their fruit and vegetable procurement. |
| | Informal semi-structured interview (Agar, 1980; Elliott & Jankel-Elliott, 2003; Kusenbach, 2003) Participants were asked questions about their fruit and vegetable activities and practices in the home according to the observed activities | As for Phase 1 - audio recorded and transcribed verbatim | Provided an opportunity interpret data and gain feedback from participants in real time to gain further insight into the thoughts and feelings behind the actions observed |
| | Household member interviews Adult household members were invited to share their thoughts and experiences of fruit and vegetable use in relation to the fruit and vegetable procurement practices of the main-food-purchaser. Household members who elected to participate often joined conversations with the main-food-purchaser informally, rather than waiting for their own individual interview. | Conversations with household members were audio-recorded and transcribed verbatim. | Provided additional insight into how the main-food-purchaser and household members influenced each other's fruit and vegetable use |

| Phase & Objective | Data collection method, description & citation | Data type & management | Justification |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Phase 4</p> <p><i>Objective 1:</i> determine how people procure and consume fruit and vegetables over an extended period of time (four weeks)</p> <p><i>Objective 2:</i> Develop deep understanding of participants' understandings and experiences of fruit and vegetable use</p> <p><i>Objective 3:</i> follow up on any loose-ends, unanswered questions, or emerging theories identified in the preceding phases of data collection.</p> | <p>Fruit and vegetable tracker activity</p> <p>Participants completed a tracker activity which asked them to record how many serves of fruit and vegetables they ate daily for one week at a time; tracker activity was based on the serve sizes and recommendations provided in the Australian Dietary Guidelines</p> <p>Participants were given instructions about how to record serving sizes accurately. Participants kept grocery receipts for the week that they completed the activity. At the end of each week, participants sent pictures of their tracker activity and receipts via email or text. Procurement (receipts) and consumption (tracker) data were compared at the conclusion of Phase 4.</p> | <p>Tracker activities, receipts and any photos taken by participants were stored digitally</p> | <p>Tracker activity was designed by myself and has been used previously in my practice as a dietitian. Self-reported data provides insight into amount of serves eaten daily and allows participants to develop skills in measuring fruit and vegetable intake. Receipts provided insight into how many fruit and vegetables were procured relative to other foods and allowed comparison of fruit and vegetables procured and fruit and vegetables eaten.</p> <p>Comparison at the end of phase four allowed me to determine if:</p> <ul style="list-style-type: none"> - participant(s) procured fruit and vegetables differently across the weeks of phase four and in comparison, with the data collected in phases 1-3 - there was any relationship between increased fruit and vegetable procurement and fruit and vegetable consumption |
| | <p>Informal semi-structured interview (Agar, 1980; Elliott & Jankel-Elliott, 2003; Kusenbach, 2003)</p> <p>participants were invited to attend a brief, informal interview to discuss the results from phase four and provide additional detail to the data obtained. Questions related to experiences of doing the tracker activity itself were included</p> | <p>Informal interviews were audio recorded and transcribed verbatim</p> | <p>Provided additional detail to the data obtained through tracker activity and receipts</p> <p>Provided insight into how participants experienced tracker activity, and if completing this activity influenced their fruit and vegetable practices.</p> |

Adaptation of the research process

I conducted a pilot with two people prior to recruiting participants and adapted the research project in response to emerging findings and my reflexivity journal entries. This ensured the quality of the research conducted, which was necessary due to the novelty of the research methods and their combination.

Trialling the mapping activity in Phase 1 led me to understand its usefulness beyond a visualisation of where people shop for fruit and vegetables, which I responded to by altering the way I collected data in Phase 1. That is, rather than using the map and data collection guide as separate tools, I incorporated them, and used the participant's map to guide the conversation, instead of rigidly adhering to the data collection guide. This enabled me to develop a comprehensive understanding of participant's fruit and vegetable use, which was relevant and contextualised to them, and facilitated a better flow of conversation due to having a physical activity/drawn image to refer and add to during conversations. This approach aligned with the 'draw and tell' method which has been utilised in other interpretive research projects, and has been found to be useful for promoting conversation and facilitating deep exploration into participants' perspectives, particularly for children and adolescents (Goodwin, Savage & Donovan, 2023).

During the pilot, I found collecting data in food retail environments challenging, due to the presence of other people, noise, and awkward spacing around trolleys (Phase 2). In response, I chose to audio-record conversations where possible, which reduced my reliance on the collection guide and notes, which were difficult to use as I walked through the store with participants. Initially, I had only intended to observe participants cooking a meal or unpacking their groceries at home, however the pilot revealed other practices in the home that influenced fruit and vegetable procurement, such as preparing a shopping list, which I had initially overlooked. As such, Phase 3 was adapted to follow any practice relevant to the participants' fruit and vegetable use in the home, allowing for deeper and more nuanced understanding of how people used fruit and vegetables.

I also piloted the reflexivity journal prompts, which highlighted several areas for improvement in data collection (as discussed above), and provided insight into my role in

data production and interpretation. An excerpt from my reflexivity journal, used in the pilot stage of this research project is provided in Appendix 4. This understanding altered the timing between data collection events, which supported me to develop understanding throughout the research process, thus aligning with the case study research methodology and interpretivist theoretical perspectives applied to this research.

Analyse & share findings

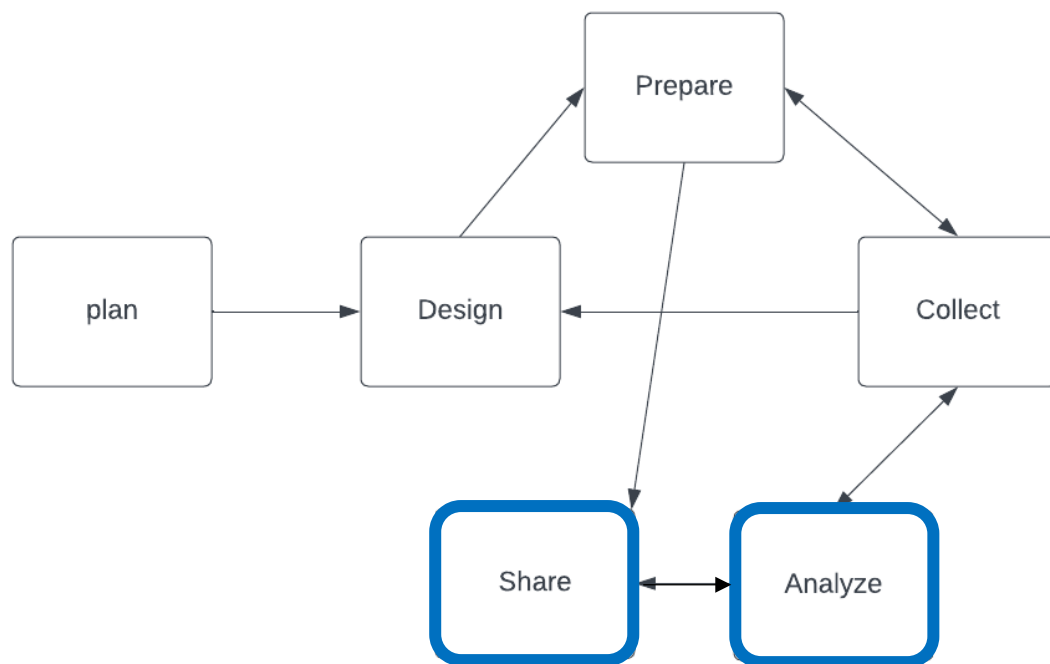


Figure 17: Analyse and share the data

The final stages of case study research involve analysing and sharing the data obtained (Figure 17). Data analysis was conducted in three stages. First, I developed individual case descriptions for each household. Steps two and three of data analysis involved the use of Braun & Clarke's (2006) thematic analysis, followed by post-hoc application of social practice theory (Castelo et al., 2021) and life course perspectives (Devine et al., 1998; Devine et al., 1999; Sobal et al., 2006). Figure 18 shows the process of data analysis used to make sense of the findings from this research project, and how each subsequent results chapter relates to the aims reported in Section 3.2.

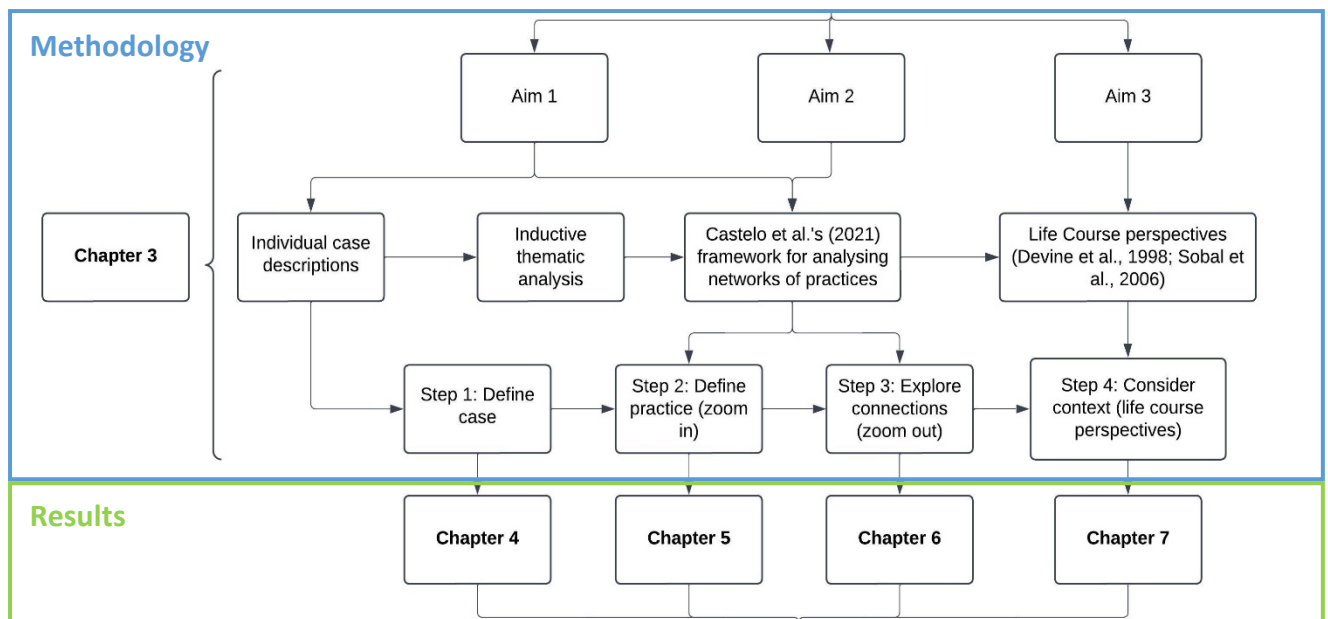


Figure 18: Overview of data analysis process and resulting chapters

Step 1: individual case descriptions

I developed individual case descriptions of each household, using a Constructionist approach to Narrative Analysis (Esin et al., 2014). This stage of data analysis focussed on representing how participants viewed their own fruit and vegetable use, while still acknowledging that my interpretation of their stories was influenced by my own positioning and role in co-creating the research data (Esin et al., 2014). The primary goal of developing these descriptions was to show the unique context of each household, and how this influenced their understanding and experience of fruit and vegetable use, which could not be represented in such detail through the cross-case analyses conducted in later stages of data analysis. Data for individual case descriptions were primarily obtained from my reflexivity journal entries. However, the narratives were developed after I had completed the initial phases of data coding (Step 2), and thus were also informed by all other data types collected, including interview recordings and transcripts, photos, and field notes. Accessing all data types allowed me to investigate how participants made sense of their own experiences, thus increasing the accuracy of the narrative produced (Esin et al., 2014). The use of reflexivity entries provided insight into the development of participants' 'stories' over time, including how I contributed to the creation of participants stories, and how my

interpretation of their stories changed as we moved through different phases of the research process (Esin et al., 2014). Individual case descriptions are reported in Chapter 4.

Participants were sent their individual case descriptions to review prior to steps two and three of data analysis. They were advised that the purpose of the individual case descriptions was to provide context and understanding for the reader of the thesis and any other research outputs, about who the participants in this project were, and how their unique experiences and situations influenced their fruit and vegetable use. Participants were invited to provide comments or feedback if they felt that I had misunderstood or misinterpreted anything in their data. All participants felt that they had been represented accurately, and no participants requested any changes to their narrative descriptions. Individual case descriptions have been edited for readability since, but no substantial changes to content have been made since they were sent to participants for review. This process highlights how knowledge was co-created through this research project, in alignment with the interpretivist theoretical perspective, and constructionist epistemology inherent to the research design.

Step 2: Inductive thematic analysis

In step two of data analysis, I analysed the data obtained from phases one through four. This included participant transcripts, field notes, reflexivity entries, photos, fruit and vegetable trackers and receipts, and participants' 'map' drawings. To analyse these data, I first used steps one through three (familiarisation with the data, generation of codes, and combining codes into themes) of Braun and Clarke's thematic analysis to develop a network of codes that could be used in subsequent analyses (Braun & Clarke, 2006). Familiarisation with the data was achieved through reviewing participant transcripts and any field notes taken during data collection. I also transcribed most of the interview transcripts, which further assisted with data familiarisation. The reflexivity process (described further in Section 3.4) allowed me to interpret the data as I moved through different phases of the research project, enhancing my understanding of it as the project progressed. To generate codes and combine them into themes I imported all transcripts, field notes and reflexivity entries into NVivo 13 (Lumivero, 2020) and inductively coded them line by line. As I generated codes, I combined and refined the coding tree, simultaneously combining codes

into themes as I did so. At this stage I had developed broad themes related to ‘understandings’, ‘experiences’, and ‘life course influences’ of fruit and vegetable use. These broad themes were then used in conjunction with applied use of social practice theory and life course perspectives to make sense of the data, in step three of data analysis.

Step 3: post-hoc application of social practice theory and life course perspective

I used Castelo et al.’s (2021) framework for analysing networks of social practices and life course perspectives to make sense of the data contained in the broad themes created in step two of data analysis. These research approaches have been previously applied to fruit and vegetable research, and support deeper understanding of the contextual nature of peoples’ interactions with food than thematic analysis can provide in isolation (Castelo et al., 2021; Devine et al., 1998; Devine et al., 1999; Sobal et al., 2006). Social practice theory and life course perspectives are highly relevant to the constructivist epistemology that informed the research. Combined, they support a belief that fruit and vegetable use is a social practice that is influenced by social actors, spatial settings and temporal factors, and that people will adapt their fruit and vegetable use over time, in response to life course events and experiences. This is represented in Figure 19, which shows how these approaches to understanding research data combine and overlap. The following sections describe these theories in greater detail and explain how I used them to make sense of my data.

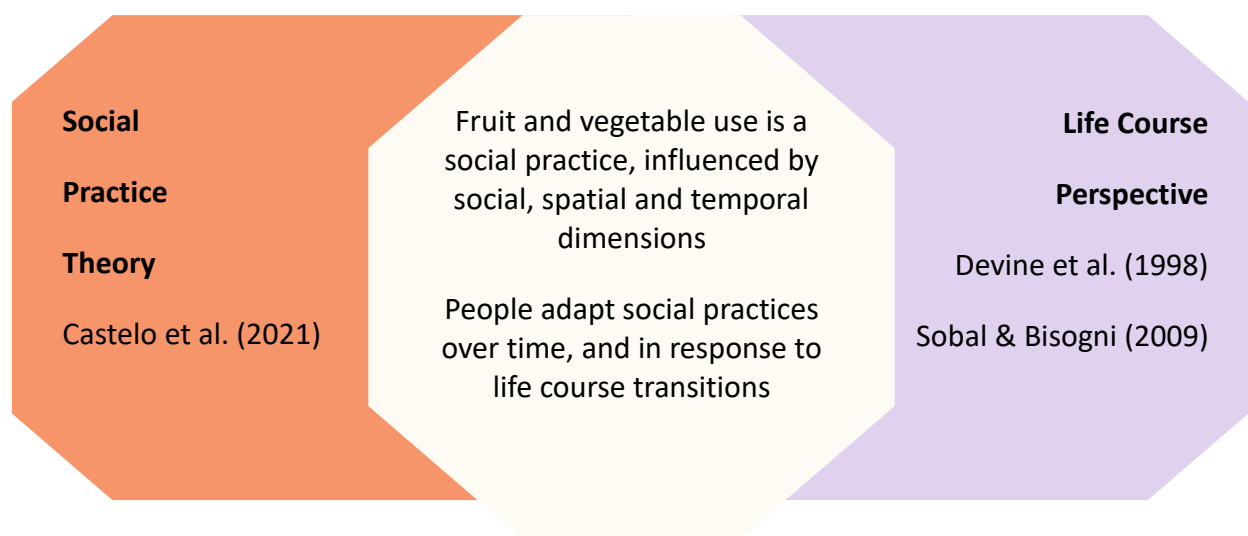


Figure 19: Intersection of social practice theory and life course perspective

Social Practice Theory

Everyday behaviours such as procuring fruit and vegetables can be considered as social practices that are embedded in, and interconnected with, daily routines and other social practices (Castelo et al., 2021; Neuman, 2019; Maller, 2015; Reckwitz, 2002; Shove et al., 2012). Recent research findings suggest that social practice theory enhances understanding about food-related practices (Burgess & Evans, 2016; Evans, 2011; Evans, 2012; Keegan & Breadsell, 2021; O'Neill et al., 2024; Wertheim-Heck & Raneri, 2020; Wertheim-Heck & Spaargaren, 2016; Wertheim-Heck et al., 2014; Wright-Pedersen et al., 2023; Wright-Pedersen et al., 2024). In addition to this, social practice theory overcomes many of the challenges inherent to more individualistic approaches which have previously been described in Section 1.5.

Social practice theory largely draws on the work of Giddens and Bourdieu and has been developed and expanded upon by several theorists over the 21st century, resulting in a variety of approaches to studying social practices (Maller, 2015; Neuman, 2019; Schatzki, 1997; Warde, 2005; Sedlačko, 2017). Bringing these theories together, is the focus on social practices as the unit of analysis, rather than individual intentions, beliefs or behaviours, or settings (Neuman, 2019; Blue et al., 2014; Reckwitz, 2002). Recent applications in food and sustainability research (e.g. Shove et al., 2012; Warde, 2016; Evans, 2011; Evans, 2012). primarily apply social practice theories developed by Schatzki (2002) and Reckwitz (2002) which build on and extend the work of Giddens and Bourdieu (Maller, 2015; Neuman, 2019). However, these various iterations and applications of social practice theory in food research often use different definitions of the elements that make up social practices (see Maller (2015) and Castello et al. (2021)). Bringing most of these definitions together, is the agreement that in social practice theory, the practice itself is the unit of analysis, and people are the 'practitioners' of the practice, who develop and evolve practices over time to the point that they become habitual and routinised (Shove et al., 2012; Warde, 2015, Castelo et al., 2021; Reckwitz, 2002). Practices are comprised of various elements, which Shove et al., (2012) have simplified from Reckwitz's (2002) definition as being 'meanings', 'materials' and 'skills or competences' (Maller, 2015; Castello et al., 2021). In addition to this, Schatzki's (2002) approach to social practice theory incorporates a consideration for how practices influence each other, which has similarly been adapted and evolved over time resulting in

numerous terms and definitions describing these relationships (see Castello et al., 2021) (Maller, 2015; Neuman, 2019; Castello et al., 2021). To clarify practice terminology, Castello et al., (2021) developed an analytical framework which focuses on analysing existing practices, and describing changes in practices. This framework provides a clear definition for the elements of practice (primarily drawing from Shove et al.'s (2012) work), and the connections between practices (based research applying Schatzki's (2002) approach to social practice theory). The framework also provides an operational conceptualisation of these concepts specific to the context of food studies, which enables and simplifies empirical analysis, making it particularly useful and relevant to this research. As such, the remainder of this section describes Castello et al.'s (2021) conceptual framework for analysing networks of practices, and how it was applied to this research project.

Castelo et al.'s (2021) conceptual framework for analysing networks of practices

Figure 20 shows a visual representation of Castelo et al.'s (2021) conceptual framework for analysing networks of practices, with life course perspectives (Devine et al., 1998) added to highlight how they were combined in this research project.

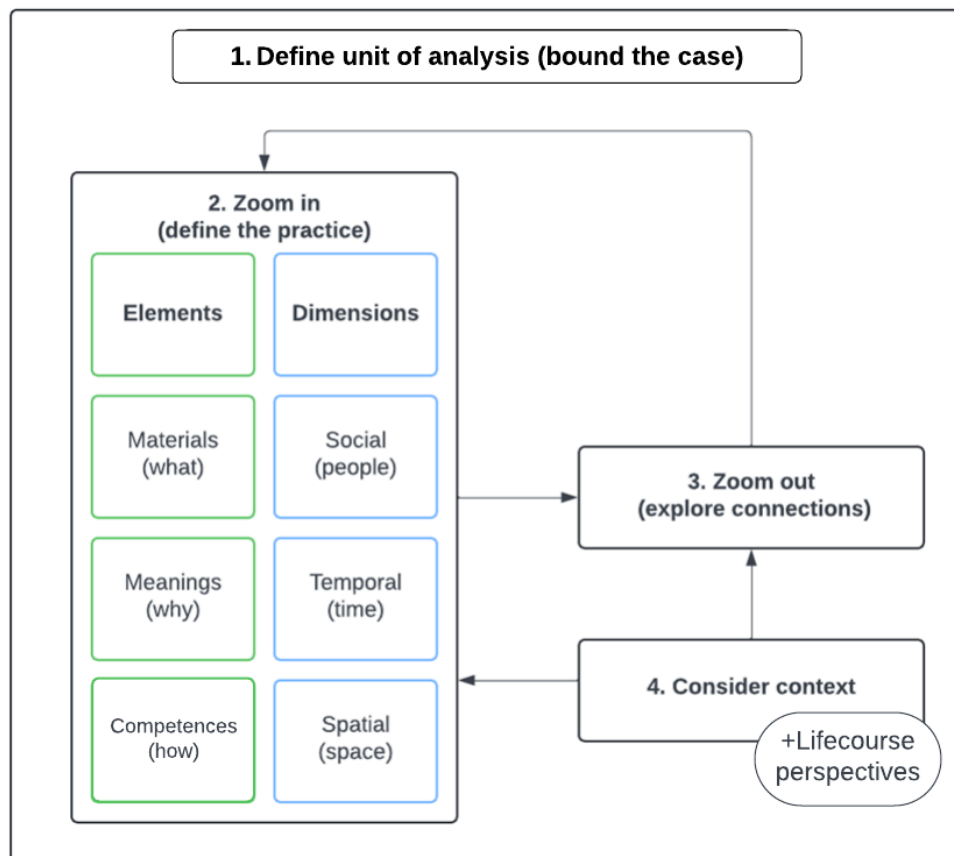


Figure 20: Visual representation of Castelo et al.'s (2021) framework for analysing networks of practices with addition of life course perspectives (Devine et al., 1998)

Social practices are discrete entities that have unique histories and trajectories, and develop and evolve through peoples' performance of them across instances, places and settings (Maller, 2015; Shove et al., 2012). Practices are formed from 'elements' including meanings, materials and competences (Castelo et al., 2021; Shove et al., 2012). To observe and understand how elements inform the performance of practice, Castelo et al.'s (2021) framework considers them in the context of social, spatial and temporal dimensions. This highlights the contextual influences that determine how and why people perform practices in the ways they do (Castelo et al., 2021; Shove et al., 2012). Importantly, Castelo et al.'s (2021) framework also incorporates the concept of 'zooming in' and 'zooming out' of practices, drawn from Nicolini's (2012) work on practice theory. The 'zooming in' and 'zooming out' approach provides a useful framework for looking at the practice itself, along with the connections between practices that influence how the practice is performed by different people, across dimensions of time and space (Castello et al., 2021).

Castelo et al.'s (2021) framework involves four primary steps in the empirical analysis of social practices. The first step requires the unit of analysis to be defined, which was completed in step one of the case study research design. The practice of fruit and vegetable procurement was the phenomenon under investigation. The second step involves 'zooming in' on the practice under investigation, to describe the elements (materials, meanings and competences) required to perform the practice. It also involves exploring the social, spatial and temporal dimensions that influence how the practice is performed. The third step 'zooms out' from the starting practice to explore the connections between practices that may compete or facilitate the practice under investigation. Throughout all steps, researchers consider the broader context of the social world that may be influencing how the practice under investigation is performed. For example, global events such as the Covid-19 pandemic, and policy environments are likely to influence how social practices are performed. Researchers must consider such events when considering how social practices might be changed or adapted given this context. The following sections describe the 'zooming in' and 'zooming out' process in greater detail, and provide a definition of elements and dimensions, according to Castelo et al.'s (2021) framework.

Step 3a: Define the practice (zoom in)

This section describes the ‘zooming in’ stage of Castelo et al.’s (2021) framework for analysing networks of process. It primarily focusses on exploring the ‘elements’ and ‘dimensions’ of social practices, and how they are interlinked and considered in social practice theory approaches to research. While social practice theory is in no way specific to the practice of ‘eating breakfast’, I have included examples throughout the elements and dimensions sections that are related to the practice of ‘eating breakfast’. These examples were provided to support the reader to make sense of these concepts, through an everyday practice that they are likely to already be familiar with.

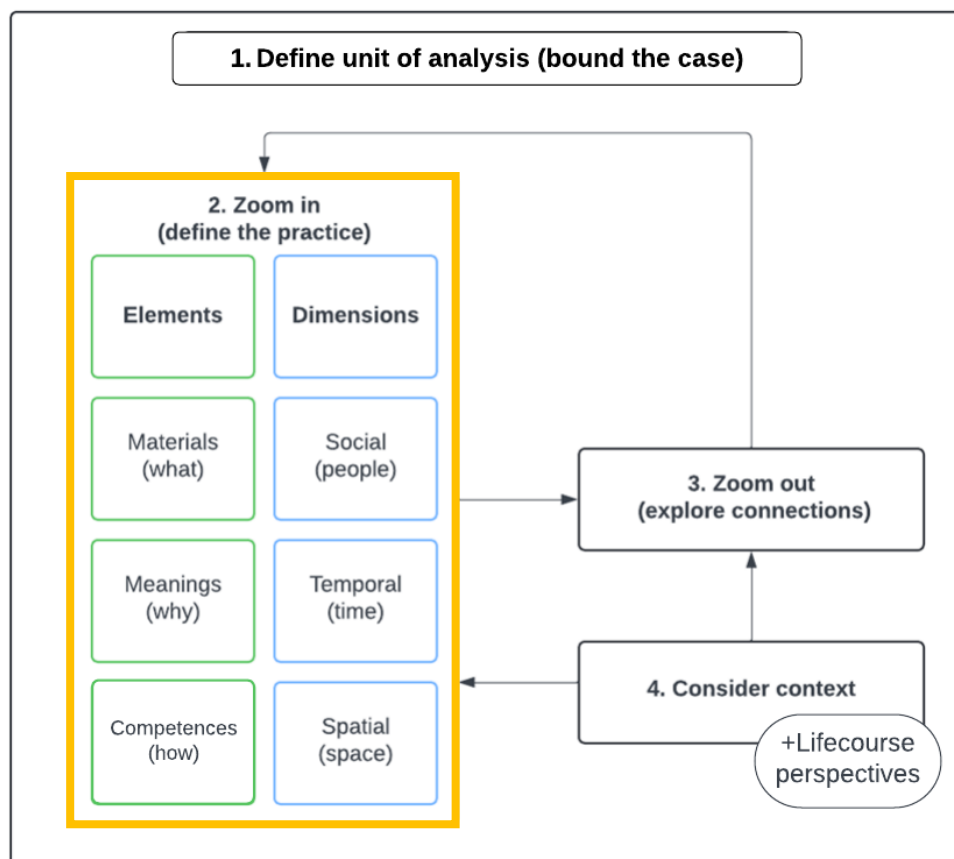


Figure 21: Visual representation of Castelo et al.’s framework for analysing networks of practices (zoom in)

Elements of social practices

Practices are constituted by elements which include meanings, materials and competences (Castelo et al., 2021; Maller, 2015; Shove et al., 2012). While practices themselves can be considered entities, they are only maintained, reproduced or changed through their performance, thus relying on people to evolve them over time (Castelo et al., 2021; Shove et al., 2012). That is, social practices cannot exist without their performance through people over time. Figure 22 shows a visual representation of elements of practices with examples for the practice of eating breakfast.

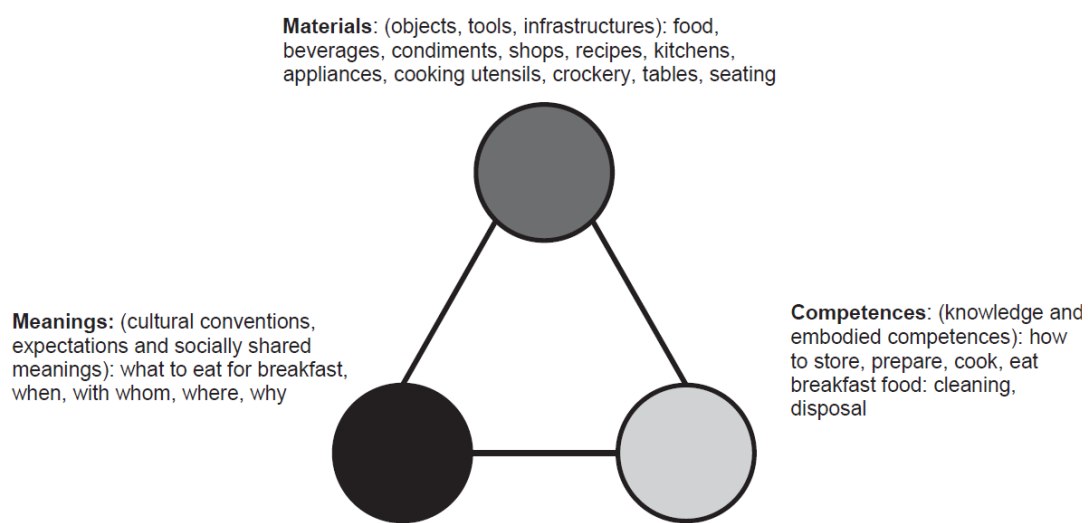


Figure 22: Elements (materials, meanings and competences) of social practices with examples for 'eating breakfast'. Figure developed by Maller (2015, p. 58) to include examples for 'eating breakfast', originally adapted from Shove et al., (2012, p 29).

Meanings are the basis of people's motivations to perform practices and can include cultural conventions, expectations and socially shared meanings (Maller, 2015). They allow us to make sense of our actions and provide information about how and why we should, or would want to do things (Castelo et al., 2021; Maller, 2015). For example, believing that 'breakfast is the most important meal of the day' may motivate people to eat breakfast every day, because they feel they 'should' do this to be healthy, or to have a fulfilling life. Similarly, socio-cultural rules or norms about what time breakfast should be eaten, and what foods are acceptable to include in the breakfast meal, might determine how people perform the practice of 'eating breakfast' (e.g. through determining what foods they incorporate and what time they sit down to eat). In summary, meanings determine why

people do or do not perform practices, and can influence how they are performed and thus reproduced or altered over time.

Materials refer to the ‘things’ that are required to ‘do’ practices, including objects, tools, and infrastructures (Castelo et al., 2021; Maller, 2015; Shove et al., 2012). Extending the breakfast example, materials might include the dining table, food, crockery, condiments, reading materials, phones, hands, the kitchen, and any number of other ‘things’ that a person involves in the practice of ‘eating breakfast’. Considering materials is particularly important in investigating social practices as it takes these ‘things’, which are often overlooked in food research, and places them as active elements at the centre of practices (Maller, 2015). Doing so provides critical insight into how elements beyond individual people’s control can influence health-related practices. For example, limited access to materials required to perform practices is likely to limit people’s ability to perform them (Maller, 2015). Overlooking the role of these materials, and people’s access to them, underestimates the impact of the structural world on our everyday behaviours, and provides an unrealistic representation of the role of individual agency in driving change in social practices over time.

Competences refer to the knowledge and skills required to perform practices. They include both tacit (e.g. how to do) and explicit (e.g. what to do) knowledge, physical abilities (e.g. motor control) and mental skills (e.g. comprehension, reasoning) (Castelo et al., 2021; Maller, 2015; Shove et al., 2012). For example, to perform the practice of ‘eating breakfast’ people must know what foods are acceptable to eat for breakfast, what time it is appropriate to eat breakfast, and quite literally ‘how to eat’ including how to chew etc.

Dimensions of social practices

Practices are performed differently dependant on where and when, and who performs them (Castelo et al., 2021). These factors are referred to in social practice theory as ‘dimensions’, and include social, spatial, and temporal dimensions. Investigating these dimensions allows researchers to develop deeper understanding about how practices are developed, performed, and altered over time, in response to contextual shifts that occur as part of daily life (Castelo et al., 2021; Shove et al., 2012).

The **social dimension** influences how practices are performed and, the meanings, materials and competences that constitute a practice across different settings (Castelo et al., 2021; Warde, 2016). This occurs on both a personal level, and a broader socio-cultural level. Who performs practices and who they are with (or not) can determine how the practice is performed. For example, people who eat alone are likely to practice 'eating breakfast' differently to people who are eating with their family or friends (Warde, 2016). Furthermore, the specific format and structure of 'breakfast' will vary dependant on the socio-cultural background and understandings of the people performing the practice (Castelo et al., 2021). For example, 'eating breakfast' in Australia might look very different to 'eating breakfast' in Singapore, due to different socio-cultural norms and rules about what 'breakfast' is. In summary, the social dimension refers to who is performing the practice, and how that person's socio-cultural world and relationships influence how they perform it. In the following sections, I provide examples for the spatial and temporal dimensions of practices from a predominately white, middle-class, Australian socio-cultural perspective.

The **spatial dimension** refers to the settings and environments in which practices are performed. Social practices can be performed in more than one place at any given time. They are highly context dependent, and are adapted to situations and locations by the people who perform them (Castelo et al., 2021). Comparing practices performed in different spatial settings (e.g. countries, towns, institutions) provides insight into the specific configurations of elements that form a practice and how they differ between settings (Castelo et al., 2021). For example, it is easy to jump to the conclusion that breakfast eaten is in the home, but when considering the practice of eating across multiple settings, it becomes clear that breakfast can also be eaten in the car, at work, at school, or at the gym. The specific materials, meanings and competences of 'eating breakfast' in each of these settings is likely to be different. Figure 23 shows an example of how the practice of 'eating breakfast' might differ between two spatial settings (home and work). The spatial dimension also influences how social practices interact with each other (Castelo et al., 2021). For example, eating breakfast at home might compete with the practice 'taking the kids to school' while eating breakfast at work might compete with 'doing my job'. These

connections to other practices will be discussed further in the remainder of this thesis section.

| Eating breakfast at home | Eating breakfast at work |
|----------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Meanings: ‘family time’, eat tasty food | Meanings: fast, easy, don’t offend colleagues or cause discomfort |
| Materials: bacon, eggs, pancakes, juice, coffee, crockery, table | Materials: banana, yoghurt cup, desk, spoon, lunchbox |
| Competences: sharing food, keeping pancakes hot, balancing flavours | Competences: opening food, eating quickly, packing breakfast |

Figure 23: Example of potential differences between elements of ‘eating breakfast’ based on two spatial dimensions the practice is often performed in

The **temporal dimension** refers to the timing and sequence of practices and how they are organised in day-to-day life. Our understanding of temporal order in the world (e.g. seasons, months, days and weeks) influences our food-related practices and the patterns in which we perform them (Castelo et al., 2021). The order in which we perform social practices then creates temporal segments in our daily lives such as morning, afternoon and evening (Castelo et al., 2021). For example, a person’s understanding of seasons might change the materials (food) involved in the practice of eating breakfast (e.g. fruit in summer, porridge in winter). Similarly, if the timing of a person’s work-related practices change (e.g. from working night-shift to working day-shift), their conceptualisation of temporal segments in their daily life is likely to change, therefore altering the timing and sequence in which they perform other practices. For example, day shifts might involve: morning (wake up>walk dog> eat breakfast>go to work), evening (go to gym>have dinner>go to sleep); while night shifts might involve: evening (wake up>eat breakfast>go to gym>go to work), morning (walk dog>have dinner>go to sleep). In this example, the social practices performed remain the same, but the timing and sequence in which they are performed is altered, due to fluctuations in the timing required to perform ‘going to work’. Factors in the temporal dimension can also influence the socially expected duration or frequency of practices (Castelo et al., 2021). For example, the practice of ‘eating breakfast’ might be expected to take more time on weekends than during the working week. In summary, the temporal

dimension refers to the timing, duration or frequency of practices, and the broader social understandings of time and how that impacts performance and organisation of practices in daily life.

Step 3b: Explore connections (zoom out)

‘Zooming out’ refers to the process of analysing the connections *between* social practices (Castelo et al., 2021). ‘Zooming out’ follows the practice initially investigated in the ‘zooming in’ step, to ‘where it leads’ (Castelo et al., 2021) (Figure 24). This allows researchers to explore how the starting practice connects with other practices, allowing for deeper and more comprehensive understanding about both the starting practice (e.g. eating breakfast) and how other practices of daily life influence and are influenced by this practice (e.g. going to school, going to work, going to the gym) (Castelo et al., 2021; Nicolini, 2012).

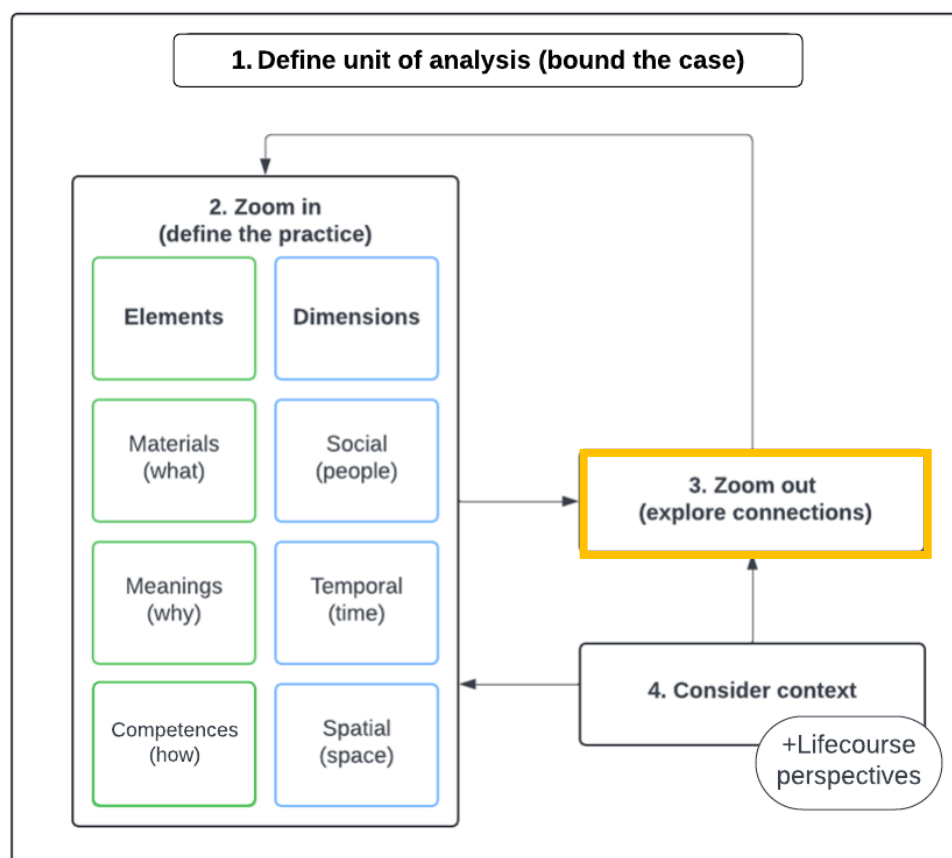


Figure 24: Visual representation of Castelo et al.'s (2021) framework for analysing networks of practices (zoom out)

Castelo et al. (2021) describe three main types of connections between practices, which include 'complexes', 'bundles', and 'nexuses'. The following sections briefly describe what each of these are and how they can be identified. These terms are important to understand as they are used in Chapter 6 to define the connections between practices identified in this research.

Complexes of practices are co-dependent, and often difficult to separate from each other (Castelo et al., 2021; Shove et al., 2012). Often, they will be performed in sequential or synchronised ways. For example, to eat a meal at home, people generally must prepare or acquire food first. This highlights a 'sticky' form of sequential co-dependence in which the practice of eating cannot be performed without first performing the practices of food 'acquisition' or 'preparation' (Castelo et al., 2021). Complexes of practices are so highly co-dependent that individual practices (e.g. eating breakfast) cannot be fully understood without looking at the other practices within the complex (e.g. buying food, cooking, family time) (Castelo et al., 2021). Practices within complexes often share elements that link them together. For example, the meaning 'being healthy' might link practices of 'procuring', 'preparing', and 'eating' food, thus altering how these practices are performed in sequence (see Figure 25) (Castelo et al., 2021).

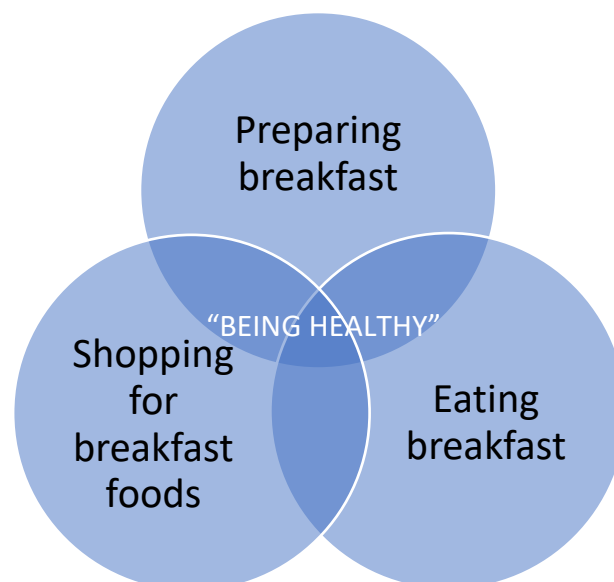


Figure 25: Visual representation of complex of practices involving 'eating breakfast' linked by shared meaning 'being healthy'

Bundles of practices describe networks of practices that are linked but unlike complexes, are not co-dependent with each other (Castelo et al., 2021). Bundled practices are often performed in the same spatial settings as food-related practices and thus may *compete* with the practice under investigation. For example, ‘eating breakfast’ might compete with ‘going to work’. The links between bundled practices can influence how the practice(s) under investigation are performed, due to the person having to ‘juggle’ or ‘manage’ allocation of time and resources to different practices that compete with each other (Castelo et al., 2021). Not all bundled practices will compete. For example, the practices of ‘eating breakfast and ‘getting kids ready for school’ might be bundled together (Castelo et al., 2021). In this example, ‘eating breakfast’ and ‘getting the kids ready’ are not co-dependent, nor competing as such. Rather, the two practices are loosely coupled through their organisation in time (morning) and space (the home) (see Figure 26). Understanding how practices are bundled can increase understanding about how practices can or cannot be changed within social, spatial and temporal settings (Castelo et al., 2021). For example, a person is unlikely to change how they perform ‘eating breakfast’ within their home if the practice of ‘eating breakfast’ competes with time and resources already allocated to home-bound practices such as ‘getting kids ready for school’, ‘feeding the dog’, and ‘getting ready for work’.

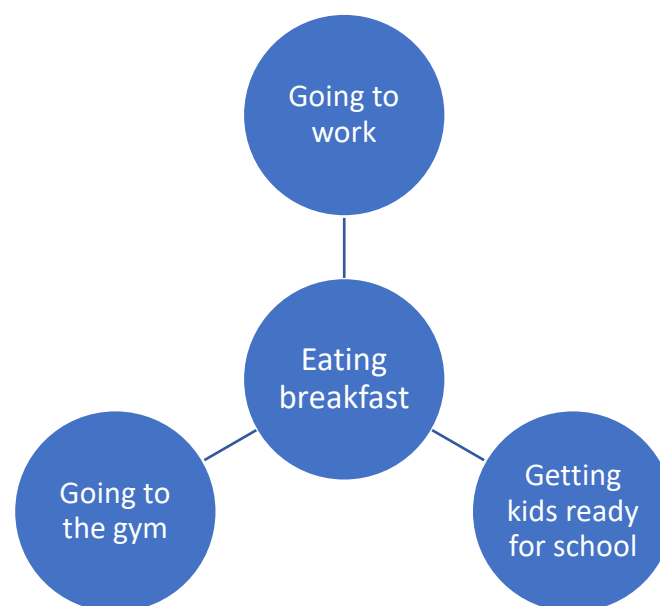


Figure 26: Visual representation of practices which might be ‘bundled’ with ‘eating breakfast’

Nexuses of practices refer to practices that *intersect* with other practices, including bundles and complexes of practices (Castelo et al., 2021). Identifying nexuses that link bundles or complexes of practices together can provide insight into why certain practices are carried out in the way they are (Castelo et al., 2021). For example, ‘driving’ might link several different bundles and complexes of practices, including ‘going to work’, ‘buying groceries’, ‘taking the kids to school’ and ‘eating out’ (Figure 27). The links between driving and these other practices, bundles and complexes are likely to determine how, when and in what order these practices are performed.

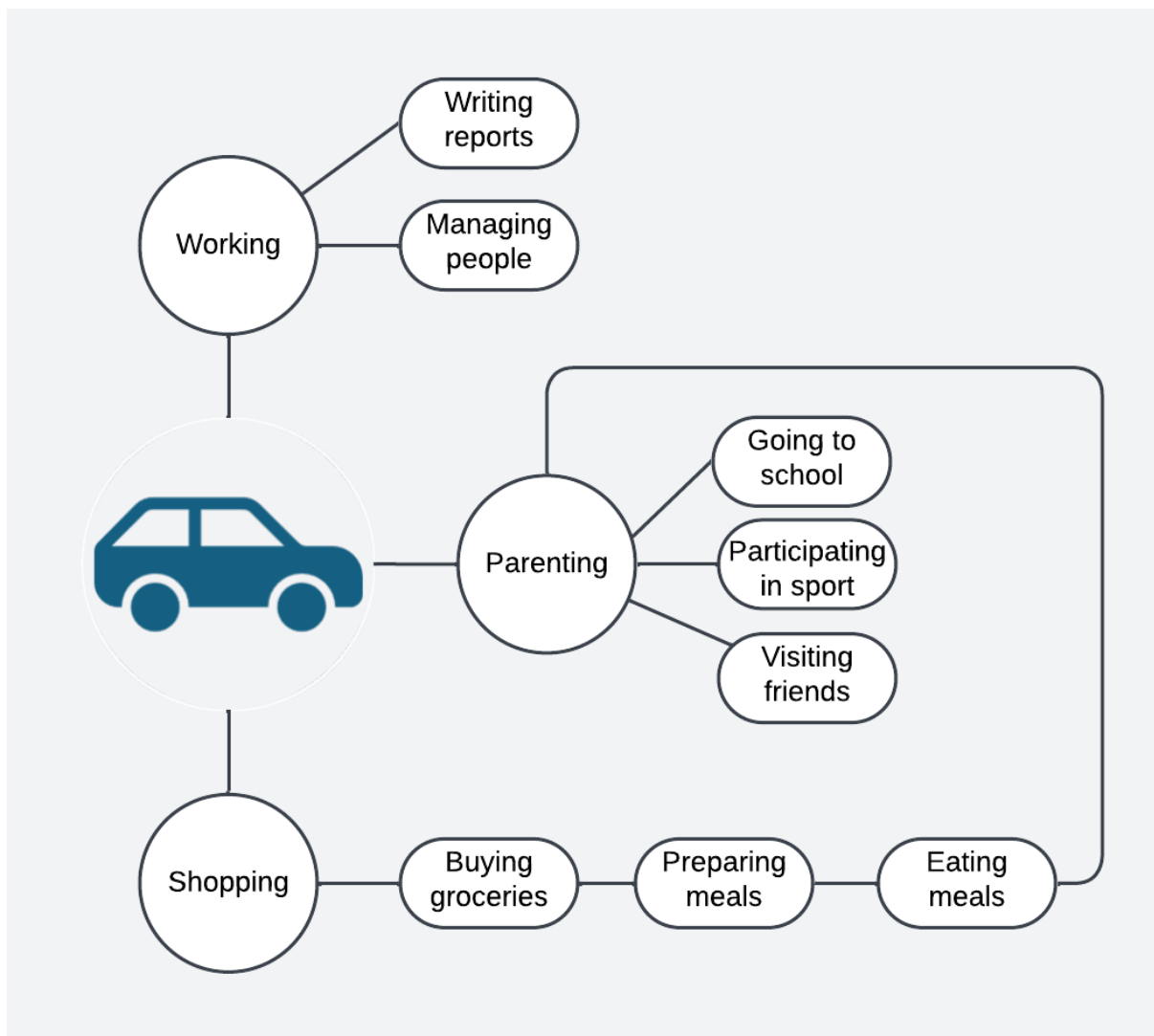


Figure 27: Visual representation of a nexus (driving) that links several complexes and bundles of practices

Step 4: Consider context

Practices of fruit and vegetable use involve many different food choice decisions and behaviours that ultimately determine whether or not fruit and vegetables will be eaten (Sobal & Bisogni, 2009). These decisions and behaviours are embedded within people's unique personal history, and evolve over time as people adapt, or make new food choice decisions (Sobal & Bisogni, 2009). Therefore, no food choice decisions can be fully understood without considering the past events that have influenced people's current ideals and resources for making food choice decisions, and the social, spatial and temporal factors that influence these decisions as they are made (Castelo et al., 2021; Sobal & Bisogni, 2009). As such, this section describes how context was considered in this analysis, and how life course perspectives were integrated into the 'consider context' component of Castelo et al.'s (2021) framework to build existing theory (Figure 28).

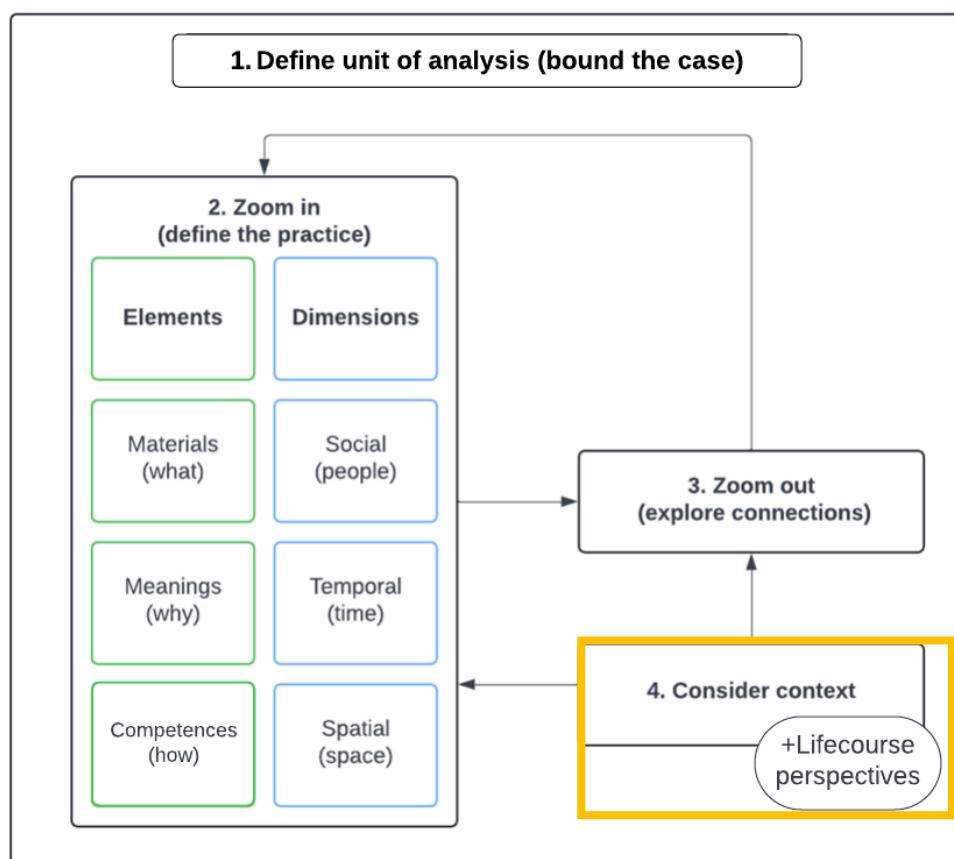


Figure 28: Visual representation of Castelo et al.'s (2021) framework for analysing networks of practices (consider context)

Inductive thematic analysis of the data collected in this research project highlighted several life-course transitions and factors that influenced the meanings, materials, and competences people associated with the practice of fruit and vegetable procurement. Life course perspectives have been applied in previous research to provide insight into how food choices evolve and change over time (Devine et al., 1998; Devine et al., 1999; Sobal & Bisogni, 2009; Wethington & Johnson-Askew, 2009). Previous research investigating life course influences on fruit and vegetable trajectories identified that there are seven major influences on fruit and vegetable trajectories throughout the life course (Devine et al., 1998). These include food upbringing, roles, health, relocation and immigration, resources, and the food system, which have previously been described in Thesis Section 2.4.

Inductive codes developed under the heading 'life course' in Step 2 of data analysis primarily highlighted transitions that influenced how participants adjusted or adapted their fruit and vegetable practices over time. As such, I applied the life course concepts reported by Devine et al., 1998 post-hoc to the inductive codes developed in Step 2 of data analysis, to make sense of my themes and findings. This involved re-categorising relevant codes according to the life course concepts (food upbringing, roles, health, relocation and immigration, resources, and the food system) defined by Devine et al., (1998), and developing new themes when findings from this research did not align with the categories previously reported by Devine et al., (1998). This life course perspective was applied as an additional layer to social practice theory, supporting my understanding of the context surrounding the development and modification of practices over time (Castelo et al., 2021). Findings from this analysis are reported in Chapter 7. Applying life course perspectives in this way allowed me to build social practice theory through combining two existing theoretical perspectives, as shown in Figure 19.

3.4 Measures of Rigour

In this section, I describe how I have considered rigour throughout the research. The section starts by describing the methods of reflexivity incorporated into the research project, which was critical to ensuring quality within the interpretivist theoretical perspective I applied to the research. Following this, I use Lincoln and Guba's (1985) proposed criteria for assessing the rigour of qualitative research to scaffold additional methods of rigour under concepts of credibility, dependability, confirmability and transferability (Lincoln & Guba, 1985).

3.4.1 Reflexivity

Reflexivity is an important component of maintaining rigour in qualitative research, and thus was incorporated throughout the entire duration of the research project (planning, designing, preparing, collecting and analysing data, and sharing results). Reflexivity provides insight into how researchers' own biases and rationale for decision making influence the research process and interpretations drawn (Johnson et al., 2020). To ensure that I maintained awareness of my influence on the research project, I completed a reflexivity journal entry immediately after every data collection event. The reflexivity journal included prompts which encouraged me to think about my interpretation of the data, and how my own personal values and experiences influenced my approach to data collection and my interactions with participants (Roller, 2022). Alongside this, I recorded less structured reflexivity memos and notes throughout the research project.

This research project included a substantial amount of observation and researcher-participant interaction. My personal biases and worldview influenced the data, and any subsequent analyses and outcomes (Johnson et al., 2020). My reflexivity journal entries, alongside informal notes and memos were used as data to support development of participants' individual case descriptions, and to provide insight into my influence on the research project and outcomes. Data from my reflexivity journals are reported throughout this thesis where relevant, but particularly in the preface (p 16-19), section 3.3.3 (Adaptations to the research project), Chapter 4 (Individual Case Descriptions) and Section 8.3 (Strengths and Limitations). An excerpt from my reflexivity journal, used in the pilot stage of this research project is provided in Appendix 4 to show the depth of my reflections and how I used them to alter and adjust the research process to facilitate better outcomes.

3.4.2 Credibility

Credibility refers to the extent to which the understandings and interpretations drawn from my research project are believable and add value to public health research and practice (Houghton et al., 2013; Lincoln & Guba, 1985). Alongside my reflexivity journal, I ensured my research was credible through prolonged engagement, persistent observation, triangulation, peer debriefing and member checking.

Prolonged engagement and persistent observation enhances the credibility of qualitative case study research by grounding investigations in consistent phenomena that are observed over time (Houghton et al., 2013; Johnson et al., 2020; Lincoln & Guba, 1985). I integrated prolonged engagement and persistent observation through incorporation of multiple data collection phases. This allowed me to gain access to participants at multiple time points, and in multiple settings, which supported me to develop an understanding of the context surrounding the people and practices being studied. Furthermore, the prolonged engagement between myself and participants supported us to build rapport which facilitated more open and honest sharing from participants (Johnson et al., 2020).

Triangulation reduces the risk of error or bias that may arise when only interpreting data from a single source or data type (Houghton et al., 2013; Johnson et al., 2020; Roller & Lavrakas, 2015; Yin & Campbell, 2018). I used triangulation of data collection methods, data types, and data sources in my research project. Triangulation of data collection methods was achieved through the use of multiple ethnographic and food-systems research methods including personal food system mapping (Connors et al., 2001; Wilsey & Dover, 2014), the go-along (Kusenbach, 2003), informal semi-structured interviews and conversations (Agar, 1980; Elliott & Jankel-Elliott, 2003; Kusenbach, 2003) and researcher observations. This supported triangulation of data types, through collection of photographs, field notes, memos, reflexivity journal entries, audio-recordings, and interview transcripts, which were incorporated into the data set to provide depth to the analysis (Yin & Campbell, 2018). Source triangulation was achieved through the inclusion of different participants, who were involved with data collection on several occasions, and in multiple different settings (Yin & Campbell, 2018).

Peer Debriefing provides insight into how researchers' interpretation of the data may be influenced by their personal worldview and biases (Lincoln & Guba, 1985). To provide additional insight into how I was influencing the research process and outcomes beyond what I was able to identify in my reflexivity journal, I reflected on my findings with my peers and supervisors. This allowed me to gain feedback on my approaches to the research and my interpretations of the data which provided insight into how others might interpret the data differently (Graneheim & Lundman, 2004; Houghton et al., 2013). This encouraged me to consider different perspectives and research approaches which resulted in a more accurate representation of participants' understanding and experiences of fruit and vegetable use.

Member checking increases credibility through providing research participants with an opportunity to verify that the meanings drawn from qualitative research truthfully reflect the meaning and intent behind their contribution to the research project (Johnson et al., 2020). Often, participants are invited to read their interview transcripts to ensure that they have been accurately recorded (Houghton et al., 2013; Johnson et al., 2020). However, due to the extent of prolonged engagement built into this project, it was not realistic to expect participants to review their transcripts. Furthermore, this research is interpretive in nature, and I felt it more pertinent to gain participants' insight into my interpretation of their data, rather than the raw transcripts. Therefore, participants were provided with a copy of their individual case descriptions, rather than their interview transcripts to facilitate member checking (see Section 3.3.3 – Analyse and share findings). Participants were invited to review and add to these descriptions to provide insight into credibility of my interpretations and how we had co-constructed knowledge about their fruit and vegetable use (Birt et al., 2016; Houghton et al., 2013).

3.4.3 Dependability and Confirmability

Dependability and confirmability refer to the reliability and accuracy of my data and analysis, and how my worldview (constructionism) influenced the data reported (Houghton et al., 2013). Dependability and confirmability were primarily achieved through my reflexivity journal, which has been discussed in Section 3.4.1. Furthermore, I provided a preface to this thesis which describes how I view the world, knowledge, and the issues

investigated in this thesis. These components allow readers of the research outcomes to make an informed decision about how I have influenced the data, and how their own interpretation of the data may be similar or different dependant on their worldview. The member checking activities described in Section 3.3.3 and 3.4.2 support the accuracy and reliability of the data through showing that my interpretations have been validated by the participants who they represented. Furthermore, changes to the research protocol were recorded through document versioning and any major changes have been reported in this chapter already, thus ensuring that sufficient detail has been provided for the research to be repeated (Johnson et al., 2020). Inclusion of participant quotes in the final reports of this data also support dependability and confirmability, further allowing the reader to assess the credibility of my interpretations (Houghton et al., 2013; Lincoln & Guba, 1985).

3.4.4 Transferability

Transferability refers to the extent to which the findings from this research project can be applied to another context or situation (Houghton et al., 2013; Johnson et al., 2020). When designing this research project, I took great care to ensure that I captured, and therefore was able to report the contextual information relevant to the results presented in my thesis. Including the use of Castelo et al.'s analytical framework for analysing networks of practices provided a structured way to report the contextual influences on people's fruit and vegetable practices, thus supporting a deeper and more nuanced understanding of how people understand and experience fruit and vegetable use, and how context influences this (Castelo et al., 2021). Furthermore, the inclusion of the individual case descriptions shows in great detail the unique context of each individual household. When writing this thesis, I highlighted the unique contextual factors that influenced the interpretations drawn from my data, and supported my findings with qualitative data including photos, direct quotes from participants' transcripts, and excerpts from my field notes and reflexivity journals to provide a rich description of my results (Houghton et al., 2013; Lincoln & Guba, 1985). These strategies support readers to make informed decisions about how transferable my findings are to other people and contexts (Johnson et al., 2020). It should be noted that the sample included in this research is not representative of the opinions and experiences of the entire Australian population, and the interactions between other people, in other environments

are likely to result in different practices, thus limiting the transferability of this work to other populations and environments.

3.5 Ethical considerations

Ethical approval was provided by Flinders University's Human Research Ethics Committee (Project ID 5618). All participants were reimbursed for their time with cash at a rate of \$30 per hour. All consent forms and information sheets clearly stated that participation was voluntary. I reiterated that participation was voluntary, and reminded participants of their right to drop out verbally both at the start of participants' involvement in the project, and as they progressed through different phases. A data management plan was prepared to ensure safe and ethical management of participant data. A safety plan was also implemented to ensure that I was safe and locatable when visiting participants in public spaces or their homes. Participant identity has been protected throughout the project through use of pseudonyms. All participants were invited to review data related to their household to ensure that they were comfortable with the information being reported based on their data. No participants opted to change their data at this stage of the research project and their individual case descriptions have not been substantially changed since.

3.6 Chapter Summary

This chapter outlines the research design which is represented visually in Figure 29. This chapter contains a brief summary of the research design to guide the reader through the research design in accordance with Figure 29.

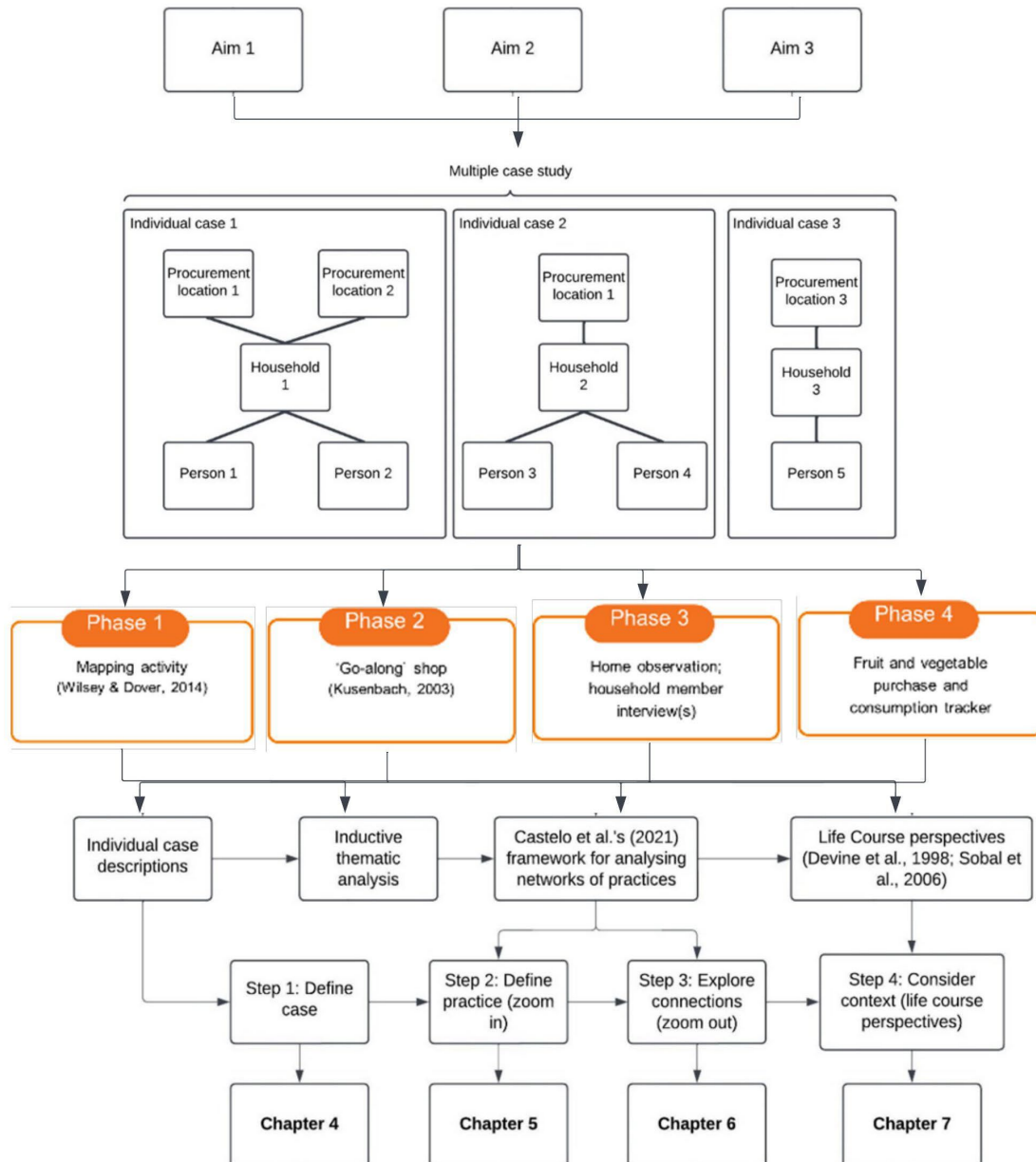


Figure 29: Summary of research process including plan, design, prepare, collect, analyse and share steps of case study research

Three research aims were developed, including:

Aim 1: explore how Australian people understand and experience fruit and vegetable procurement, and determine how food retail environments influence this

Aim 2: determine how fruit and vegetable procurement influences other practices of fruit and vegetable use (such as planning, preparing and eating)

Aim 3: determine how life course events and experiences influence development and modification of fruit and vegetable practices for Australian adults

This research is underpinned by a Constructionism worldview and interpretivist theoretical perspective. The guiding methodology was Yin & Campbell's (2018) framework for conducting case study research, and the research project incorporated multiple methods of data collection from ethnography and food-systems research. These included: personal food system mapping (Connors et al., 2001; Wilsey & Dover, 2014), the go-along (Kusenbach, 2003), informal semi-structured interviews and conversations (Agar, 1980; Elliott & Jankel-Elliott, 2003; Kusenbach, 2003) and researcher observations. Analysis of the data first included development of individual case descriptions. Then, data were analysed using Braun & Clarke's thematic analysis to inductively develop codes and group them into themes. Following this, Castelo et al.'s (2021) framework for analysing networks of practices was applied to the inductive codes post-hoc, to provide answers for Aim 1 and Aim 2. Life course perspectives (Devine et al, 1998) were then incorporated into the 'consider context' stage of Castelo et al.'s framework, to provide answers for Aim 3. These approaches and how they were used are further explained in the respective results Chapters (4-7). Rigour was achieved through use of a reflexivity journal; data, method and source triangulation; member checking; peer debriefing; and provision of rich descriptions in the research report, among other strategies. The next chapter reports the results from the first step of data analysis: 'inductive case descriptions', and provides a rich description of participants' understandings and experiences of fruit and vegetable use according to the unique context of their individual household.

CHAPTER 4 INDIVIDUAL EXPERIENCES OF FRUIT AND VEGETABLE USE: CASE DESCRIPTIONS

4.1 Introduction to chapter

Figure 30 shows the positioning of this chapter in the overall thesis, and provides insight into how the research aims and methods described in Chapter 3 led to the findings presented in this chapter. This figure is repeated in all results chapters, to guide the reader through the thesis. Chapter 4 starts by providing an overview of the sample recruited and exploring participants' understandings of fruit and vegetables across the sample (multiple case study). Following this, I provide a rich description of participants' understandings and experiences of fruit and vegetable use according to the unique context of each household (individual case descriptions). Data presented in this chapter were analysed in step one of data analysis (reported in Section 3.3.3).

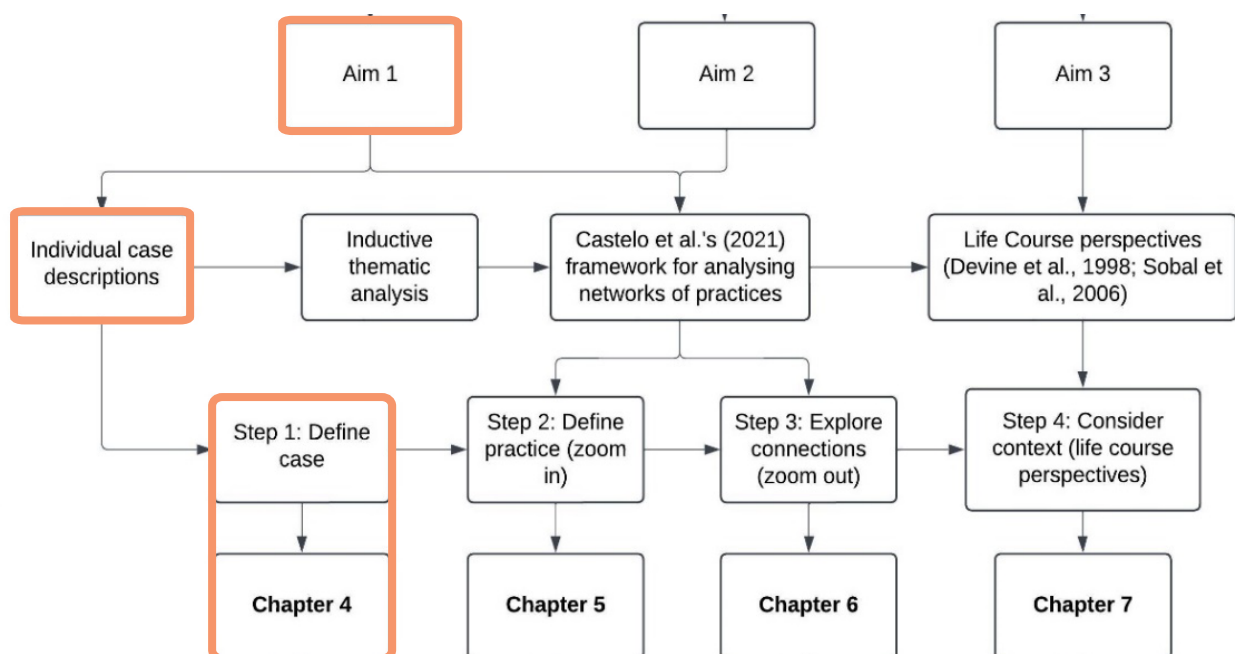


Figure 30: Visual representation of the positioning of Chapter 4 in the broader thesis

4.2 Overview of participants

Twelve households, consisting of 18 individual participants were included in the research sample. Table 3 shows the characteristics of all households and individual participants who provided data for this research project.

Table 3: Characteristics of participants and households included in the research sample

| Household | EDHI Quintile | Household type | Main purchase location | Geographic location & Classification ^a | Share food tasks? | Participant | Type | Age | Age Group ^b | Country of Birth | Occupation ^c | Participation ^d | Duration |
|---------------------------|---------------|------------------------------------|------------------------|---------------------------------------------------|-------------------|---------------|---------|-----|------------------------|------------------|-------------------------------|----------------------------|------------------------------|
| Mandy & Doug | Highest | Adult couple no children | WW | Outer West Brisbane; MM2 | Yes | Mandy | MFP | 42 | Gen Y | New Zealand | Clerical Worker | Phase 1,2 | Jan-Feb 2024 (2 months) |
| Elanor & Riley | - | Adult couple children >12 | WW | North Brisbane; MM1 | Yes | Elanor | MFP/HHM | 38 | Gen Y | Fiji | Professional | Phase 1 | Oct 2024 (1 month) |
| Kasey & Justin | Second | Adult couple children <12 | Box Delivery | South Brisbane; MM1 | No | Kasey | MFP | 25 | Gen Z | Australia | Stay at home parent | Phase 1,3 | Jan-Feb 2024 (2 months) |
| Leanne & Terry | Fourth | Adult couple no children | WW/ Coles | North Brisbane; MM1 | Yes | Leanne | MFP | 59 | Gen X | England | Administrative Worker | Phase 1 | Jan 2024 (1 month) |
| Laura & Tonia | Second | Adult shared housing (related) | Lite n Easy | North Brisbane; MM1 | Yes | Laura | MFP | 24 | Gen Z | Australia | Administrative Worker | Phase 1,2,3,4 | Jul-Nov 2023 (4 months) |
| | | | | | | Tonia | HHM | 50 | Gen X | Australia | Unemployed, on welfare | Phase 3,4 | |
| Connor & Leah | Third | Adult couple children <12 | Aldi | North Brisbane; MM1 | Yes | Connor | HHM | | Gen Y | Australia | Stay at home parent | Phase 3 | Jul-Aug 2023 (2 months) |
| | | | | | | Leah | MFP | 36 | Gen Y | Australia | Professional | Phase 1,2,3 | |
| Lucy & Reece | Lowest | Adult couple children <12 | Food Pantry | North Brisbane; MM1 | No | Lucy | MFP | 39 | Gen Y | England | Stay at home parent | Phase 1,2,2,4 | Oct-Nov 2023 (2 months) |
| Maggie & Rob | | Adult shared housing (not related) | Coles | Rural WA; MM5 | No | Maggie | MFP | 52 | Gen X | Australia | Sales & Administrative Worker | Phase 1,2 | May 2023 (1 month) |
| Ben & Olivia | Highest | Adult couple no children | WW | South Brisbane; MM1 | No | Ben | HHM | 30 | Gen Y | South Africa | Labourer | Phase 4 | Sep 2023-Jan 2024 (4 months) |
| | | | | | | Olivia | MFP | 33 | Gen Y | Australia | Professional | Phase 1,2,4 | |
| Ned & Eve | Second | Adult couple no children | Coles | North Brisbane; MM1 | No | Ned | MFP | 71 | BB | Australia | Pensioner | Phase 1,2,3,4 | Jul-Oct 2023 (4 months) |
| | | | | | | Eve | HHM | 75 | BB | Hungary | Pensioner | Phase 3 | |
| Susie & Bill | Fourth | Adult couple no children | Aldi | North Brisbane; MM1 | Yes | Susie | MFP | 54 | Gen X | Australia | Trade Worker & Manager | Phase 1,2,3 | Jun-Sep 2023 (4 months) |
| | | | | | | Bill | HHM | 55 | Gen X | Australia | Manager | Phase 3 | |
| Tom & James | Fourth | Adult shared housing (not related) | Multiple | North Brisbane; MM1 | No | James | MFP/HHM | | Gen Y | Australia | Unassigned | Phase 1 | Aug 2023 (1 month) |
| | | | | | | Tom | MFP/HHM | 33 | Gen Y | Australia | Unemployed | Phase 1 | |

^a Area classified using Australian Government Modified Monash Model classifications tool (2023): <https://www.health.gov.au/topics/rural-health-workforce/classifications/mmm>; ^b Age group classified according to (ABS, 2022c) - Gen Y (born 1981-1995); Gen Z (born 1996-2010); Gen X (born 1966-1980); BB = Baby Boomer (born 1946-1965); ^c Occupation at time of participation, classified according to (ABS, 2024); ^d Twice occurring numbers indicate phase was repeated more than once; ^e EDHI = equivalised disposable household income quintile (ABS, 2025b). EDHI was used as it better reflects the distribution of income across a household than gross income alone, and takes into consideration the number of adults and children within a household with consideration for their ability to contribute to household income. Information related to this process can be found in Appendix 5; MFP= main food purchaser; HHM= household members; IGA = Independent Grocers Australia; WW = Woolworths

4.3 Understandings of fruit and vegetable use across the sample

This section explores participants' understandings of fruit and vegetables across the sample and provides insight into how participants broadly conceptualised fruit and vegetables across the sample. It is particularly beneficial for highlighting how fruit and vegetables were understood based on the unique context of participants' daily lives, which is further expanded upon in Section 4.4. This is important as participants' understandings of fruit and vegetables had a strong influence on how they used them, which is further unpacked in results Chapters 5-7.

Participants' understandings of fruit and vegetable use were strongly influenced by the unique context of their daily life. While most participants reported that they liked or were motivated to eat fruit and vegetables, they generally valued them less than other foods such as meat and grain products. This was particularly true for vegetables, with fruit being viewed as more desirable to eat by most participants: *"Fruit, whole fruit on a hot day is amazing. It's just enjoyable in that sense. Veg is just, I think it complements the meat dish. Would I eat a plate of vegetables? Probably not."* (Connor, interview transcript, Phase 3, August 2023). Vegetables were also considered to be 'tedious' to prepare, and most participants felt more effort was required to incorporate them into daily routines, which was often related to concerns about food waste: *"...it can be really tough sometimes. Like you get like a really nice big thing of cauliflower but then when there's only two of you, it can be really tedious to try to find recipes to use that nice, big cauliflower and yeah, and you just end up having like a lot of it because it's like, I don't want it to go to waste and it can get tedious."* (Laura, interview transcript, Phase 1, July 2023).

When asked about fruit and vegetables, participants first thought of fresh fruit and vegetables, considering frozen and canned types to be secondary in both quality and desirability: *"I think the frozen ones are second grade... when I cook them I don't have a high opinion of them... It's, my worst-case scenario is either cans or frozen..."* (Maggie, interview transcript, Phase 1, May 2023). Frozen vegetables were also considered less favourable than frozen fruit, being incorporated in diets as 'backups', or a way to 'get more' vegetables into meals, especially by mothers of young children who were time-poor.

Participants often spoke about population-level ideals that they believed all Australian people should be achieving. Most could vaguely recall the 'Go for 2&5 message' from the Australian Dietary Guidelines, though to varying degrees of accuracy. This is reported in greater detail in Section 6.3.4. Alongside this, there was a general perception that the Australian population should 'support local farmers', 'buy seasonal produce', 'develop community', and 'reduce food waste', when procuring fruit and vegetables. Furthermore, participants felt it was important to 'eat a variety', 'eat healthy', 'eat organic', and 'enjoy food' when planning and preparing meals. However, most participants believed these goals were unattainable for themselves and their households, due to the external pressures of everyday life. The following section describes in depth how each individual household understood and experienced fruit and vegetable use according to their unique context.

4.4 Individual case descriptions

This following section provides a detailed description of each individual household, including their thoughts and feelings about fruit and vegetables, and how they use them in their daily lives. As shown in Table 3, many households were represented by the main-food purchaser. Where household members have also contributed to the data for that household, their perspectives and opinions have been incorporated into the individual case description. That is, the case descriptions are reported at the household level, not the individual level (Figure 13).

Elanor & Riley

Elanor and Riley were a generation X married couple who had recently moved to North Brisbane from New Zealand. Both had spent their childhood living in Fiji. At the time of participation, they had a 12-year-old daughter, and both worked full-time as Engineers (Occupation group - Professionals (Australian Bureau of Statistics, 2024)).

Elanor and Riley shared food-related tasks in the household. This was preferable for Elanor who reported: *“I hate shopping, so he does the shopping and he’s very good with the list, he never goes outside of the list”* (Elanor, interview transcript, Phase 1, October 2023). While Riley was a routine shopper for fruit and vegetables, Elanor often added new items to their repertoire, as she felt she was more open to trying new things: *“...he’s not an experimenter with fruit and veg whereas I am. I can go into the supermarket and if I see... a new type of fruit or veggie that I’m interested in I might try it whereas for him he already has set meals, and he knows what has to go in them. So if it’s anything new it will come from me...”* (Elanor, interview transcript, Phase 1, October 2023).

Elanor performed most of the food preparation tasks in the household. When Elanor procured new fruit and vegetable items, the entire household’s fruit and vegetable use changed, due to Elanor’s ability to trial new ways of preparing and eating fruit and vegetables: *“...I discovered this whole world of fruit and vegetable in organic range which I wasn’t aware of... everything is already cooked. So it transformed our cooking again, because now... our freezer is full and... we’ll just go through that [instead of buying fresh produce]”* (Elanor, Interview transcript, Phase 1, October 2023). Elanor was highly motivated to procure fruit and vegetables that aligned with her higher-order values, such as buying organic produce, and supporting local farmers and businesses. However, despite feeling positively about her family’s switch to frozen organic produce procured from supermarkets, she felt guilty for not fulfilling her values of supporting local farmers and businesses through procuring from her local fruit and vegetable markets. She explained that she felt that living in alignment with such values was unrealistic within the bounds of their busy life, due to competing demands of work and raising their child.

Kasey & Justin

Kasey and Justin were a Generation Z married couple who had three children aged 2-months, 2-years and 4-years at the time of participation. Justin worked full-time as a Scientist (Occupation group - Professionals (Australian Bureau of Statistics, 2024)) and Kasey was a full-time stay-at-home parent. They lived in the outer suburbs of South Brisbane, in a semi-rural area, and shared their property with Justin's parents. Kasey and Justin did not share food-related roles in the household, with Kasey performing all food-related tasks.

Kasey enjoyed cooking and planning meals. She took pride in preparing tasty, healthy meals for her family and enjoyed the creativity of cooking. Kasey also had a keen interest in health, and regularly visited a naturopath. She actively sought nutrition information online, and implemented what she had learned into her day-to-day life. Kasey procured her fruit and vegetables primarily through a fruit and vegetable box delivery service. She explained that she initially engaged in this service for the convenience it offered, in not having to physically visit a store to procure fruit and vegetables. However, she had since found satisfaction in knowing that the produce she purchased was grown by local farmers, and sourced and delivered by a small business. She felt this aligned with her values of supporting local farmers and found a sense of community belonging and support from using the box delivery service.

Kasey found balancing her family's food preferences and nutrition needs stressful. She felt that planning her meals and purchases around her fruit and vegetable box delivery heavily reduced this stress, and that this was one of the main reasons she continued to use the box delivery service for several years. At the time of participation, Kasey was procuring fruit and vegetables from her local supermarkets, due to the fruit and vegetable box delivery service being closed over the holidays. She and Justin were also incorporating simple recipes into their daily routines that Justin could prepare without Kasey's direction, to reduce the burden of food-related tasks for Kasey.

Laura & Tonia

Laura (Generation Z) lived with her mother Tonia (Generation X) in Northern Brisbane after moving there from Adelaide two years prior to participating in this project. Laura and Tonia had historically had very low combined income, and were reliant on welfare payments and housing support through family. At the time of participation, Laura worked in an administrative role at a Government Organisation (Occupation group – Clerical and Administrative (Australian Bureau of Statistics, 2024)). Tonia was unemployed and receiving welfare payments, but gained employment in the same sector as Laura towards the end of participation. They felt that their increased access to desired fruit and vegetables in Brisbane, along with their higher combined income, increased their motivation and ability to try new fruit and vegetables. This generated a sense of positivity and enjoyment for eating fruit and vegetables that they previously felt they could not access or afford.

Initially, Laura did most of the food shopping at Woolworths. She shopped for fruit and vegetables at Woolworths because she had previously worked for the Woolworths brand, and felt more familiar with their processes. Laura performed one major shop per fortnight, and then procured additional fruit and vegetables over the weekend if desired. She chose fruit and vegetables primarily by looking at price-reduction specials because she had learned to do this when her income was much lower, and she felt it reduced the mental burden of procuring fruit and vegetables: *“... I don’t wanna really think about [shopping for fruit and vegetables], I don’t wanna overcomplicate things.” (Laura, interview transcript, Phase 3, August 2023)*. While Laura performed most of the food procurement tasks, Tonia planned them, and they shared preparation tasks. Laura found food preparation very tedious, often leading her to order takeaway meals instead of cooking fruit and vegetables she had procured. Toward the end of their participation, Laura and Tonia started ordering Lite ‘n’ Easy meals to reduce their reliance on takeaway, reduce their food waste, and to eat healthier. They found Lite ‘n’ Easy beneficial for their fruit and vegetable consumption because it eliminated the need for planning and preparation of meals, while also allowing them to eat fruit and vegetables prepared in different ways: *“... going with lite n easy has definitely opened up a lot more vegetable choices that I normally wouldn’t buy myself, because I wouldn’t even know how to cook most of them.” (Tonia, interview transcript, Phase 4, November 2023)*

Leah & Connor

Leah & Connor were a Generation Y couple who had moved to Northern Brisbane from rural Victoria one year prior to their participation in this research project. Leah worked full-time in a marketing role for a Government (Occupation group – professional (Australian Bureau of Statistics, 2024)), Connor was a full-time, stay-at-home parent (historically trade worker and manager (Australian Bureau of Statistics, 2024)). They had two daughters aged two and five years old and spoke about wanting to be good role models for their young girls through demonstrating healthy behaviours around fruit and vegetable use. Both Leah and Connor thought that it was important to eat fruit and vegetables for weight loss and health goals.

Leah was primarily responsible for meal planning and food purchasing and spent several hours each week planning her family's meals and grocery shopping, while Connor prepared most of the meals in the home. Leah felt very negative about purchasing food, explaining that the combination of food prices, time taken to shop, and being in an environment with other people drove her dislike for food shopping: *"...it's not a nice environment... I don't enjoy doing the shop...paying the bill at the end is...not conducive of a good time... it's expensive, it takes away time from my free-time...last thing I wanna be doing is spending that free time at the supermarket..."* (Leah, interview transcript, Phase 1, July 2023). Cost and quality were Leah's key focus when procuring fruit and vegetables. While she felt she should fulfil higher order values in her fortnightly shop, such as buying safe, environmentally friendly, and morally and ethically produced fruit and vegetables, she did not feel that she had the capacity to do so. To overcome negative emotions related to not acting in alignment with these values, she relied on her trust of the Australian food system:

Leah: "It's not because I don't care, that's not what it is. I wish I had enough time to care [laughs] about where the fruit's coming from, and who's picking it, and how they're treated as a worker, and whether it's coming from a sustainable source or not. I just literally have no time, and no brain capacity to add anything extra into my world. I like to presume that if things are at major chains and supermarkets that they've gone through some checks and balances in terms of their worker rights and processes for getting those things. (Interview transcript, Phase 1, July 2023)

Leanne & Terry

Leanne and Terry were a generation X, married couple who moved to North Brisbane from Adelaide two years prior to participating in this research project. They immigrated to Australia from England over 20 years ago with their two, now-adult daughters. The couple owned a consulting business, with Terry working in a professional and managerial role, and Leanne fulfilling clerical and administrative duties (Australian Bureau of Statistics, 2024). They had a high combined income compared to most Australian people.

Leanne and Terry shared food related tasks, however as Terry was working long hours during their participation in the research project, Leanne generally planned, procured and prepared foods, with Terry assisting or taking over preparation tasks for special occasions. Leanne felt that fruit and vegetable procurement was simply something that 'had to be done'. She performed minimal planning, and considered fruit and vegetables to be a normal part of her day-to-day, life that required little conscious thought: *"I don't even think about it really, I just buy it and eat it"* (Leanne, interview transcript, Phase 1, January 2024).

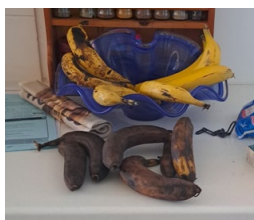
Leanne was not loyal to any particular procurement location, and preferred to 'shop around' for fruit and vegetables dependant on where she wanted to procure other foods from: *"I'm not a very loyal person [laughs]. I'll go to Aldi, I'll go to Coles, and I'll go to Woolies. I like the Coles in [location] best... because I like the bread..."* (Leanne, interview transcript, Phase 1, January 2024). To remind her to procure fruit and vegetables, Leanne would write 'fruit/veggies' on her shopping list, and then select fruit and vegetables in store, dependant on how they looked. She was not concerned about fulfilling higher-order values such as supporting local farmers, and liked to get what she wanted, when she wanted it: *"I must admit I'm not quite good at picking up stuff and going 'oh that's from there', 'that's from there' and that stuff. I just go 'I want that today'."* (Leanne, interview transcript, Phase 1, January 2024)

Leanne did not feel that Terry influenced her purchasing or planning of fruit and vegetables. She had become familiar with procuring food for the two of them, and felt that she could satisfy both of their preferences with ease. While she enjoyed some vegetables, she felt that her enjoyment of other foods, such as meat and dairy foods, limited her capacity to eat more fruit and vegetables.

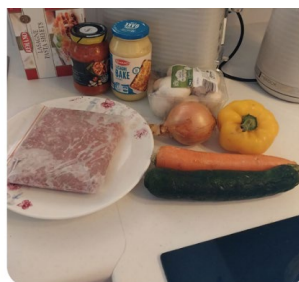
Lucy & Reece

Lucy and Reece were a Generation Y couple who lived in a suburb of Northern Brisbane with their three young boys Adam (aged 7), Zach (aged 5) and Eli (aged 18 months) who all had intellectual and/or developmental disabilities. Lucy was a stay-at-home parent, with a history of working as a health professional and Reece worked as a plumber (occupation group – trade worker (Australian Bureau of Statistics, 2024). In the year prior to their participation in this research project, Reece had a heart attack which limited his ability to work for several months, subsequently reducing the family's income. At the time of participation, they were in the lowest equivalised disposable household income bracket compared to other Australian households (Australian Bureau of Statistics, 2022b).

Lucy performed most of the food-related tasks in the household, having to 'fit it in' between caring for her sons, studying, caring for her family's health and wellbeing, and managing the family budget. To overcome the financial limitations of her current situation, Lucy accessed charity food pantries to supplement her family's weekly grocery shops. Often, the fruit and vegetables procured from these locations were very close to spoiling, which required Lucy to develop new skills around food safety, preservation and preparation (Figure 31).



Update on bananas.... although I had every intention of making banana cake, I didn't get around to it! So all 6 black bananas went in the bi. Unfortunately as they were too past it to freeze. See you Wed



Later this arvo I will make lasagne for dinner tonight. Using up the carrot and zucchini which are probably ready to throw out+

Figure 31: Images of fruit and vegetables procured from food pantry one day prior, with text updates from Lucy her plan to use the produce

Lucy could not control what was provided by the food pantries. In response, she developed a complex routine for fruit and vegetable procurement which started with collecting fresh produce from charity stores, followed by developing a rough meal plan and shopping list, and finally visiting supermarkets (primarily Aldi), to procure any additional ingredients needed for the planned meals. Lucy held a wealth of information about food prices and items and used this knowledge to compare products and prices between different supermarkets and food pantries. Tension between her desire for her family to eat well, and the reality of her limited time and finances resulted in feelings of frustration and disempowerment about fruit and vegetable use:

Lucy: *"...I spend the whole week trying to plan this food and get it... looking back now I probably hadn't realised how much we have changed over the years because of that financial constraint..."*

(Lucy, interview transcript, Phase 1, October 2023).

Lucy: *"...When I think about how I'd like to cook if time and money [weren't] a barrier, it would be like going and getting that fresh produce from the market on the weekend. Helping the boys pick out what they want and put it in the bag and just involving them a bit more. Having the time to enjoy cutting it and cooking with love... if nothing else mattered, and I was just here to cook, that would be how I would cook. And that's how I should cook, but that's not a reality..."*

(Lucy, interview transcript, Phase 4, November 2023)

Maggie & Rob

Maggie and Rob were an unmarried, Generation X couple who live together in a rural town in Western Australia. Both were employed with Maggie working part time in sales and administrative roles, and Rob working full time as a trade worker (Australian Bureau of Statistics, 2024). At the time of participation, Maggie had recently moved into Rob's house and started growing her own fruit and vegetables there. Maggie was responsible for most of the food-related tasks in the household. She primarily shopped for fruit and vegetables at Coles, despite not wanting to, because she felt she had no other choice. She explained that she valued fruit and vegetables grown in her own garden, or gifted from friends more highly, finding them more worthy of attention than produce purchased from large supermarkets like Coles.

While she felt motivated to eat fruit and vegetables, she believed the quality of produce available to her was suboptimal, and as such felt that she primarily purchased it for Rob's benefit: *"...the food that's offered in the grocery store is not exciting. It doesn't make me feel motivated to particularly buy it or consume it, it's just 'oh I have to do something because I've got a partner'. If it was just me... I probably wouldn't be buying any of this."* (Maggie, interview transcript, Phase 2, June 2023). Her procurement practices were thoughtful and considered. She held values about food waste, nutrition, taste, quality, ethics and cost, and considered these in her fruit and vegetable procurement: *"there's those factors of price and, whether the product's come locally, and what it looks like when it's here and, it's so much more than just going whether I like them or not..."* (Maggie, interview transcript, Phase 2, June 2023). She found that their home grown produce tasted better, and as such encouraged Rob to eat more fruit and vegetables than he previously had before having the garden: *"...he's interested in our food that we're growing and that's huge... it's really diversified his everyday experience [of eating fruit and vegetables]."* (Maggie, interview transcript, Phase 2, June 2023).

Mandy & Dale

Mandy and Dale were a Generation Y couple who did not have children. They had a high equivalised disposable income compared to other participants and the Australian population (Australian Bureau of Statistics, 2022b). Mandy worked in an administrative role, and had immigrated to Brisbane from New Zealand, while Dale worked as a delivery driver and was of Scottish descent. At the time of participation, they lived in a semi-rural area of outer Brisbane.

Mandy had found increased motivation to eat fruit and vegetables due to recent health concerns and experiences seeing a naturopath. While Dale was responsible for most of the cooking in the household, Mandy performed most of the food procurement tasks. The couple also grew their own fruit and vegetables in their 'hobby garden'. When procuring fruit and vegetables from supermarkets, Mandy prioritised convenience, cost and time. She rarely pre-planned her purchases unless she was using online shopping services. Mandy described herself as a busy person, and felt that she did not have the time or energy to consider higher order values like climate change when purchasing fruit and vegetables:

Mandy: "... people are really into sustainability and being green and all that... I keep thinking to myself that maybe I should listen a bit more but... there's so much to think about... in life... paying bills and sorting out stuff at home, and sorting out stuff with your dog, and then trying to do everything for yourself, and your partner, and everything like that. There's not a lot of space left for other things."

(Mandy, interview transcript, Phase 1, January 2024)

As a result, Mandy primarily shopped for fruit and vegetables at major supermarkets, despite feeling that they were untrustworthy. She explained that she continued to shop at these retailers because she felt she didn't have access to a suitable alternative: *"...you don't have any choice really... if you could avoid going to the supermarket... you deserve a medal... I don't think it's achievable to not rely to some extent on your Woolworths and Coles."* *(Mandy, interview transcript, Phase 1, January 2024).*

Ned & Eve

Ned & Eve were a retired couple in their 70s (Baby Boomer Generation). Ned immigrated to Australia from Hungary as a child, however Eve was born and raised in Australia. At the time of participation, they had recently moved to a suburb of Northern Brisbane from New South Wales. The couple were both retired, on a self-funded pension. Eve had a history working in administrative roles for Government organisations, and Ned had worked in managerial roles at a major telecommunications company for most of his career.

Eve had historically performed most of the food-related tasks in the household, however since retiring, Ned had taken over these tasks as Eve spent much of her time volunteering. Ned was an avid researcher and had lived with diabetes for several years. As such, he held a wealth of knowledge about food and nutrition which influenced how he understood and incorporated fruit and vegetables in his daily life. He found it difficult at times to manage conflicting food preferences, which he felt stemmed from his and Eve's different cultural upbringings. However, he took pride in his ability to prepare tasty, healthy meals for his family, feeling that this connected him to his cultural heritage: *"...in a way it's a hobby. Also, people of Hungarian background, don't eat to live, they live to eat (Ned, interview transcript, Phase 1, July 2023).*

Ned was a self-described 'optimiser'. He took time to learn about and understand systems, particularly those related to obtaining food. He primarily shopped for fruit and vegetables at an independent grocer, as it was located within walking distance from his home and because he felt the quality and freshness of the produce was better than other local stores, despite requiring him to 'pay a premium'. This aligned with his goal of providing tasty, healthy meals for himself and Eve: *"I like to optimise everything and I get good quality stuff, it's fresh and enjoyable..." (Ned, interview transcript, Phase 1, July 2023).* This store acted as a single location within a 'circuit' of suitable stores that he would regularly visit dependant on which food products he wanted to procure. For example, he would visit one Coles store for a particular brand of bread, and another for a particular pre-made salad product. Ned's strong values around flavour and freshness outweighed his concerns about cost of fruit and vegetables. He cited his Hungarian roots and love for good food, along with his perceived fortunate social position as reasons for why cost was less important to him.

Olivia & Ben

Olivia & Ben were a Generation Y couple who lived in the southern suburbs of Brisbane. During their participation they had moved into a new home, and gave birth to their first child (Issy) while participating in Phase 4. Their equivalised disposable income was high compared to the majority of Australian people, but decreased when Olivia started maternity leave (Australian Bureau of Statistics, 2022b). Prior to this, Olivia worked as a professional and manager in the education sector, and Ben worked as a Labourer (Australian Bureau of Statistics, 2024). Olivia was born and raised in Queensland, and Ben immigrated to Queensland from South Africa several years prior to the research project.

Olivia performed most of the food-related tasks in the household and adapted her approach to fruit and vegetable planning, procurement, and preparation often, and in response to fluctuations in time availability. While she was aware that she and Ben did not eat the recommended amount of fruit and vegetables daily, she felt that she procured a suitable and realistic amount for their household. She explained that she felt their lower intake of vegetables was partly related to how they valued vegetables in their meals: *“I know that we do not eat enough vegetables...my partner and I ...don’t come from a household where vegetables were really incorporated. It always was an add-on... (Olivia, interview transcript, Phase 1, September 2023).* Olivia enjoyed eating fruit because she liked the flavour, but found vegetables difficult to incorporate into her diet due to their high spoilage rate, and perceived difficulty incorporating them into the evening meal: *“I feel like fruit, you can add in throughout your day ... But vegetables are a little bit more hard, I find, to incorporate... they go rotten more easily in the fridge... It just doesn’t come naturally, I feel like I’ve got to think about it and plan it more.” (Olivia, interview transcript, Phase 1, September 2023)*

After giving birth to Issy, Olivia planned her meals and purchases in greater detail to cater to a smaller food budget. She primarily shopped at major supermarkets (e.g. Woolworths and Coles) as she found them to be more convenient and reliable than alternatives, which was important to her in the context of limited time and income: *“...sometimes if you get home and the fruit or veg is not quality, that’s frustrating because I’ve just been talking about how time-poor I am, it’s like, ‘I don’t have time to take this back’ or, ‘I’ve wasted this money’...” (Olivia, interview transcript, Phase 1, September 2023).*

Susie & Bill

Susie and Bill were a Generation X married couple who live in Northern Brisbane. Bill worked in a managerial position, and Susie owned a pet-sitting business (occupation group - manager and trades person (Australian Bureau of Statistics, 2024)). which required her to spend lengths of time away from their home. At the time of data collection, Susie was responsible for most of the planning and shopping for food, and Bill assisted by providing ideas for meals, doing grocery runs, and cooking.

Susie was confident and certain about her fruit and vegetable procurement routine and explained that she had found what worked for her through years of trial and error in providing fruit and vegetables for her husband and children. She took advantage of the several retailers available in her neighbourhood, using each for a specific purchase opportunity: *“Probably the main place we buy fruit and veg now, would have to be ALDI. It was always Woollies, but it would now be ALDI... I can see the savings, and quite often their quality is better... Coles would probably... be the last place I would shop ... we ended up doing a three-way shop which is quite often, and then occasionally if we have the time we will do the markets which has always got relatively good quality and prices”* (Susie, interview transcript, Phase 1, June 2023).

Despite wanting to procure fruit and vegetables from independently owned retailers, Susie and Bill primarily procured fruit and vegetables from larger supermarkets (e.g. Coles, Woolworths, ALDI). While they did visit independent retailers, they chose not to procure fruit and vegetables here, because they found them to be too expensive: *“It’s not somewhere, a location that we would drive to, to get fruit and veg though. Other things yeah, but not fruit and veg...”* (Susie, Interview Transcript, Phase 3, September, 2023)

Susie explained that she felt many people in her neighbourhood could not afford fruit and vegetables, and described feeling ‘lucky’ to be able to purchase the amount and quality of fresh produce she did: *“I think it’s essential and it’s expensive and I wonder how people who are struggling to pay rent and who are living week to week are able to eat healthily at the prices that that we’re paying... I suppose we’ve always been lucky... lucky that we can afford to shop each week and shop healthily”* (Susie, interview transcript, Phase 1, June 2023).

Tom & Jamie

Tom was a Generation Y male who initially had indicated interest in participating alongside his mum Paula, who was elderly and suffered from a rare bone disease. Due to a recent flare of her disease, Tom's mum was unable to participate. At the time of participation, Tom had moved into shared housing in Northern Brisbane with his childhood friend Jamie who also opted to participate in the research project as a household member. Tom and Jamie did not have a formal agreement about food related tasks in their household, and Tom had moved in one week prior to participation. At the time, Tom was having trouble developing new food procurement routines due to having moved. Tom was unemployed and not receiving welfare at the time of participation, but had a history of working as a consultant in Asia (occupation group – professionals (Australian Bureau of Statistics, 2024)).

Tom: "...because I've moved into the new place, it takes me a little bit to get familiar with the kitchen... my shopping day was yesterday..."

Interviewer: "so you didn't go shopping yesterday as planned?"

Tom: "or the day before, or the day before."

(interview transcript, Phase 1, August 2023)

Tom spoke highly of fruit and vegetables, and attributed his liking to growing up with his mum's guidance around food and nutrition, and his experiences living and working in Asia. Unlike most other participants, Tom favoured fruit and vegetables over meat and other foods, primarily because he found they improved his mood and overall health: *"My mood's impacted a lot by what I'm intaking. I don't eat a lot of processed sugars or anything like that... so then when I do have those things, I really do, like I see the, I feel the, I get a sugar crash shortly after eating too much, if I'm eating too much red meat I'm just lethargic... I guess people are eating these things all the time and they're not seeing the point of difference and... I guess I've just grown up with that being showed to me all the time, that point of difference."* (Tom, interview transcript, Phase 1, August 2023). Tom procured fruit and vegetables from a variety of locations, dependant on what was convenient to him at the time. He preferred shopping at his local markets, due to his ability to procure from Asian stallholders there, but found supermarkets more convenient, and continued to shop at them, despite describing them as 'convenient pond scum'.

4.5 Chapter summary

This chapter explored the understandings and experiences of the 12 households that participated in this research project through provision of a narrative case study of each individual household. It explores participants' motivations to use fruit and vegetables and highlights the significant influence of context on their understandings and experiences with fruit and vegetables. The chapter pays particular attention to how different households divided food-related tasks in the household, and how they managed procurement in alignment with their households' needs. An important finding of this chapter is that most participants were generally aware that fruit and vegetables were important for their health, and desired to incorporate them into their diets for these reasons. However, barriers related to income and time resources, and their perception of the quality of fruit and vegetables available in the retail locations they primarily shopped at prevented them from doing so. Furthermore, while some participants wanted to fulfill higher order values such as supporting local farmers and businesses and making ethical purchasing decisions when procuring fruit and vegetables, they felt they had no choice but to shop at larger supermarkets, despite these retailers not aligning with their perception of 'what is right'. These concepts will be explored in greater detail in the following results Chapters (5, 6, 7). Findings from this chapter support Aim 1 by contributing to a deeper understanding of the factors that influence Australian people's procurement of fruit and vegetables. That is, individual beliefs, values, and perceptions, social support and roles, food retail and neighbourhood environments, and social rules and norms, influenced how participants thought about and used fruit and vegetables. This chapter also allows the reader to see which findings from the cross-case analysis (reported in Chapters 5-7) relate to which participants, and provides insight into how their unique context might influence these findings. This supports high quality and rigour in qualitative research, allowing the reader to make informed judgements about the transferability of the research, as described in Section 3.4.4.

CHAPTER 5 ZOOMING IN: FRUIT AND VEGETABLE PROCUREMENT IN AUSTRALIAN FOOD RETAIL SETTINGS

Figure 32 shows the positioning of this chapter in the overall thesis, and provides insight into how the research aims and methods described in Chapter 3 led to the findings presented in this chapter. This figure is repeated in all results chapters, to guide the reader through the thesis.

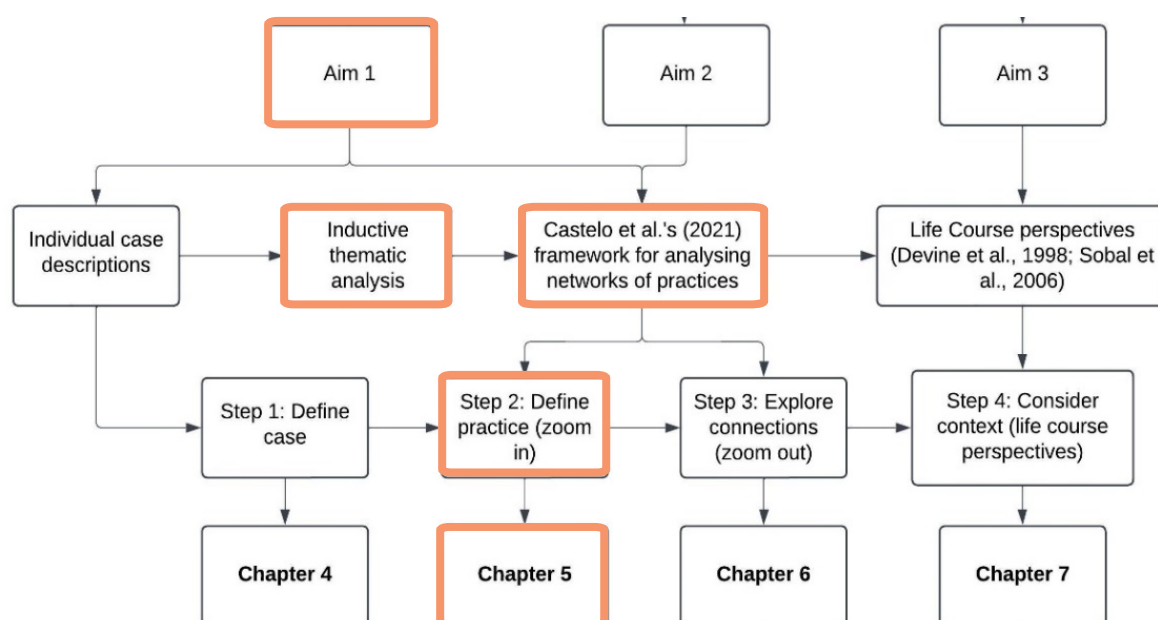


Figure 32: Visual representation of the positioning of Chapter 5 in the broader thesis

5.1 Introduction to chapter

This chapter explores how Australian people understand and experience fruit and vegetable procurement in different retail settings (Aim 1). Findings were synthesised using the ‘zooming in’ process described in Castelo et al.’s (2021) analytical framework for analysing networks of practices (see Section 3.3.3). In this chapter, the practice of fruit and vegetable procurement was the unit of analysis, and research participants were performers of the practice. Analysing the data in this way allowed me to gain deep insight into how participants performed fruit and vegetable procurement, and how different contextual factors including materials, meanings, competences, and social, spatial and temporal dimensions influenced this. The next section describes in greater detail how data were analysed and reported for this chapter. Following this, I explore how fruit and vegetable procurement differed between different spatial settings, using food retail environments as the unit of comparison to provide insight into how they influenced fruit and vegetable procurement. Then, I report how social, spatial and temporal dimensions influenced this practice.

5.2 Methodology

Data reported in this chapter were obtained from interview transcripts and field notes gathered across the four research phases, and across all households. Analysis was performed using thematic analysis to develop codes and themes in the first instance, followed by post-hoc application of social practice theory to make sense of the results, as described in Chapter 3. I used Castelo et al.’s (2021) description of elements (meanings, materials & competences) and dimensions (social, spatial, temporal) to guide synthesis of the results. In this framework, meanings refer to the ‘*why*’ behind practices, and include socio-cultural norms and rules, and individual beliefs, understandings, and motivations to perform practices. Materials refer to the ‘*what*’ required to perform practices and are the ‘*things*’ required to ‘*do*’. Competences refer to ‘*how*’ practices are performed, including knowledge and skills about ‘what to do’ and ‘how to do’, physical abilities, and mental capability and cognitive space. In this chapter, materials and competences are reported together as there was often cross-over between materials and their involvement in

competences. Meanings are reported separately as these were highly variable across the findings obtained.

5.3 Results

The following sections report the how participants practiced fruit and vegetable procurement in different food retail environments, and how this was influenced by social, spatial and temporal dimensions, thus providing an answer to research Aim 1.

5.3.1 Fruit and vegetable procurement in different food retail environments

This section ‘zooms in’ on fruit and vegetable procurement as it was described and performed by participants in different food retail environments (supermarkets, greengrocers, markets, box and meal delivery services, online shopping services, food pantries and home gardens). While not a food retail environment, home gardens were raised by some participants as an important method for procuring fruit and vegetables. Analysis comparing practices of fruit and vegetable procurement from home gardens, compared with procuring fruit and vegetables from the other food retail environments investigated provided interesting insight into the social and cultural meanings associated with fruit and vegetable procurement. As such, growing fruit and vegetables has been included in this thesis as a method of fruit and vegetable procurement, despite not meeting the definition of a food retail environment as defined in Section 2.3. Table 4 shows the meanings, materials, and competences involved in fruit and vegetable procurement, and highlights how they differed dependant on the location in which fruit and vegetable procurement was performed.

Table 4: Meanings, materials and competences of fruit and vegetable procurement from different locations; FV = fruit and vegetables

| Procurement location | Meaning(s) | Reason for procuring here | Competences & Materials | | | |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------|-----------------------------------------|
| | | | Planning procurement | Choosing retailer | Choosing FV | Carrying FV |
| Supermarket | Convenient Necessary 'No other choice' | Reduce time & effort burden of fruit and vegetable procurement | Mental list Physical list | Familiar brand(s)/location(s) | Labels Quality cues Packaging Promotions Displays | Trolleys Baskets Prams Arms |
| Greengrocer | Support community High quality FV Inconsistent quality FV Disorganised | Acquire higher quality fruit and vegetables | Mental list Price labels Visual displays | Convenient location(s) | Price labels Promotions Displays Quality cues Samples | Baskets Cardboard boxes |
| Market | Enjoy time with friends/family Difficult to access Support community Trustworthy High quality, 'Natural' FV | Acquire 'special' fruit and vegetables | Visual displays Price labels | Staff Display Price labels 'Trial and error' | Price labels Display Quality cues | Collapsible bags |
| Box Delivery Service | Convenient Connect to community Connect to FV High quality FV | Acquire high quality fruit and vegetables, reduce time and effort of FV procurement | Not required (auto-delivery) Website/Facebook Phone | Phone/laptop Word of mouth | Not required/ not discussed | Box Driver/truck Packaging |
| Meal Delivery service | Convenient More expensive Healthy meals | Reduce time and effort burden of FV procurement and preparation | Kitchen table/couch Website | Phone/laptop Word of mouth | Not required/ not discussed | Box Driver/truck Packaging |
| Online shopping services | Convenient Unreliable quality | Reduce time and effort burden of FV procurement | Phone/laptop Online shopping app/website Fridge Food labels Barcodes 'how many' vs 'how much' | Familiar brand(s)/location(s) | Not required/ not discussed | Staff Trolley Bags Car carpark |
| Food pantries | Essential Cheaper/free Very poor quality FV Difficult to access | 'something is better than nothing' | Not required/not discussed | Word of mouth | Not required/ not discussed | Baskets Bags |
| Home gardens | High quality FV Enjoyable activity Unachievable for most | An enjoyable 'hobby' that produces high quality FV | Online information Plant nurseries | Not applicable – see written text below | | |

The following sections explore how meanings, materials, and competences involved in fruit and vegetable procurement influenced participants' understandings and experiences of fruit and vegetable procurement in alignment with research Aim 1.

Meanings

This section investigates the meanings that participants associated with fruit and vegetable procurement in different food retail environments, including supermarkets, greengrocers, markets, fruit and vegetable box delivery services, meal delivery services, food pantries and home gardens.

Supermarkets

Most participants procured fruit and vegetables from supermarkets (e.g. Coles, Woolworths, Aldi, and small supermarkets such as Independent Grocers Australia) because they found them to be convenient, and felt that it was necessary to do so in the context of their busy lifestyles. The convenience of performing fruit and vegetable procurement in supermarkets was attributed to the concept of performing a 'one-stop-shop' in which participants could obtain all required fruit and vegetables, and other household items from a single location. However, many participants were frustrated by their experiences procuring fruit and vegetables from these locations, and felt that they had no other choice but to continue doing so, unless they were able to grow their own fruit and vegetables at home:

Interviewer: Are there any good things in Coles that help you, or support your fruit and vegetable use?...

Maggie: No. that's a resounding no. I feel like it's... a point of friction for me 'cause I'm trying to do something with something we don't have much to do with [laughs].

Interviewer: Can you tell me a bit more about that?

Maggie: ...the things that they have on offer. So it's choice, prices, and quality.

Interviewer: OK. And when you compare that to... your home grown and donated fruit and vegetables, what can you see as being the positives or benefits [of that]

Maggie: ...It's more like "I'm not eating that shit, I'm gonna grow it myself". So the silver lining in that is it's motivated that way, but it's a negative motivation. It shouldn't have been that way in the first place...

(Maggie, interview transcript, Phase 1, May 2023)

As shown in this quote, Maggie grew her own fruit and vegetables not solely because she desired to do so, but because she felt disappointed and frustrated by her experiences of fruit and vegetable procurement in supermarkets. Many other participants also experienced this frustration, often believing that the ideal alternative would be to grow their own, but feeling that this was unattainable and unachievable for them, which is further explored in this section, under 'home gardens'.

Supermarket brands

Unlike other food retail environments, supermarkets were differentiated by their branding. Participants' understandings of different supermarket brands were primarily formed through their prior experiences having procured fruit and vegetables in these locations. Coles and Woolworths, while considered highly convenient, were considered to be untrustworthy, and participants were often dissatisfied with their fruit and vegetable procurement in these locations: *"... they market well, so they get you back through the door... you've gotta go there to get everything else that's been marketed to you [laughs]... I dunno what it is, convenient pondscum, but very convenient"* (Tom, Interview transcript, Phase 1, August 2023). All participants considered Aldi to be more affordable than other supermarkets however this was particularly relevant to mothers of young children who tended to be more budget-conscious when shopping than other participants: *"...even when [Reece] has a good [income] week... We'd never just be 'I won't worry about Aldi, let's shop at Woolworths' because we know how much more expensive that would be."* (Lucy, interview transcript, Phase 1, October 2023). Independent grocers were considered to offer

fresher, more local fruit and vegetables, but at the expense of the produce costing too much. As such, few participants considered it feasible to procure fruit and vegetables from these locations on a regular basis, despite desiring to do so in support of local businesses: “...it’s very expensive for fruit and vegetables... It’s not somewhere, a location that we would drive to, to get fruit and veg.... Other things yeah, but not fruit and veg” Susie, interview transcript, Phase 3, September 2023). Figure 33 shows the meanings participants attributed to supermarket brands, and their primary reasons for procuring fruit and vegetables there.

| Supermarket brand | Meanings associated with supermarket brand | Reason for shopping at supermarket brand |
|-------------------------------|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| Woolworths & Coles | Convenient Untrustworthy Dissatisfying | Reducing time & effort burden |
| Aldi | More affordable / low-cost Product offerings too large for single households | Reducing cost of weekly/fortnightly grocery shop |
| Independent grocers | Fresher More local More expensive | Convenience, service and alignment with taste values (<i>when cost not an issue</i>) |

Figure 33: Meanings attributed to supermarket brands across the sample, and participants’ primary reasons for procuring fruit and vegetables there

Greengrocers

Only Mandy regularly procured fruit and vegetables from a greengrocer, with most other participants performing ‘top-up’ shops in these locations when they considered them to be conveniently located near other locations they visited as part of their day-to-day activities (e.g. work, gym, supermarket). Almost all participants compared quality, service and prices of fruit and vegetables sold at greengrocers to that of supermarkets: “...I just felt [greengrocer] was extremely disorganised... I just wasn’t impressed and I don’t think the prices really did justice, I mean I know they can’t compete with the larger chains, like you know Woolies... (Interview transcript, Phase 1, June 2023). While most participants considered fruit and vegetable procurement at greengrocers to be a more ethical choice, and supportive of local businesses and farmers, they continued to procure fruit and vegetables from supermarkets because they perceived greengrocers to be ‘too difficult to

access'. That is, participants felt that they had to go 'out of their' way or 'make an extra trip' in addition to visiting the supermarket to procure fruit and vegetables, if they desired to procure from greengrocers. Their desire to reduce their time and effort burden outweighed their desire to fulfil higher order values through their fruit and vegetable procurement, thus leading most to continue procuring from supermarkets. Those who did procure fruit and vegetables from greengrocers continued to do so because they found the quality and/or price of fruit and vegetables to be better than that procured from supermarkets:

Olivia: *"I feel like when there's a fruit shop, the fruit is farmed locally and grown locally, and the quality seems to be more fresh, and it seems to be just more... I feel like it might be more, I don't know, I'm just making this up, but it might be more organic, or the colour looks more vibrant compared to the grocery store. And... the price point is usually cheaper."*

Olivia, interview transcript, Phase 1, September 2023

Markets

Several participants 'dabbled' in fruit and vegetable procurement at markets, however only Tom regularly procured fruit and vegetables from his local markets. Many participants felt guilty that they did not procure fruit and vegetables from their local markets more often, as they believed doing so was a more ethical and community-minded way of procuring fruit and vegetables. However, the perceived difficulty of procuring fruit and vegetables from markets outweighed this concern, with participants choosing to only procure fruit and vegetables from markets if they were 'already there': *"I feel guilty about shopping with Woolies⁹... we're not supporting our local produce... but then the mission of going to those markets on a Sunday, you'd have to be in love with doing that."* (Elanor, interview transcript, Phase 1, October). Because of this, most participants who procured fruit and vegetables from markets primarily procured small amounts of *"...fairly like specialist... nice fresh stuff, if*

⁹ 'Woolies' is a colloquial name used for the Woolworths supermarket chain in Australia

we're feeling it on the day" (Leah, interview transcript, Phase 1, July 2023). Regardless of what, or how much fruit and vegetables were procured from markets, participants enjoyed the activity of 'spending time with friends and family', and believed that the fruit and vegetables they did procure were more 'natural', and of superior quality compared to other retailers, especially supermarkets: "... A lot of vegetables won't last as long as supermarket veggies... and that to me just, I don't know, it feels better knowing that... it just seems like it's probably a little bit more real." (Tom, interview transcript, Phase 1, August 2023).

Fruit and vegetable box, meal delivery & online shopping services

Online shopping, fruit and vegetable box, and meal delivery services were popular among participants who sought opportunities to reduce their time and effort burden of procuring fruit and vegetables. This was primarily because these services removed the requirement for participants to 'choose' fruit and vegetables (discussed further in Section 5.3.6).

Some participants engaged with fruit and vegetable box delivery services due to frustration with fruit and vegetable procurement in supermarkets: *"[I] got sick of buying stuff from the supermarket and it either being expensive, or crappy variety, or didn't last very long"* (Mandy, interview transcript, Phase 1, January 2024). After initiation, fruit and vegetable box delivery services fostered a sense of community, and connection to food, retailers and farmers: *"I know someone, that I'm paying, has personally put that box together, dropped it to my door, and they're trying to source locally, so I feel more connected to that food, I don't want to waste that food..."* (Kasey, interview transcript, Phase 3, January 2024). However, this was quickly lost if participants became frustrated with retailers: *"...she just got too big and then got a bit greedy... as soon as you're rude, I'm out..."* (interview transcript, Phase 1, January 2024).

Laura and Tonia initiated a meal delivery service to reduce the requirement for them to procure and prepare fruit and vegetables, and to 'eat healthier'. After starting this service they found it offered a unique opportunity for them to try new fruit and vegetables, due to the incorporation of new fruit and vegetables that they would not feel confident to procure or prepare otherwise: *"... going with lite n easy has definitely opened up a lot more*

vegetable choices that I normally wouldn't buy myself, because I wouldn't even know how to cook most of them" (Tonia, interview transcript, Phase 4, November 2023).

Online shopping services were considered a 'backup' to procuring fruit and vegetables from supermarkets in-person, particularly when participants were time-poor. For example, during her participation in this research project, Mandy's dog became unwell, at which point she switched from procuring fruit and vegetables from the physical supermarket, to ordering them online, so that she could spend more time at home with her dog. Several participants were concerned about the potential quality of fruit and vegetables procured through online shopping services, due to a lack of trust towards supermarket staff to select fruit and vegetables for them: *"I definitely wouldn't do online shopping because I wouldn't want to rely on someone else to choose fruit and veg for me" (Tonia, interview transcript, Phase 3, August 2023).* While this was the case for most participants, Olivia felt that the quality of fruit and vegetables procured through online services was better than what was on offer in physical stores: *"...I do find in the click and collect they give you really quality vegetables?... I don't know, I guess they're picking the groceries for you, so they want to make sure what they've picked is really good. That's what I've noticed." (Olivia, interview transcript, Phase 1, September 2023).*

Food pantries

Only Lucy procured fruit and vegetables from food pantries. She describes the process for attending one of these food pantries in the following quote:

Lucy: "In here, the way they work is it's normally done on a number system because it's a small shop. They only allow a few people in at once. You take a number, sit and wait, free tea and coffee... And then as long as you make a purchase of something, you are entitled to take some free fruit, vegetables or bread. Again, most of the stuff that they sell here has either been donated to them or they've bought it cheap because it's like coming close to expiry day.

(Lucy, Interview Transcript, Phase 2, October 2023)

While she felt the fruit and vegetables available for procurement were of very poor quality, she believed it was essential that she continue to procure fruit and vegetables from these locations to feed her family nutritious meals: *“...finances were really difficult, so we found little food pantry places... otherwise we wouldn’t be able to get everything we needed for the family, especially fruit and veggies....”* (Lucy, interview transcript, Phase 1, October 2023).

While procuring fruit and vegetables from food pantries was considered to reduce financial stress, it came at the expense of additional time and effort burden, due to having to go ‘out of the way’ to visit the food pantries on days they were open, which were often located further away from participants’ homes than major supermarkets such as Coles, Woolworths and Aldi.

Home gardens

Some participants (e.g. Kasey, Mandy, Maggie) grew their own fruit and vegetables at home. This was often viewed as an enjoyable activity, and participants felt pride and satisfaction in bringing fresh fruit and vegetables from their garden into their home: *“I want good taste, I want to be able to enjoy freshness and go: ‘tonight’s meal was proudly presented by the garden because I just picked it out of there’. There’s a real sense of enjoyment just out of that, because it’s been produced here...”* (Maggie, interview transcript, Phase 1, May 2023).

Similarly, those who did grow their own highly valued their fruit and vegetables, and considered it to be of high quality and value compared to supermarket produce:

Maggie: *“... from the weekly shop from Coles, I wouldn’t think too much about anything other than just eating them that week, whereas... home grown, I think about how I can try and hang on to them longer... maybe it’s cooking it so it lasts a week, maybe I’m blanching it to make it frozen, maybe I’m pickling or preserving to make it last even longer than that... because I know that it’s fresh, it’s good and there’s benefits to be had...”*

Maggie, interview transcript, Phase 1, May 2023

However, for many participants, growing fruit and vegetables at home was a desirable, but unachievable goal, due to the additional time, resources and knowledge required to do so. For example, Lucy explained:

Lucy: *... they're trying to get a co-op going in the new neighbourhood centre. I forget what it was called, like 'grow your own' or something... where you can bring your produce or... whatever you bring, you swap it on these days... I'd love to get involved, but I don't have anything to offer, and I don't have the time... We planted a lemon tree because we get through a lot of lemons because it's dad's thing to cook pancakes every Sunday for the boys, but again, it didn't get watered [laughs – points to dead lemon tree]. I think that tree was \$35 or something, "This is going to save us money", but anyway... I think people don't realise just how busy stay-at-home mums are and to be honest, I would have been that judge-y person before I had kids as well.*

Lucy, Interview Transcript, Phase 1, October 2023

These findings show that while growing fruit and vegetables at home was viewed very positively by participants, it was not a common avenue for fruit and vegetable procurement, due to limitations in resources and competences required to perform the practice of 'growing fruit and vegetables'.

Materials & Competences

Fruit and vegetable procurement primarily involved three major competences of: planning what to procure, choosing retailers and choosing fruit and vegetables, and carrying fruit and vegetables. The specific materials and competences involved within these categories differed dependant on where the practice was being performed. The following sections describe the competences and materials used in each location, and how this influenced fruit and vegetable procurement. Growing fruit and vegetables is reported separately at the end of this discussion, including how competences 'planning garden', 'growing fruit and vegetables' and 'harvesting fruit and vegetables' were involved in fruit and vegetable procurement for those who grew their own.

Planning fruit and vegetable procurement

Planning was identified as both a competency of fruit and vegetable procurement, and a distinct practice performed prior to procurement, which is reported in detail in Chapter 6. Participants who procured fruit and vegetables in supermarkets often did so as part of a ‘full shop’. These participants had usually already performed prior planning resulting in a mental or physical shopping list which was used to guide selection of fruit and vegetables in the supermarket. Participants who did this relied on their prior planning, using their shopping list to guide them to which fruit and vegetables should be procured, before moving on to choosing competences. However, some participants planned fruit and vegetable procurement ‘on-the-go’. This was particularly common among participants who shopped at greengrocers and markets, and those who performed several ‘top-up’ shops, as opposed to one larger ‘full shop’ weekly or fortnightly. These participants relied heavily on promotional displays and price labels to guide them to fruit and vegetables that ‘looked good’, thus informing their planning of fruit and vegetable procurement ‘on-the-go’. Some participants also relied on what was on ‘special’ to guide what was ‘in season’, using availability and cost to primarily guide their fruit and vegetable choices:

Interviewer: How do you work out what’s seasonal?

Olivia: Well, whatever’s cheaper, like stone fruit when that comes out, that’d be really cheap, or comparatively cheap.

(Olivia, interview transcript, Phase 1, September 2023).

Participants who used online shopping and meal delivery services also planned their fruit and vegetable procurement on-the-go, through use of an online shopping app, or ordering form. For Laura and Tonia (meal delivery service), this involved sitting down once a week and ordering meals that ‘looked good’ through Lite ‘n’ Easy, while for Mandy (online shopping service) this involved: *“looking in the fridge... at what we had... thinking of what I’d like to eat, and then... searching and seeing what was on special or what different stuff that they had.”* (Mandy, Interview transcript, Phase 2, Feb 2024). Fruit and vegetable procurement through box delivery services seldom involved planning, beyond participants choosing to order a box. This is because participants who procured fruit and vegetables

through this service were comfortable with receiving a box of fruit and vegetables chosen by someone else, and planning their meals around the supplied produce, rather than planning procurement based on what they wanted to cook or eat. Similarly, procuring fruit and vegetables from food pantries involved little to no prior planning. Unlike box delivery services however, this was because only a limited variety of produce was offered. Due to the small variety of produce available, Lucy did not feel it worth her time or energy to attempt to plan her procurement prior to, or during her visit to the food pantry, rather feeling that 'something is better than nothing' and taking what she could.

Choosing retailers and choosing fruit and vegetables

Choosing retailers was heavily influenced by the meanings participants associated with the food retail environment, and their familiarity with the store or location based on previous experiences. For some participants 'choosing a retailer' overcame the need to engage with many of the materials and competences involved in 'choosing fruit and vegetables', which is further explained in the following sections.

Choosing fruit and vegetables in supermarkets involved more competences and materials than choosing fruit and vegetables in other retail locations. This mostly occurred due to the requirement for participants to assess quality cues against household needs and preferences. The specific sequence and weight of different competences of 'choosing fruit and vegetables' differed between participants, however most used a combination of price, past experience, and visual cues. The following quote from Laura's 'go-along' shop highlights her process for choosing fruit and vegetables:

Laura: ...Always get apples... They're just a staple, they're super easy

Interviewer: Is there a specific type you usually get?

Laura: Yes, always go for a Kanzi, or a Jazz

Interviewer: Why's that?

*Laura: We just find they're really nice and crisp and Kanzi's on special so that's why I'm picking up on this one [selecting Kanzi apples]
Sometimes we'll get pink lady if mum wants something a bit sweeter...*

Interviewer: So you're checking each one of those apples individually, what are you looking for?

Laura: Just making sure they're not bruised or anything like that. No extra marks and just making sure they've got a nice reddish colour to them.

(Laura, interview transcript, Phase 2, August 2023)

Assess quality

To assess ripeness and longevity of the produce prior to purchase, participants visually inspected fruit and vegetables for bruises, blemishes, soft spots and wet spots. This was performed more often in supermarkets and greengrocers than other retail locations. Some participants did not perform this competency due to a belief that fruit and vegetables available for sale in supermarkets should automatically be suitable for purchase. Some greengrocers and markets offered taste-testers or samples however no participants tried these during their go-along shops. At markets, participants chose 'nice', 'special' or 'unique' fruit and vegetables, dependant on their visual assessment of 'what looked good' at the time. Most participants relied on past experiences to guide their choices of what fruit and vegetables to procure. Often this involved repeat-purchasing similar varieties (e.g. Roma vs common tomato), colours (e.g. bright green vs yellowing broccoli), or product offerings (e.g. packaged vs unpackaged zucchini), and relying on 'staple' fruit and vegetables:

"[procuring fruit and vegetables at the supermarket is] taking me way longer because I have to check 'does this punnet have any already bad strawberries?'... 'which one's the cheapest tomato at the moment per kilo?'... it does take longer because I'm not just quickly grabbing something and putting it in... and it is more stressful because I'm obviously trying to stick to a budget somewhat... I'm probably not buying as much vegetables as what would come in the box, and definitely nothing different to like just the staples of what I can." (Kasey, interview transcript, Phase 1, January 2024)

As shown in the previous quote, participants primarily used these strategies to reduce the cognitive burden of choosing products within an already stressful shopping experience.

Compare prices

Participants often had an internalised idea of appropriate prices for fruit and vegetables, that they used to determine their purchase decisions (reported further in Chapter 6). Participants who had planned their purchases prior to performing fruit and vegetable procurement rarely looked at price labels, and did not alter their procurement based on the displayed price. For example, when selecting a cauliflower that was on sales promotion Leah explained: *“I would have bought them anyway. I don’t think I’ve ever looked at the price of the cauliflower”* (Leah, interview transcript, Phase 2, July 2023). However, others who preferred to ‘shop the sales’ were much more reliant on price labels to guide their purchases. For example, during her go-along shop in phase two, Laura explained: *“... definitely getting a cauliflower, because it’s on special, especially because it’s an ‘each’ so I can get the biggest one possible for the same price as a tiny one”* (Interview transcript, Phase 2, August 2023). These examples highlight that assessing price is a competency required for fruit and vegetable procurement but that the importance of doing this depends on the individual practitioner and the other practices of fruit and vegetable use that they engage in.

When assessing price of fruit and vegetables in locations other than supermarkets, participants almost always compared prices to their internalised knowledge of supermarket prices at the time. If the difference in price was considered to be favourable, participants often procured fruit and vegetables from other retailers, even if they had not previously planned to. For example, in phase two, Olivia procured fruit and vegetables from Woolworths and then visited the greengrocer next door. At the greengrocer, she selected fruit and vegetables that she would not usually buy from the supermarket, or that she did not consider to be ‘staples’, such as berries and avocados. When asked why she was selecting these fruit and vegetables, she explained that the lower cost of the produce available for purchase at the greengrocer compared to what she had just viewed in Woolworths made them present in her mind, and therefore appealing, especially if she had ‘not had them in a while’. When considering a new location for fruit and vegetable

procurement, participants would sometimes perform a 'scoping excursion', in which they visited the new location prior to, or immediately after visiting a supermarket to compare prices and quality of fruit and vegetables in both locations. This highlights the role of supermarkets as a comparison point from which participants assessed the value of fruit and vegetables available for purchase in other locations.

Assess credence attributes

Most participants associated different retail locations with credence attributes, which echoes the findings of the scoping review reported in Chapter 2. That is, markets and greengrocers, among other alternative procurement locations were considered to be more ethical and desirable than procuring fruit and vegetables from supermarkets:

Interviewer: If cost wasn't an issue, you just had all the money in the world and I guess, time is the next thing as well, what would you be doing around your fruit and veg? How do you see that would be panning out?

Lucy: I would be at the organic markets. I would not use a supermarket at all. I would try and source everything fresh... Just organic and from markets, support small business, stay local, in-season.

...

Interviewer: ...when you said, if you had a choice, you would never use the supermarket for fruit and veg, why is that?

Lucy: That's probably more of an ethical/political thing, I just don't believe in supporting these big companies that are taking from all the little farmers. Like I said before, the farmers aren't getting that much of an increase. So, you have a look at how much profit Coles and Woolies made, they made a huge profit. I just wouldn't want to support them, try and support small business, try and stay local.

(Lucy, interview transcript, Phase 1, October 2023)

However, most participants continued to procure fruit and vegetables from supermarkets, often finding that the convenience of these locations, combined with a belief that they had 'no other choice' prevented them from utilising other retail locations:

Mandy: ...you don't have any choice really

Interviewer: what do you mean by that?

Mandy: ... if you were a full time, working with a family, if you could avoid going to the supermarket, buying everything at other stores, you deserve a medal, because I don't know where you get your time from. But I don't think that that would be achievable because like your health and your beauty and your deodorants and all that sort of thing, if you go and buy that from the chemist, that's a huge expense... I don't think it's achievable to not rely to some extent on your Woolworths and Coles, I just don't think their quality is great on a lot of things. Even – don't like buying their meat, don't like buying their steak, don't think it's good quality, think it's expensive for what it is... but yeah there's a lot of kind of things that are cheaper at the supermarket, but I don't think that the supermarket is as cheap as what it used to be so, I'd hate to think what families spend on food... So yeah I think you're stuck with Woolworths and Coles I think."

(Mandy, interview transcript, Phase 1, January 2024)

Within the supermarket environment, participants seldom used promotional materials advertising credence attributes to guide their fruit and vegetable choices, despite some indicating that they felt they 'should'.

Interviewer: do you ever try to buy like Australian grown or, do you have any preferences around –

Leanne: Yeah I try to, but I must admit, I'm not quite good at picking up stuff and going 'oh that's from there', 'that's from there' and that stuff. I

just go 'I want that today'... I think it's good to help our farmers out and stuff. If I can buy Aussie, I'll buy it.

Leanne, interview transcript, Phase 1, January 2024

For example, messages such as 'grown locally' or by 'Aussie farmers' were usually ignored, and when prompted to their presence, participants reported that they did not trust them, and felt generally confused about what messages about food production could be trusted:

Leah: "there's 'product of Australia' there so I'm assuming that's correct but I also know that that means a lot of different things as in, it might not be an Australian farm, it might not be Australian workers, it might be imported and the product of Australia might be that the transport process was in Australia, so I know that doesn't necessarily mean what I want it to mean. I think I've lost faith in the whole system... I get that there's some buzz words going on there and there's definitely some like PR-ing happening with that messaging and so – what that actually means I have no idea."

(Leah, interview transcript, Phase 2, July 2023).

Despite ignoring or not noticing promotional materials containing information about credence attributes, many noticed price reduction labels and sometimes used these to guide their selection of fruit and vegetables: *"I do look for Gold labels, but they don't like dominate what I shop for, especially since I got a new job."* (Laura, interview transcript, Phase 2, August 2023). This was particularly relevant when participants were comparing fruit and vegetables from within the same product category that they had already planned to purchase: *"I will look, so in terms of like the cherry tomatoes. Like obviously there are 50 different kinds [three different types/brands on shelf at time]. I will pick these ones [marked on sale, different colour price tag] because they're cheaper definitely but it's not going to make or break, like if they weren't \$1.99... I'd still get them... I'm not choosing specifically to buy tomatoes just because they're on sale, I would be buying them anyway."* However, larger display promotions such as the 'super savers' section in Aldi stores were not

necessarily recognised, with most participants stating they just procured what they wanted from whichever display was closest or easiest to access:

Interviewer: Is there a reason you're using the super savers section? Like do you actually use it because it's the super savers?

Leah: Literally because it's just in front of me. [Laughs] I had, I honestly didn't even realize that that was a thing.

(Leah, interview transcript, Phase 2, July 2023)

Choosing a retailer as a proxy for 'choosing fruit and vegetables'

Competences of 'choosing fruit and vegetables' were overridden for participants who procured fruit and vegetables from markets, food pantries and box, and meal delivery services due to their prior engagement in 'choosing a retailer'. That is, when procuring fruit and vegetables through these services, participants chose *who* to buy from, which then acted as a proxy for their choice of *what* to buy. These participants did not feel the need to assess quality of fruit and vegetables or engage in other competences of 'choosing fruit and vegetables' because they trusted their selected retailer(s) to do this for them.

Participants who procured fruit and vegetables from food pantries, box delivery, and online shopping services offloaded many of the competences of 'choosing fruit and vegetables' to the retailer/staff of the business they were procuring from. For example, when procuring from the markets, Tom had a general idea of what fruit and vegetables he would like to procure, and then collected them from his preferred retailer, who he had previously engaged with. This required prior engagement with competencies of 'choosing a retailer'.

To 'choose a retailer' at the markets, participants first assessed the staff and visual display of the market stall, at all available retailers, and then selected the one they felt was most likely to be reliable. Once selected, participants would engage with some of the competences of 'choosing fruit and vegetables', such as assessing price and quality of fruit and vegetables, though to a lesser extent than they did at other retailers due to a belief that these retailers were more aligned with their values:

Interviewer: ... so your perception is that because [the market stall is] Vietnamese-run, [the fruit and vegetables are] grown by Vietnamese people and therefore culturally they're less likely to use chemicals like we do tend to use in Australia?

Tom: yeah, yeah, like, that's the idea, whether that's true or not, I'm not sure, so I'll believe my own fallacy there... And that to me just, I don't know, it feels better knowing that.

(Tom, interview transcript, Phase 1, August 2023)

Following this, participants would then 'trial' some produce from this stall. If the produce was good, they reverted to the same retailer every time they visited the markets, finding it too 'risky' to trial a different retailer:

Interviewer: Do you go to a specific fruit and veg stall?

Susie: Yes... It's right down the other end on the right hand side rather than the one that's right down this end, that's really big. Their quality doesn't seem as good. Prices might be but I don't think their quality is as good.

Interviewer: Yep, so you pick the one on the end for the better quality produce

Susie: Yeah, their prices are reasonable and their quality is good.

Interviewer: How did you determine that it's good quality?

Susie: Ah by, just buying a few things there and, it looked, looked good.

(Susie, interview transcript, Phase 1, June 2023).0

In future visits to the markets, participants would return to the same retailer, with very little engagement in competences of 'choosing fruit and vegetables' due to the trust built with the retailer and the limited offerings available at the market stall compared to supermarkets. Even when other retailers had better sales, participants stayed with the

retailer they were familiar with, for fear of being ‘tricked’ into buying fruit and vegetables that wouldn’t last as long at home by other retailers.

Choosing an online shopping service retailer was less important to participants than for markets, as they usually defaulted to the supermarket they usually shopped at. For example, if they shopped in person at Woolworths, they would shop online at Woolworths as and when needed. This was primarily done for convenience, for example when participants had little time available to perform fruit and vegetable procurement. In this setting, participants still performed some competences of ‘choosing fruit and vegetables’ albeit to a much lesser extent than when procuring fruit and vegetables from a physical supermarket. For example, Olivia explained that when procuring fruit and vegetables from online shopping services, she simply told them what she wanted, and how much, and then trusted them to select fruit and vegetables of appropriate quality: “... *I guess they’re picking the groceries for you, so they want to make sure what they’ve picked is really good. That’s what I’ve noticed.*” (Olivia, interview transcript, Phase 1, September 2023). While it is possible that participants assessed price and credence attributes when online shopping for fruit and vegetables, this was not observed or discussed during data collection. Trust was an important factor for participants who relied on supermarket staff to perform some competences of ‘choosing fruit and vegetables’, however some participants explained that they did not trust these staff to perform the competency to an adequate standard, thus preventing them from utilising these services: “*I definitely wouldn’t do online shopping because... I wouldn’t want to rely on someone else to choose fruit and veg for me... I like certain points of ripeness, like with a tomato, I like it when it’s sort of more that paler orange than the bright red, and a little bit of firmness, you’re like just order two tomatoes, they’ll just go and grab you two tomatoes. So shopping online for me, is not something I’d ever do for fresh produce.*” (Tonia, interview transcript, Phase 3, August 2023).

Fruit and vegetable box delivery services took this another step further, with participants simply selecting a retailer, and then trusting the retailer to select all fruit and vegetables, regardless of the participants’ preferences. This was highly desirable to some participants due to the reduced cognitive burden of having to perform competences of ‘choosing fruit and vegetables’ entirely. Kasey noticed the impact of this on her fruit and vegetable procurement when she was unable to obtain her fruit and vegetables through the box

delivery service over the holiday period: “... *grocery shopping is more like, so much effort... you’ve gotta think about what you’re gonna get, then you’ve gotta go there, get it, pack it, come home, whereas I have no thought in the fruit and veggie box, it just rocks up at my door and I bring it inside and put it away.*” (Kasey, Interview Transcript, Phase 1, January 2024). This required the participant to trust the retailer to select fruit and vegetables that would align with their preferences and needs, and as such, choosing a retailer was considered a highly important step in procuring fruit and vegetables from these services. To choose a fruit and vegetable box retailers, participants considered a number of important factors about the logistics of the service which included monetary transfer, delivery timing and weather among other things: “*I did look to get [fruit and vegetable box delivery service]...she’s only in my area on a Monday which is my office day... you’ve gotta pay cash or eftpos, you’ve gotta be there when she’s there... it doesn’t work really... with the heat and everything like that, I didn’t really want to just leave the cash out and then have it sitting there for about 5 hours in the sun.*” (Mandy, interview transcript, Phase 4, February 2024). Often, their initial awareness of the retailer was gained through word of mouth, or advertisements on Facebook community pages.

Meal delivery services were chosen based on participants’ desire to try them, which was determined by their previous experiences and changes in personal circumstances:

Tonia: “... *the first time I ever thought about looking at lite n easy, I found the pricing too expensive so I didn’t bother but then about three years ago I think we tried YouFoodz, but we weren’t so crash ... the meals [were] a lot smaller and they just weren’t as nice, not as big variety, especially for [Laura]. So then when I found out that I had the job and I thought about it, I’m like ‘we need to sort something before I start working so that we know that we’re covered’ and I thought ‘we’ll give lite n easy a go’.*”

Tonia, interview transcript, Phase 4, November 2023

When procuring fruit and vegetables from meal delivery services, competences of ‘choosing fruit and vegetables’, such as assessing price and credence attributes were transferred to the meal, rather than the fruit and vegetables themselves. Assessing quality was not

required, due to the trust of the meal delivery service to perform this competency on behalf of the participant: *I've been getting salads and what not and challenging it. I still sit there and go 'ooh' [acts out inspecting each leaf for bugs]. I still inspect it, but I have faith in Lite n Easy that they're not gonna have bugs in there... It's been pre-packed elsewhere, I can put my faith into that. (Laura, interview transcript, Phase 4, November 2023).*

Competences of 'choosing' at food pantries were complex, due to a lack of choice for both the participant and the retailer. Lucy 'chose' her preferred food pantry based on its availability and accessibility to her. For example, she would shop at one food pantry on a Wednesday, and another on a Thursday, as these were the only days she could access them within their opening hours, and in alignment with her busy schedule. Competences of 'choosing fruit and vegetables' were entirely removed when procuring from the food pantry observed, due to the very limited offering of fruit and vegetables within the store. That is, neither the participant, nor the retailer 'chose' the fruit and vegetables procured, due to the donation-style of fruit and vegetable provision in these locations. In this environment, the issue of trust for the retailer was outweighed by the necessity of accessing food, thus essentially rendering all competences of 'choosing' ineffective and requiring the participant instead to 'accept' what was available.

Carrying fruit and vegetables

Carrying fruit and vegetables was performed for fruit and vegetable procurement regardless of where it was performed. However, the availability of carrying materials in different retail environments altered fruit and vegetable procurement in several ways. For example, carrying fruit and vegetables in supermarkets required use of a trolley or basket which was usually provided by the supermarket. Availability of these materials was highly influential on how much fruit and vegetables were procured, particularly for participants who intended to perform a 'full shop'. In these situations, if a trolley was not available, participants limited their fruit and vegetable procurement to fit into a smaller basket, their arms, or in some cases the base of a pram, resulting in the need to perform additional 'top-up' shops:

Interviewer: what happens when there's no smaller trolleys, what do you do?

Mandy: I'll use a basket, or I'll put stuff in bags that I've brought in but that then determines how much [fruit and vegetables] I buy. I shorten my list real quick.

(Mandy, interview transcript, Phase 1, January 2024).

Some participants reported that carrying materials (e.g. baskets, trolleys) were more accessible in greengrocers than supermarkets. They felt positively about the provision of free cardboard boxes provided at greengrocers to assist with carrying fruit and vegetables from the checkout to the car, particularly when compared to paying for shopping bags at supermarkets. Carrying materials were smaller in food pantries due to the smaller physical space within the food retail environment. The offering of a 'free bag of fresh produce' led to fruit and vegetables being placed directly in a plastic bag, rather than participants using items such as baskets or trolleys to carry their produce. Similarly, participants only procured small amounts of fruit and vegetables from markets at a time as they felt prohibited in how much they could carry in collapsible bags through the market once full of fruit and vegetables. While it did not have an influence on the amount or type of produce procured, the different process of collecting fruit and vegetables from online shopping services compared to shopping in-person often frustrated participants. For example, Mandy found it difficult to find a carpark that would be suitable for her click and collect order, which made her feel negatively about procuring fruit and vegetables through this service.

The box and packaging materials used for box delivery services and meal delivery services were viewed by participants positively, particularly as they felt these materials prolonged the lifespan of their fruit and vegetables, reduced time pressure of having to unpack it immediately:

Kasey: "...I could leave my fruit and veg box for three days, not unpacked and it's fine, there's no smell, everything is still perfectly fine... they're obviously making sure they're really not packing anything into boxes which are compromised, which I appreciate... [the fruit and vegetables] either come in paper bags or cardboard...So that's really good, there's no plastic."

(Kasey, interview transcript, Phase 1, January 2024)

Interestingly, Kasey felt that the packaging supplied in her fruit and vegetable box were more environmentally friendly than packaging materials used at her local supermarket, as shown in the previous quote. However, Laura and Tonia did not comment on the environmental-friendliness of the packaging involved in using their meal delivery service, beyond stating that it was mostly cardboard, and that they recycled the empty containers.

Growing own fruit and vegetables

Planning garden

Planning fruit and vegetable procurement was not realistic for people who grew fruit and vegetables at home. This was due to a reliance on the seasons and the success of their gardening efforts to produce fruit and vegetables available for harvest. Instead, planning was applied to the growing of fruit and vegetables itself, in which participants utilised online information sources, friends, family, and nursery staff to guide their decisions about which fruit and vegetables to grow, at what time, to ensure they would have produce available for procurement throughout the year.

Growing fruit and vegetables

Many of the competences and materials discussed by participants who grew fruit and vegetables at home revolved around the process of growing fruit and vegetables itself. Materials such as: soil, fertiliser, pots, garden stakes, nets, buckets, other people, shovels, fruit trees, seedlings, seeds, and watering devices (e.g. hoses, watering cans) were important for achieving the competences: digging, storing, preparing, learning, researching, managing pests, staking trees/plants, swapping produce, netting tress, and planning, watering, and 'winterising' gardens. Maggie also spoke of having to 'convince' her partner to assist her with these competences, viewing them as 'too much' for one person to perform: *"there's a lot going into it with persuasions and digging holes and...preparing the ground, and me educating about watering... pest control and that kind of stuff..."* (Maggie, Interview transcript, Phase 1, May 2023).

Harvesting fruit and vegetables

For participants who grew their own fruit and vegetables, competences of ‘carrying’ fruit and vegetables were replaced with ‘harvesting’, in which participants were required to know when fruit and vegetables were ripe enough to pick, how to pick them, and how to deal with excess produce: “... I got 350 bananas off a few trees... they’re messy to take down too, you’ve gotta have very old clothes... capsicums... I reckon I’ve probably given away about 200 in the last fortnight” (Mandy, interview transcript, Phase 1, January 2024). As shown in the previous quote, dealing with excess produce usually meant giving produce away, however some participants described swapping fruit and vegetables with friends or family, and preserving fruit and vegetables grown at home to prolong their life when there was surplus produce: “...it’s a nice little community thing... you give somebody something and they give you something back, a little bit of a trade thing which is always nice to do too. So for example, if I’ve got a friend down in [rural town in WA] and they’re growing a whole lot of chillies, I can say, well, I’m not going to grow chillies, I’ll grow this, and we’ll swap it about at that time. (Maggie, Interview transcript, Phase 1, May 2023).

5.3.2 Social, Spatial and Temporal Dimensions of Fruit and Vegetable Procurement

This section provides insight into when (temporal dimension), where (spatial dimension), and with who (social dimension) participants procured fruit and vegetables, and how this influenced the practice of procurement. Table 5 shows an overview of the location, frequency, and reasons for why people procured fruit and vegetables in those locations.

Table 5: Location, reason and frequency of fruit and vegetable procurement across the multiple case study

| Name | 'Full shop' location, (frequency & reason) | 'Top-up shop' location, (frequency & reason) |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mandy | <p>Woolworths (once weekly, aligns with other purchase requirements (e.g. meat, pharmacy); Believes fresh produce unlikely to last longer than one week)</p> <p>Greengrocer (once monthly, 'out of the way', produce lasts two weeks requiring less frequent visit)</p> | <p>Woolworths (as needed – forgotten items)</p> |
| Elanor & Riley | <p>Woolworths (frequency varies, busy work and family life)</p> | <p>Woolworths (as needed – forgotten items, running out of things)</p> |
| Kasey | <p>Fruit and vegetable box delivery service (weekly, regular delivery schedule of box delivery service, uses most produce supplied in one week)</p> <p>Aldi (weekly - only when box delivery service unavailable)</p> | <p>Aldi/ Woolworths/ Greengrocer (as needed – usually extra fruit for lunchboxes)</p> |
| Leanne | <p>Woolworths/Coles/Aldi (2-3 times weekly as needed)</p> | |
| Laura & Tonia | <p>Woolworths (once fortnightly, aligns with pay schedule)</p> <p>Lite N Easy (once weekly, meals provided for one week at a time)</p> | <p>Woolworths (2-3 times weekly, prefers to plan for 2-3 days at a time to reduce food waste)</p> <p>Independent Grocer(s) (ad-hoc, if convenient to weekend activities)</p> |
| Leah | <p>Aldi (once fortnightly, likes to reduce time spent in supermarket; aligns with meal planning for the fortnight)</p> | <p>Coles (1-2 times weekly, if needing other items (e.g. nappies) will sometimes procure additional fruit for lunchboxes)</p> <p>Market (as convenient to other activities e.g. visiting market with kids, 'special' fruit and veg only)</p> |
| Lucy | <p>Food pantry / Aldi (once weekly, aligns with pay schedule; not enough room in fridge for more fresh produce)</p> | <p>Coles/ Woolworths (1-2 times weekly, shops to catalogue specials, if fruit on sale will sometimes procure additional, always gets free fruit for kids from Woolworths if nearby)</p> |
| Maggie | <p>Home Garden (as ripe/ready – would prefer this to be primary procurement method for fruit and vegetables but garden not producing enough at time of data collection)</p> <p>Coles (once weekly - habitual routine)</p> | |
| Olivia | <p>Woolworths (weekly, aligns with meal planning for the week)</p> | <p>Greengrocer (weekly, after visiting supermarket, purchases 'extra' fruit and vegetables on sale)</p> <p>Online supermarket (as needed when busy; usually replaces weekly in-person shop when busy)</p> |
| Ned | <p>Coles (weekly, aligns with meal planning for the week)</p> | <p>IGA (daily as needed, e.g. if forgot something)</p> <p>Woolworths (ad-hoc if visiting for other items e.g. bread sometimes gets 'extra' fruit and vegetables)</p> |
| Susie | <p>Aldi (once weekly, aligns with weekly meal preparation for pets for the week)</p> | <p>Woolworths/ Aldi (as needed/convenient; if visiting for other items e.g. specials, or if needs additional fruit and veg e.g. spinach for pet food)</p> |
| Tom | <p>Woolworths/ Greengrocer/ Market (as convenient to other activities e.g. visiting market with mum, appointment near Coles etc.)</p> | |

Frequency of fruit and vegetable procurement (temporal dimension)

Fruit and vegetable procurement was performed differently dependant on whether the participant considered the practice part of a 'full shop' or 'top-up shop'. 'Full shops' were characterised by prior planning and a larger amount and variety of food being purchased. The main reason participants performed fruit and vegetable procurement as part of a 'full shop' was to reduce the amount of time and effort required to procure fruit and vegetables and other household items. Participants often synchronised their 'full shop' to align with their pay schedule, or a weekly or fortnightly meal plan, which guided what and how much fruit and vegetables were procured (further explored in Chapter 6). 'Top-up shops' were performed on an 'ad-hoc' basis. Most participants performed 'top up shops' when they had forgotten an item in their 'full shop'; had not procured 'enough'; had run out of an item or food that they deemed necessary for their household; or the fruit and vegetables procured had spoiled prior to participants using them: *"...at the moment if I grab a shredded coleslaw pack... they don't last... So like they're things that I'll have to get more of, or top up on because they just don't last the full fortnight"* (Kasey, interview transcript, Phase 1, January 2024). Frequency of 'top-up' shop was highly variable, and dependant on the individual participant and their unique lifestyle. For example, Ned performed fruit and vegetable procurement daily through 'top-up' shops at his local IGA store. He did this because it was located within walking distance of his home, and he often forgot to procure fruit and vegetables during his weekly 'full-shops'. Laura however, performed fruit and vegetable procurement through 'top-up' shops every two to three days on her way home from work to supplement fruit and vegetables procured in a once-fortnightly 'full shop'. Similarly, Elanor and Riley performed fruit and vegetable procurement whenever they felt they could *"squeeze it"* (Elanor, Interview transcript, Phase 1, October 2023) into their busy lives.

Primary and secondary procurement locations

Participants rarely procured fruit and vegetables from a single location. Most participants performed a 'full shop' at a supermarket or food retail environment, and then performed additional 'top-up' shops in the same¹⁰, or a different location. However, some procured most of their fruit and vegetables through other means, including fruit and vegetable delivery services (Kasey), food pantries (Lucy), home gardens (Maggie), meal delivery services (Laura & Tonia), and green grocers (Mandy). Often participants would switch their primary and secondary food retail locations, dependant on the circumstances of their day to day lives at the time (see Table 4). For example, Mandy visited a greengrocer once per month to procure a 'large box' of fresh fruit and vegetables, using Woolworths as a secondary location to 'top-up' on more perishable fruit and vegetables throughout the following weeks. However, when her dog became unwell, she procured most of her fruit and vegetables from Woolworths, finding it too difficult to make an 'extra trip' out to her local greengrocer for fruit and vegetables. Some participants preferred to 'shop around' and access retail locations that were 'convenient' to them, or that they perceived to offer better sales than another location. For example, Tom, Leanne, Elanor & Riley would all 'pop in' to a variety of retail locations to procure fruit and vegetables multiple times throughout the week dependant on what they were doing at the time (e.g. driving home from work, going to the doctors etc.).

Social influences on fruit and vegetable procurement

Who was shopping, and the presence of other people in food retail environments influenced how fruit and vegetable procurement was performed by the participants in this research project. **Staff & Patrons** present in retail stores were perceived by participants to impact their fruit and vegetable procurement through their role in facilitating trust for the retail brand. Some participants found supermarket staff to facilitate their fruit and vegetable procurement, through offering their assistance: *"...if I can't see something on the shelf, I'll go*

¹⁰ Where fruit and vegetable procurement was repeated in the same location, the spatial setting remains the same, however the practice is differentiated by the temporality of the performance (e.g. by being performed at a different point in time).

find someone 'hey have you got any of that in stock?'... They're usually pretty good, I've always been greeted with a 'yeah sure' or 'you want half of that, no problem'." (Susie, interview transcript, Phase 1, June 2023). Other participants felt very mistrusting of staff at fruit and vegetable retailers, particularly in supermarkets, and considered them to be rude, unhygienic, ignorant of safety protocols, and incapable of choosing quality fruit and vegetables. Many participants described providing feedback to retail stores about the quality of fruit and vegetables, and service provided, particularly in supermarkets: "... [a] couple of years ago [I] complained to my local Woolworths about their quality of vegetables, their fruit and vegetables, how I thought it was really rude to expect people to pay for the quality of vegetables that they were offering at top dollar. And I had, on a couple of occasions, pointed out to the staff 'oh look, you know, your whatever looks terrible' and I just got a grunt out of them so I complained about that a couple of times..." (Susie, interview transcript, Phase 1, June 2023). Most participants who did this felt that they were 'dismissed' or 'ignored' after providing this feedback: *"They don't give a damn, they phrase the questions in a way to get the answers they want"* (Ned, interview transcript, Phase 3, August 2023). Combined, these factors led participants to feel negatively towards procuring fruit and vegetables from supermarkets, despite continuing to procure fruit and vegetables from these locations. Some participants disliked shopping for fruit and vegetables in the presence of other patrons, as they found it to be a negative experience: *"I don't enjoy doing the shop... it's full of other people that I don't wanna be around necessarily, it's not the people I wanna be surrounding myself with..."* (Leah, interview transcript, Phase 1, July 2023). One participant (Leah) limited the time she spent procuring fruit and vegetables, and reduced the frequency of her visits to the supermarket, in part to avoid being around other patrons on the weekend.

Shopping with others was considered to be distracting and often led main food purchasers to alter their fruit and vegetable procurement to facilitate the wants and needs of the other person(s) they were shopping with. Some participants made a conscious effort to perform fruit and vegetable procurement alone, to reduce the stress and 'noise' of the task. For example, Leah specifically planned her fruit and vegetable procurement to fall on weekends so that she could leave her children at home with her husband Connor: *"...they make it 10 times harder than it needs to be. So I generally try and get half an hour, to just go and do it.*

Take some of the anxiety out of it [laughs] and just get it done” (Leah, Interview transcript, Phase 2, July 2023). Other participants who shopped with their significant others’, sometimes found the experience to be frustrating. This was particularly relevant for women who shopped with male partners. These participants often found that procuring fruit and vegetables together highlighted conflicting values around food procurement. For example, Maggie explained:

“... he moves very quickly and sometimes he’s not receptive to me actually getting things we need. He’ll get like - ‘costs too much money’ and all this kinda stuff... he’s tryna [sic] get out quicker... he’ll be walking in front of me, like saying stuff and I can’t even hear him, but he just wants to like cover his topics and keep moving and get out... and you know ‘oh what do you wanna get that for?’ if it’s something over there at the veggie section...it turns into this little, snarky little thing” (Maggie, Interview transcript, Phase 2, May 2023).

Even when shopping alone, the impact of other household members on participants’ procurement practices was evident, particularly influencing what and how much fruit and vegetables were procured. This was often associated with conflicting values and preferences between household members of what foods were desirable. For example, Lucy’s children favoured packaged snacks, which they perceived to help them to ‘fit in’ at school. As such, when procuring fruit and vegetables, Lucy constantly juggled between her own desire to procure healthy foods for her children, her children’s preference for packaged snacks, and her limited finances, making the practice of fruit and vegetable procurement laborious and time consuming: *“...Going back to school, having to buy all the lunchbox stuff again and all that packaged food. It’s really hard because they want the packaged food that their friends have. So, it’s challenging.” (Lucy, interview transcript, Phase 1, October 2023).*

While most participants described procuring fruit and vegetables with others as a negative experience, those who procured fruit and vegetables from markets found the presence of other people to positively influence their fruit and vegetable procurement. These participants found that procuring fruit and vegetables with others transformed the practice from a mundane activity of daily life, into an enjoyable social experience that was embedded within a broader practice of ‘spending time with friends and family’: *“I only really go there when I go meet mum... every Sunday... I go there for fruit, veggies, honey...” (Tom,*

interview transcript, Phase 1, August 2023). These findings show the strong influences that social connections had on fruit and vegetable procurement, and highlight the importance of considering the broader dimensions of social practices that impact how, when and where they are performed.

5.4 Chapter summary¹¹

This chapter explored how participants understood and experienced fruit and vegetable procurement in different retail settings using a social practice theory approach to analysis. The findings highlight the diverse ways in which participants performed fruit and vegetable procurement, which was largely based on their unique context and situation. Most participants procured fruit and vegetables from supermarkets, despite many believing that the produce acquired was of poor quality, or that these retailers were untrustworthy. While many wanted to procure fruit and vegetables from alternate locations such as markets, and greengrocers due to their values around supporting local farmers and the local community, the perceived necessity of a 'one-stop-shop' led them to feel that they had 'no other choice' but to shop at supermarkets. While some participants did procure fruit and vegetables from alternative retailers (e.g. greengrocers, markets), these locations were perceived by most to be difficult to access, and therefore unrealistic to procure fruit and vegetables from on a regular basis.

The retail location from which participants procured fruit and vegetables highly influenced the meanings they attached to fruit and vegetables. Trust and mistrust of staff and retailers drove alterations in competences involved in fruit and vegetable procurement. Non-supermarket retailers were viewed to be more trustworthy, and participants would often rely on their trust for this retailer to guide or offload competences of 'choosing' fruit and vegetables, usually in an attempt to reduce the cognitive burden of procuring fruit and vegetables. Regardless of where participants procured fruit and vegetables, the large supermarkets were viewed as a point of comparison from which participants compared prices, quality, and the ethical and moral suitability of purchasing fruit and vegetables from different retail locations. The following chapter expands upon these findings to explore how fruit and vegetable procurement influenced, and was influenced by other practices of fruit and vegetable use.

¹¹ Generative AI (Gemini) was used to cross-check the clarity of my writing in this section. An example of this process is supplied in Appendix 6. The summary has since been edited several times without the use of AI, and all work presented in this chapter is my own original thinking and wording.

CHAPTER 6 ZOOMING OUT: FRUIT AND VEGETABLE PROCUREMENT AS A CENTRAL PRACTICE IN THE BROADER COMPLEX OF 'FRUIT AND VEGETABLE USE'

Figure 34 shows the positioning of this chapter in the overall thesis, and provides insight into how the research aims and methods described in Chapter 3 led to the findings presented in this chapter. This figure is repeated in all results chapters, to guide the reader through the thesis.

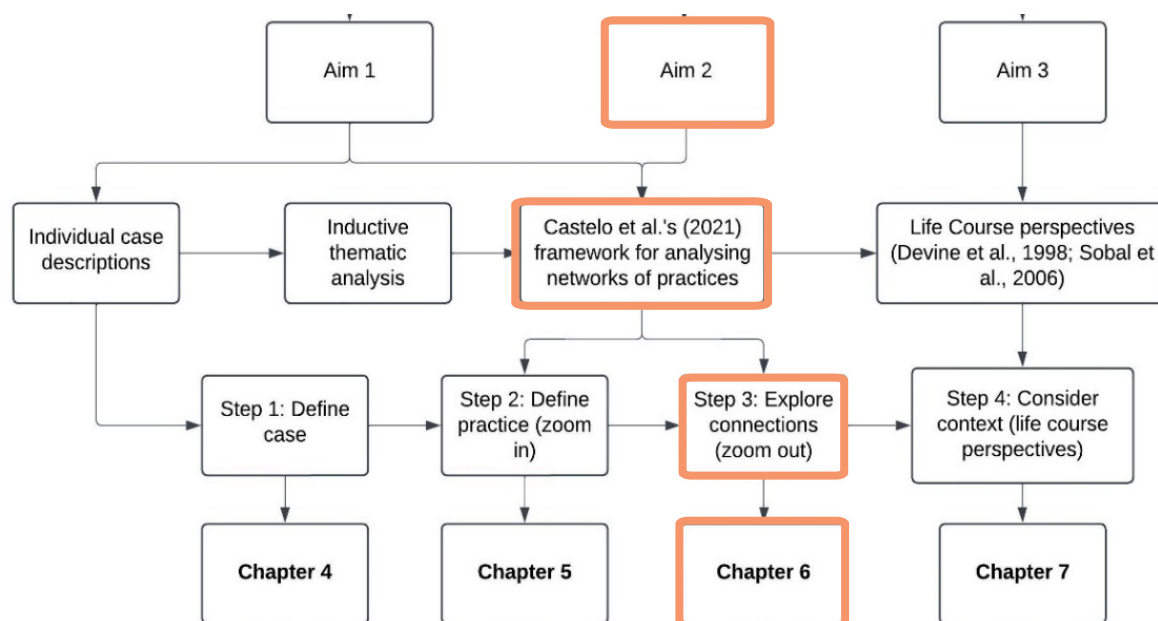


Figure 34: Visual representation of the positioning of Chapter 6 in the broader thesis

6.1 Introduction to chapter

This chapter explores how fruit and vegetable procurement influences, and is influenced by other practices of fruit and vegetable use (Aim 2). Findings were synthesised by 'zooming out' to follow the practice of fruit and vegetable procurement 'where it leads' as described in Castelo et al.'s (2021) framework for analysing networks of practices (Section 3.3.3 and Figure 24). While the analysis still focuses on fruit and vegetable procurement, and participants as performers of this practice, this approach considers the connections *between* practices. Doing this provides insight into how practices influence each other, and how their meanings, materials and competences are, or are not, linked.

6.2 Methodology

Data already coded under the ‘experiences’ theme in the inductive thematic analysis stage of analysis is reported in this chapter. Castelo et al., (2021) describe three primary networks of practices. *Complexes* refer to practices that are co-dependent, and are usually performed in synchronous or sequential ways. *Bundles* of practices are linked but not co-dependent, they can either support, or compete for performance. *Nexuses* are practices that intersect with other practices, bundles and complexes. For example, driving forms a nexus which links parenting, working and shopping, among other practices. The practices reported in this chapter form a *complex* of practices, which I have termed ‘fruit and vegetable use’. The individual practices included in this complex include planning, procuring, storing, preparing, and eating fruit and vegetables.

The data collection protocol was not designed according to Castelo et al.’s (2021) framework, due to the post-hoc nature of application to data analysis. The core focus of data collection was on the practice of procurement, in alignment with the research aims. During the design of the research project, I had developed an emerging idea that practices such as planning and eating might be associated with fruit and vegetable procurement, but had not yet discovered Castelo et al.’s framework. As such, this research was unintentionally geared towards complexes of practices, prior to my knowledge of them existing. For this reason, the analysis primarily focuses on the complex of fruit and vegetable use, in alignment with Research Aim 2, and bundled practices have also been incorporated into the results, only where they were identified through inductive analysis of the data. In other words, bundled practices and nexuses were never explicitly studied, and thus cannot be reported in this work.

As the practice of procurement has already been described in great detail in Chapter 5, this chapter focuses on describing the other practices in the complex, and exploring how they influence, and are influenced by, fruit and vegetable procurement. To do this I ‘zoom in’ on each practice identified within the complex, exploring the elements and dimensions involved in the practice, as was done for the results reported in Chapter 5. Doing this allowed me to develop a comprehensive understanding of each practice and how they were linked.

6.3 Results

The following sections provide insight into each of the practices identified to be involved in the complex of 'fruit and vegetable use' and how they link to each other, and the practice of procurement. Figure 35 shows an overview of the complex of fruit and vegetable use.

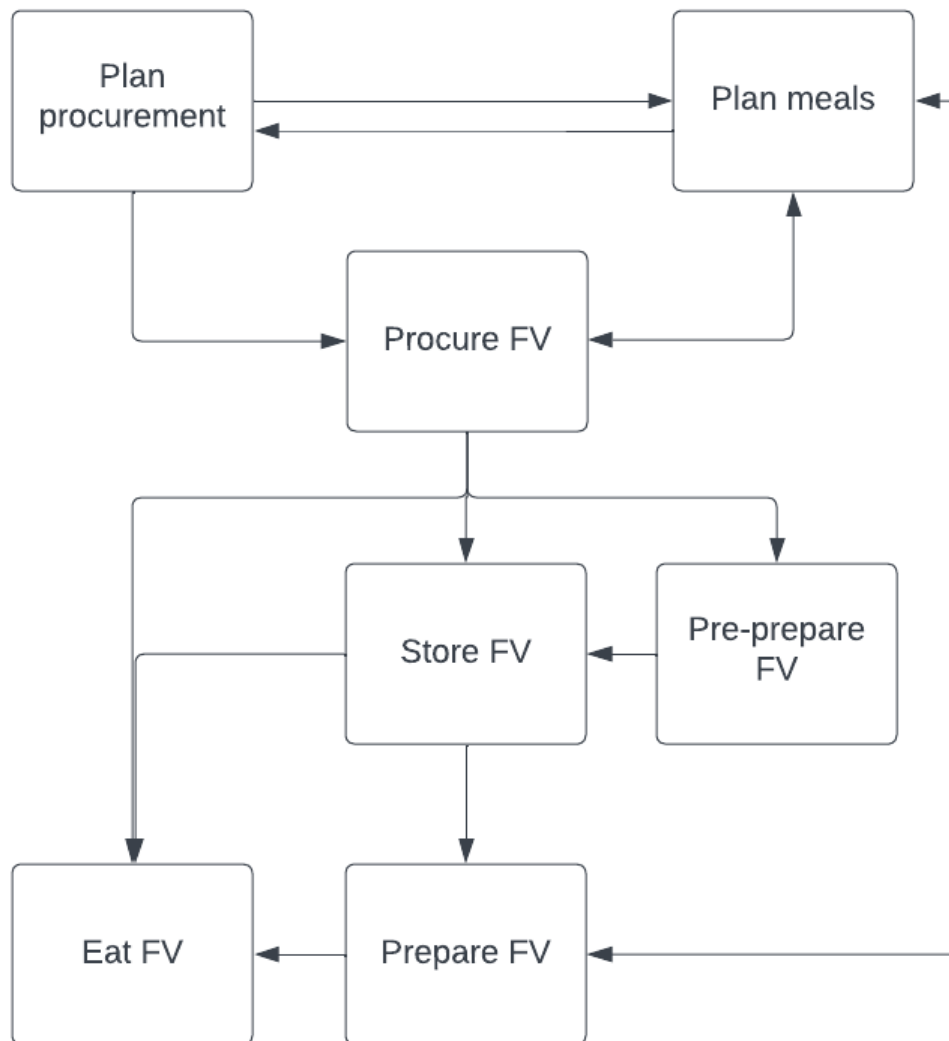


Figure 35: Fruit and vegetable use as a complex of practices

6.3.1 Planning fruit and vegetable use

'Planning fruit and vegetable use' incorporated two sub-practices: 'planning meals' and 'planning procurement'. These practices were preformed prior to, or during fruit and vegetable procurement, and influenced what fruit and vegetables participants procured and subsequently where and how they did this. Figure 36 shows the relationship between 'planning meals', 'planning procurement' and procuring fruit and vegetables. The primary meanings associated with planning practices were 'eat with the family', 'save time and money', 'prepare tasty, healthy meals', and 'reduce food waste'. These meanings influenced the order in which participants performed planning and procurement practices, which is described in the following sections under 'meanings'. Social, spatial and temporal influences also influenced` participants' fruit and vegetable planning practices, and are reported later in this section.

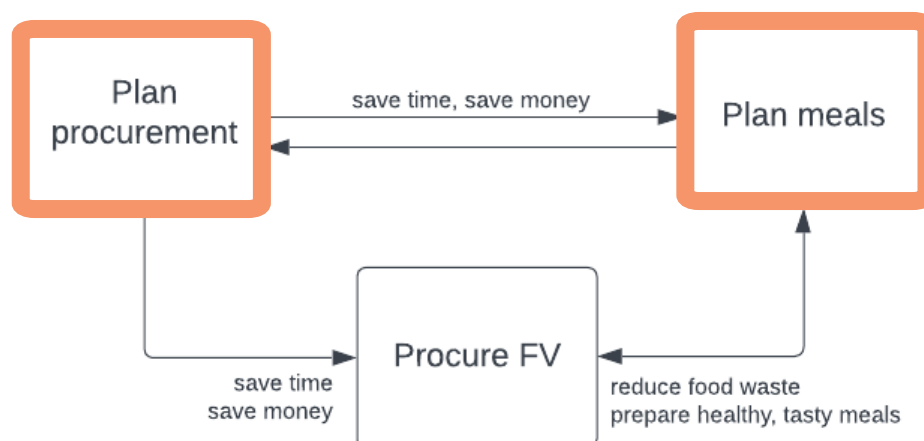


Figure 36: Relationship between sub-practices 'planning meals' and 'planning purchases', and 'procuring fruit and vegetables'

Meanings

Planning procurement 'on-the-go'

Some participants planned their fruit and vegetable procurement 'on-the-go', during fruit and vegetable procurement. They did this because they valued saving time and money, and believed that 'shopping the sales' or buying 'what looks good' was more likely to obtain fruit and vegetables that tasted good, were in season, cheaper, and likely to last longer at home. These participants were highly reliant on 'staple'¹² fruit and vegetables, and sales promotions to guide their fruit and vegetable procurement:

Laura: "We usually always get potatoes, but I think it's a staple in a lot of houses. I get a bit of sweet potato always get one each of the onions. So we usually always have a red onion, brown onion, white onion. So those are our main staples and then cauliflower and broccoli are usually other big ones that we buy, and broccolini as well. If it's not broccoli, it's broccolini, and then yeah... we just feel it out see what's on special."

(Laura, interview transcript, Phase 1, July 2023).

Planning procurement 'in advance'

Some participants planned procurement in advance of visiting their procurement locations. Often, these participants planned their meals first, developing a shopping list based on their meal plan to guide fruit and vegetable procurement. These participants generally valued being organised and were motivated by a desire to prepare healthy, tasty meals, and reduce food waste in their household. Procurement plans that were developed after meal plans determined where participants shopped for fruit and vegetables. For example, participants would only attempt to procure fruit and vegetables from locations that they felt certain

¹² 'Staple' fruit and vegetables were considered to be easy to incorporate into meals, and available throughout the year and refer to a 'mental list' of fruits and vegetables commonly used. This is described further throughout the remainder of this section.

could provide the ingredients they needed for their meal plans. If they could not procure what they needed for their meal plan, they would either adapt their procurement plan, or adapt their meal plan based on what was available to them:

Ned: "...as far as my shopping list is concerned, it's 90% pre-planned... and then I basically know how much I need... each week I will plan it out, my shopping list, and I'll make a circuit according to what's on special... between those three places (Coles location 1, Coles location 2, IGA), 99% of the time I can get what I want.... If I don't get it there [indicates one store] I'm going to get it up here [indicates another store]. I'll switch, so I'll just go with whatever I can get...."

(Ned, interview transcript, Phase 1, July 2023)

Participants who procured fruit and vegetables from services that removed planning competences (e.g. fruit and vegetable box delivery, food pantry) often planned meals *after* procuring fruit and vegetables because they had little control over *what* they procured. These participants aimed to 'use up' all the produce procured, and developed a plan for additional fruit and vegetable procurement that replaced what had been 'used up' prior to the next procurement cycle. This was often referred to as 'topping up', which meant different things for different participants. For example, Kasey referred to 'topping up' as 'buying extra': *"I do get strawberries and things in the box, but my kids go through them like crazy so I generally have to top up... We normally get a spinach or lettuce type thing but I tend to run through those quite quickly... so just a couple of those things I find I have to top up but always I find a use for the fruit and veg [in the box]. (Kasey, interview transcript, Phase 1, January 2024).* However, Lucy explained that 'topping up' to her, meant procuring additional fruit and vegetables that allowed her to use the produce supplied from the food pantry: *"... [food pantry] might give you two carrots, one onion... It's not enough for me to go 'alright, I'll make a meal with that for the family tonight'... I get them and then I top up with Aldi." (Lucy, interview transcript, Phase 1, October 2023).*

Planning meals in advance

Some participants planned meals in advance, and used this to guide their procurement and/or preparation of fruit and vegetables. Participants who planned meals in advance were often motivated to provide healthy, tasty meals for their households. Participants who had children were particularly driven to plan meals in advance, and did so because they valued spending time with their family, and wanted to support their children to learn healthy habits around food and eating. Some participants also did this to reduce the time and effort burden of planning meals and preparation during the week. For example, Leah planned her family's meals in advance, to guide her husband Connor's preparation during the week: *"...because I work full time, and I don't get home until late, [Connor] knows what's getting made so that he can get started and it's sort of like ready when I get home and then we can eat together as a family..."* (Leah, interview transcript, Phase 1, July 2023). These participants felt a sense of satisfaction in their meal planning and procurement, and highly valued the additional time it allowed them for other tasks of daily life.

Planning meals on-the-go

Some participants did not plan meals in advance, and instead planned their meals 'on-the-go', usually selecting a meat or protein source, and attempting to 'match' the vegetables procured to that food type: *"...we do it on the fly and we go, well 'we're going to have chicken or lamb or pork' ... And then we'll look at that and base it on the premise of a minimum of three veg."* (Bill, interview transcript, Phase 3, September 2023). Most participants who planned meals 'on the go' did so because they wanted to 'use up' produce that had already been procured and did not want it to go to waste. Often these participants described themselves as being 'too lazy' or 'too busy' to plan meals in advance. Because they did not have a meal plan, these participants usually also procured fruit and vegetables on-the-go, and heavily relied on 'staple' fruit and vegetables that they routinely incorporated into their meals: *"I sort of have a mental note of what regulars we buy, and if I haven't got a list I'll just buy what I know we need and, hope I haven't forgotten anything..."* (Susie, interview transcript, Phase 1, June 2023).

Materials & competences

Planning meals and planning procurement involved different materials and competences dependant on who was performing the practice, and the extent to which they engaged in planning practices.

Planning procurement

Planning procurement involved several competences related to **‘knowing’ about fruit and vegetables available for procurement**. Participants held a mental ‘catalogue’ of retail prices for fruit and vegetables, and often compared prices across retail locations, either through use of a physical catalogue, or through comparison with their own mental catalogue: *“... [I] check the catalogues... I check my receipt and I know, and I will say to them, ‘excuse me, that’s on half price this week, it hasn’t scanned down”, and they say ‘no, no’, and I say ‘Yeah’... It’s like I’ve got that catalogue in my head.”* (Lucy, interview transcript, Phase 2, October 2023). They compared these prices with their own personalised guideline of acceptable prices to pay for fruit and vegetables, which was developed based on their household’s budget (where relevant), and values around food expenditure and consumption. Participants also held extensive knowledge about what fruit and vegetables were offered at different retail locations. For example, Ned would specifically visit a Coles store in one suburb to procure pre-packaged salads, but would visit another Coles store to procure other food items such as bread and meat because he found he could not get all three items at either location, despite being the same retail chain.

Many participants relied on ‘staple’ fruit and vegetables to guide their procurement, particularly those who performed planning ‘on-the-go’. **‘Staple’ fruit and vegetables** were considered to be easy to incorporate into meals, and available throughout the year. Frozen vegetables were particularly thought of as ‘staple’ or ‘backup’ produce, because they lasted a long time at home, and could be incorporated into most meals: *“...you use the frozen veggies as a secondary because they last longer in the freezer whereas your perishables you’ve got kind of a week before they go bad...”* (Connor, interview transcript, Phase 1, July 2023). Regardless of whether they planned procurement in advance or on-the-go, most participants engaged in a form of **‘taking stocktake’** of what was left in their refrigerator

prior to visiting their chosen procurement location, which they used to guide their procurement: *“Because I failed to prep my shallots last week I have to get a new bunch. They’re all a bit wilting, very wilted...There are a bag of snow peas sitting in the fridge for the been sitting in the fridge since June [laughs].”* (Laura, interview transcript, Phase 2, August 2023). Participants who used online shopping services often ‘took stocktake’ while procuring fruit and vegetables, actively assessing what they had left in their fridge while adding items needing replenishing to their order as they did so.

Planning meals

One of the most important competences of planning meals involved managing household food preferences and dietary requirements. Participants described increasingly complex planning skills that they employed to cater to their household members’ health requirements and dietary preferences. For example, Ned described juggling his own health-related requirements, with his cultural preference for Hungarian foods, and his wife’s small appetite and preference for ‘Aussie food’: *“with meal planning, you’ve got two separate camps, my wife and myself, so you have to sort of reconcile”* (Ned, interview transcript, Phase 2, August 2023). Planning meals often required identification and acquisition of recipes from supermarkets, online sources, friends and family, which some participants translated into a shopping list that was used to guide procurement. How these lists and meal plans were developed was highly variable between different participants as highlighted in Figure 37 and Figure 38.

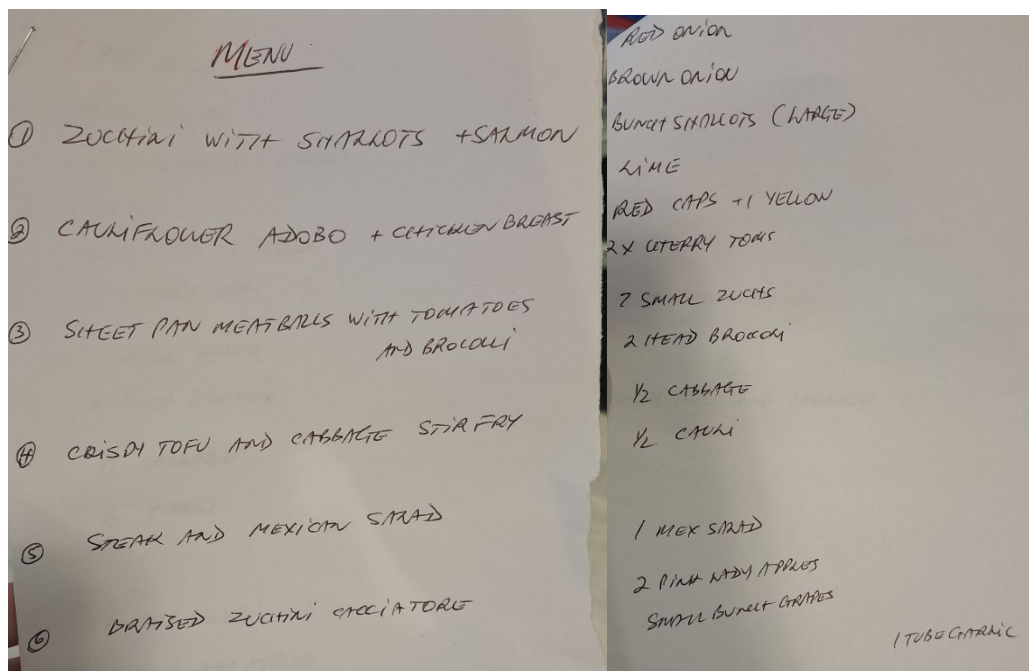


Figure 37: Meal plan and shopping list developed by Ned in Phase 2 (August 2023)

| MON | TUES | WED | THURS | FRI | SAT | SUN |
|--------------------------|-----------------------|---------------|--------------------|-----------------|-----------------------|-----------------------|
| WEEK 1 | | | | | | |
| Steak & cauli fried rice | Haloumi & veg skewers | Lemon chicken | Pesto chicken | Mexican chicken | Haloumi & veg skewers | Bacon & leek frittata |
| WEEK 2 | | | | | | |
| Mexican chicken | Lemon chicken | Roast pork | BBQ pork & spinach | Pesto chicken | Savoury mince | Leftovers/ take-away |

| Shopping List | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Chicken breast - x6 • Chicken thighs - 1.5kg • Chicken pieces - x2 (1kg pack) • Porterhouse steak - x1 (4 pack) • Pork shoulder • Beef mince - x1kg • Bacon - large pack • Eggs - x13 • Butter • Sour cream - x2 • Danish fetta • Parmesan • Cream - 800ml • Haloumi - x4 (180g) • Garlic (crushed) • Capers • Lemons - x3 • Tomato - x2 (large) • Avocado - x2 • Red onion - x6 | <ul style="list-style-type: none"> • Red capsicum - x3 • Carrots - x2 • Zucchini - x4 • Spinach - large bag • Leek - x1 • Cherry tomatoes - x3 (punnet) • Cauliflower • Frozen veggies • Parsley • Oregano • Paprika • Canned tomatoes - x2 • Sundried tomato pesto - x2 • Worcestershire sauce • Tomato paste • Mild salsa - x2 • Taco seasoning • All-purpose seasoning • Lime juice • Olive oil |

| Ingredients | |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lemon Chicken (x2) | 6x chicken breast fillets Butter Garlic Capers 3x lemons/lemon juice 2x tomato (large) 2x red onion Danish fetta Parsley |
| Pesto Chicken (x2) | Olive oil 1.5kg chicken thighs 300ml cream 1 jar sundried pesto 2 large carrots 1/3 cup parmesan (shaved) 2tbsp oregano 2 large zucchinis (spaghettified) |
| Bacon & leek frittata | 6 rashers bacon 1 leek 10 eggs ¾ cup cream Cherry tomatoes |
| Steak & cauli fried rice | 3x Porterhouse steaks Cauliflower 3x eggs All-purpose seasoning Worcestershire sauce 1x red capsicum Garlic Frozen peas/corn/carrot |

| | |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Haloumi & veg skewers | 2x zucchini 2x 180g packs Haloumi Cherry tomatoes 1x red onion Olive oil Oregano Paprika |
| Mexican chicken | Chicken pieces (1 pack) Taco seasoning Mild salsa 1x red onion 1x red capsicum Cherry tomatoes Olive oil 1x avocado 2/3 cup sour cream Lime juice |
| Roast pork | Pork shoulder Roast Capsicum Roast Tomato Roasted onion Spinach |
| Savoury mince | Beef mince Frozen veg Leftover veg from week 2x cans diced tomatoes ½ cup tomato paste |

Figure 38: Meal plan and shopping list developed by Leah in Phase 2 (August 2023)

Social, spatial & temporal dimensions of fruit and vegetable planning

Store infrastructure (spatial dimension)

Most participants who planned meals or procurement in advance did so in their homes or workplaces. Planning 'on-the-go' was performed during procurement, either through online shopping services, or in the food retail environment itself. Supermarket infrastructure such as aisles, promotional materials and displays prompted participants in store to purchase fruit and vegetables, regardless of whether they had planned in advance or on-the-go:

"when you get there and you see it, you go 'that's right I needed some of those too!' or, 'I needed this for that'" (Tonia, interview transcript, Phase 3, August 2023). This infrastructure was often not noticed by participants, despite guiding their selection of fruit and vegetables during 'go-along' shops. For example, when asked about her use of the 'super savers' display during her go-along at Aldi, Leah explained: *"...it's just in front of me. [laughs]... I honestly didn't even realise that that was a thing."* (Leah, interview transcript, Phase 2, July 2023)

Planning with and for others (social dimension)

Several participants shared roles and tasks related to fruit and vegetable planning. For example, Tonia took stocktake of fruit and vegetables needing to be procured, which Laura added to, procuring additional fruit and vegetables that were on sale or 'looked good' in the store: *"... because I'm here at home at the moment, I'll look through and see what we're really low on or what we're running out of and I'll just make a list thinking about it, so that I can just send it through if I know that [Laura's] going to do it..."* (Tonia, interview transcript, Phase 3, August 2023). Participants who planned meals and procurement for their household were required to hold a great deal of knowledge about household members, and be adaptable to changes in preferences and requirements over time:

Mandy: "...[Doug is] looking to go on the carnivore diet because he doesn't believe that humans were designed to eat anything more than meat [laughs]. I disagree with that... But he wants to try it and that's fine. He likes salad with minimal lettuce and lots of feta cheese you know? He's from Scotland so he will... He will eat canned vegetables which I

never used to but now I do... he absolutely hates bagged lettuce and bagged salad and stuff because he thinks that that's – well you hear stuff in the media about recalls and all that because of germs and bacteria and all that, so yeah that's the sort of stuff..."

(Mandy, interview transcript, Phase 4, February 2024)

Connor: *"Lisa understands that while I'm not keto now, I do... try to limit that sort of stuff, and so she's probably conscious of some of that... Halloumi and veg skewers, bacon and egg frittata, you know stuff that isn't carb heavy, there's no pastas and rices and stuff like that."*

(Connor, interview transcript, Phase 3, August 2023).

Time available to plan & frequency of procurement (temporal dimension)

Participants' planning practices were considerably influenced by the amount of time they perceived they could allocate towards them. Participants who felt they were time-poor often planned fruit and vegetable procurement 'on-the-go', and relied on 'staple' fruit and vegetables to guide their procurement. Those who perceived they could 'afford' to spend time planning meals and procurement did so, often on 'work time' to 'fit it in' around other day-to-day tasks: *"... I mean, it probably took me on an hour and a half. Just sit down and do it. But I do work at a desk job too, so like I do have the ability to sit and properly concentrate on it."* (Leah, interview transcript, Phase 1, July 2023). The order in which planning practices were performed influenced the frequency of fruit and vegetable procurement, with participants who planned procurement in advance often procuring fruit and vegetables in larger amounts, less often (e.g. through 'full shops'), and those who planned 'on-the-go' procuring smaller amounts, more often (e.g. through 'top-up shops'). The frequency of fruit and vegetable procurement influenced how participants planned procurement, and what fruit and vegetables were considered 'staples'. For example, participants who performed 'full-shops' fortnightly, were more likely to procure frozen vegetables because they did not spoil between procurement performances. Those who performed 'top-up shops' often procured more salad vegetables and mixes because these spoiled quickly, and they knew they would be able to replenish them in an upcoming shop.

6.3.2 Storing fruit and vegetables

‘Storing fruit and vegetables’ was linked to fruit and vegetable planning, procurement and preparation through meanings. These meanings primarily related to prolonging the at-home-life of fruit and vegetables (to save time and money), and ‘reducing food waste’ (Figure 39). The specific meanings participants associated with ‘storing fruit and vegetables’ determined the order in which they performed practices, and which specific competences and materials they used to do so.

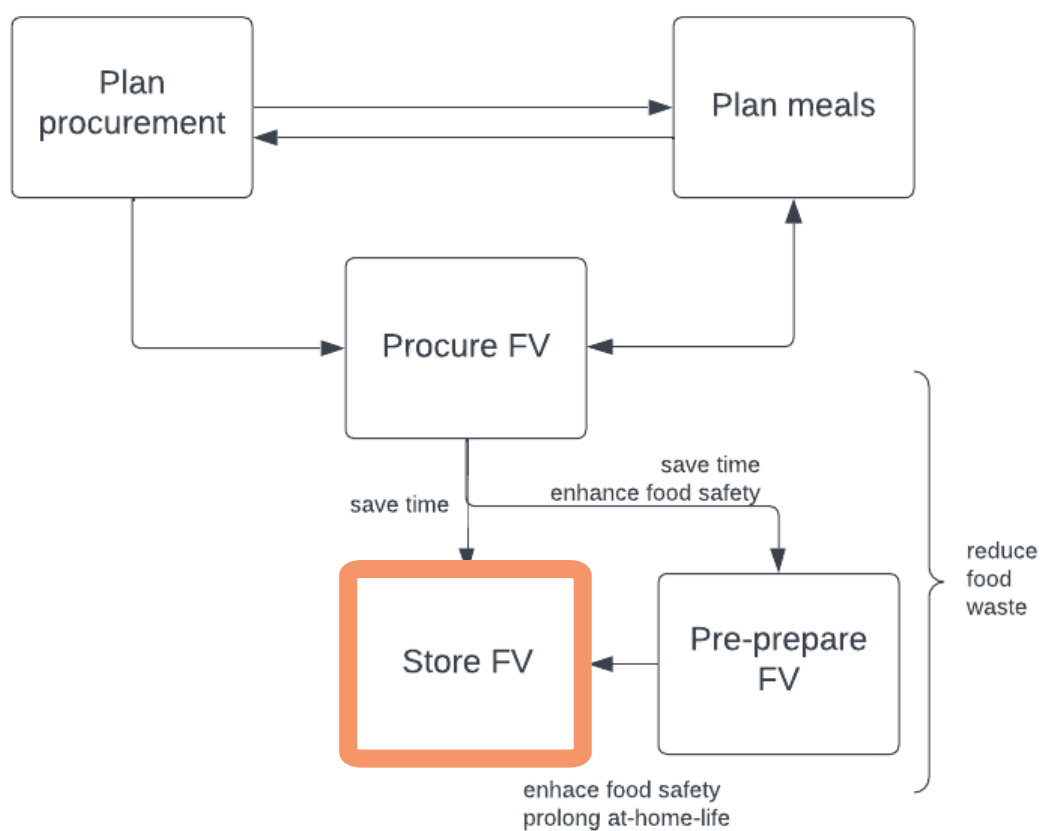


Figure 39: Relationship between storing, preparing and procuring fruit and vegetables

Meanings

Most participants wanted to prolong the at-home-life of their fruit and vegetables, and were motivated to reduce food waste. These meanings led participants to engage in the practice of 'storing fruit and vegetables' which they associated with their goals to 'save money', 'save time', 'save the planet' and 'protect health': "[storing] just means... if I forget which I sometimes do, it's still ok to eat you know" (Ned, interview transcript, Phase 3, August 2023). Some participants did not hold these values to the extent that others did, and as such did not perform practices of 'storing fruit and vegetables' beyond what they considered to be the 'bare minimum'. These participants relied on plastic bags provided by fruit and vegetable retailers to carry and store their fruit and vegetables. They also procured fruit and vegetables more often, and in smaller amounts than participants who performed more storing competences.

Participants believed that if they stored their fruit and vegetables in certain ways, the at-home-life of the produce would be prolonged, reducing the frequency of their fruit and vegetable procurement, and saving them time and money. Regardless of their motivations, most participants performed some additional step of storing fruit and vegetables beyond simply placing them in the fridge. Some participants performed an additional step of 'pre-preparing' their fruit and vegetables prior to storing them, which they did to reduce the time required to prepare them later in the week and to reduce food waste: "once it's all cut up it's like 'ok cool, I can cook with this, I don't have to prep this' ... if I didn't prep it, a lot of it would go to waste... but if I put that effort in then a lot of it will get used, because it's just a bit easier." (Laura, Interview transcript, Phase 2, August 2023). Some participants also cleaned their fruit and vegetables prior to storing them, to 'wash off' any pesticides on the skin of the produce, and reduce the likelihood of being infected by foodborne pathogens. Many participants who stored their fruit and vegetables after procurement desired to 'reduce food waste', however they spoke about this in broad terms, and usually associated storing more with values of 'saving time' and 'saving money' than environmental concerns:

Ned: [showing interviewer a container of cherry tomatoes with paper towel in the base]. "Look at that, that will go on the pizza, it's almost good as the day we bought it almost two weeks ago. Because when you have stuff like that

leftover and you're paying a premium, it means you can make it last a bit longer than it's worth doing that... sometimes it just means you know I don't have to go and do shopping or I don't throw stuff out, or if I forget which I sometimes do, it's still ok to eat you know?"

(Ned, interview transcript, Phase 3, August 2023).

Materials & competences

Every household had a unique way of storing fruit and vegetables, which most participants explained they had learned through 'trial and error'. Most fruit and vegetables procured were stored in participants' refrigerators, however frozen types were stored in freezers, and some root vegetables were stored in cupboards/pantries. Some participants stored fruit and vegetables in the packaging they were purchased in (e.g. strawberry punnets, plastic bags). Other participants removed produce from the packaging they were procured in, prior to storing them loose in the refrigerator's produce draw. Some participants also decanted fruit and vegetables into reusable plastic containers, to which they sometimes added paper towels or other moisture absorbers before placing in the fridge, or freezer. The specific methods and materials used to store fruit and vegetables differed considerably between participants and types of produce. The following quote shows the different methods of 'storing' used by Susie and Bill for different types of produce:

Susie: ...Celery I will cut it to container size and line that with paper towel on the bottom and the top and that I find, keeps it for quite a long time that way. Spinach... I cut it up really fine and small... and then I put that into a Ziplock bag with paper towel lined in it and I find that lasts for a couple of weeks, whereas it wouldn't in the bag. I've tried different things of keeping mushrooms but I find that it keeps quite well in the containers that you buy it in.

- Bill: Silver beet, cutting the stems off and putting them inside a bag and sealing them. They're lasting. Asparagus and the broccolini into a cup of water.*
- Susie: I always find that by keeping something in the bag it comes in, rather than loose, because when they're loose, especially carrots, they go all fluffy... And zucchini, stuff like that if I put it into a plastic bag or something.*
- Bill: We've got an avocado holder; we've got an onion holder... they work a treat. What else have we got, did try the tomato one but that was rubbish...*
- Susie: Yeah look cherry tomatoes and stuff like that, just in their own little container. The tomatoes that you might chop, I'll just cling wrap.*
- Bill: Apples, once you start cutting into it you put it in the bag or gladwrap. Cabbage, keep that in its gladwrap or once it comes out of the gladwrap in a plastic bag, it keeps longer.*

Bill & Susie, interview transcript, Phase 3, September 2023

Some participants organised produce inside their refrigerator so that the fruit and vegetables more likely to be damaged, or spoil quickly were used first: *"once we kind of get the groceries home, we'll organise the freezer accordingly and stuff like that... and we might have it set up on the [fridge] shelves when we're really getting organised"* (Connor, interview transcript, Phase 3, August 2023). However most placed the majority of their fruit and vegetables into their refrigerator without doing any additional organising. Several participants discussed using cleaning products to wash produce prior to storing it, including bi-carb soda, vinegar, and soap, however only Kasey and Ned used these during their participation in the research project. Interestingly, several participants who did perform additional competences of 'storing fruit and vegetables', for example decanting them into containers, described themselves as being 'lazy'. These participants explained that they performed these additional competences with the intention of prolonging the at-home-life

of their produce, to reduce the time and energy required to perform additional shopping trips. These participants also sometimes selected different types of fruit and vegetable products that they believed would last longer without them needed to perform storing competences. For example, despite knowing how to store lettuce in ways that prolonged the at home life, Ned chose to purchase pre-packaged lettuce products, in an attempt to reduce the amount of storing competences he needed to perform at home:

Ned: "...with a lettuce, you take of the outer leaves, you wrap it up in a couple of towels and put it into an airtight container, to keep for two weeks. You don't core it because then in two days it's gone, then you can take off the outer leaves and as long as it's nice and clean you're gonna have a lettuce for two weeks... I'm lazy and I buy it in pre-packaged stuff, only the premium and freshest."

(Ned, interview transcript, Phase 1, July 2023)

Social, spatial & temporal dimensions of storing fruit and vegetables

The home environment (spatial dimension)

All participants stored their fruit and vegetables in their home kitchen. As such, the materials present within the kitchen were important in determining which competences were performed as part of 'storing fruit and vegetables'. For example, if participants did not have paper towel or reusable containers available for 'storing fruit and vegetables' they would rely on the packaging the produce was procured in instead. Participants reported that when they didn't make the 'extra effort' to store their fruit and vegetables, they found that the produce spoiled faster, resulting in frustration during preparation, and sometimes elimination of vegetables from the meal if substitutes could not be found:

Laura: The other day there was an older packet of beans, before the new beans came in and um, I went to cook them up but there was a couple of mouldy ones in there and I was like [makes frustrated noise]... once

one is mouldy, you've gotta get rid of them, it's not worth risking... It was very frustrating

Interviewer: Did you find anything to substitute the beans with or did you just go without?

Laura: Just went without all the vegetables and was like [shrugs]... With the container-ing it really does usually keep things fresher which is why we do it with beans

(Laura, interview transcript, Phase 3, August, 2023)

Most participants accounted for space required to store fruit and vegetables during their planning and procurement, considering the space available in their refrigerator at the time. As such, space within the refrigerator was rarely an issue for storing fruit and vegetables. However, if participants over-procured, or received gifted produce that they did not feel they could use prior to it spoiling, they would sometimes adapt their storing practices, engaging in additional steps of pre-preparing produce to be frozen, and then used later in the year: *"the veggies, I tend to just whack in the freezer and then, when I've got enough, I just bung them in a soup."* (Lucy, interview transcript, Phase 1, October 2023).

Transmission of competences (social dimension)

Participants adopted storing practices from observing and discussing them with family members, friends and online sources, which they then developed into their own unique methods through 'trial and error' and 'experimentation': *"I just kind of like, did it... Yeah, like experimentation... Mum probably did it on and off, and just picked it up from there..."* (Laura, Interview transcript, Phase 2, August 2023). Parents were particularly influential for the development of storing practices, with several participants describing 'picking up' competences from them over time: *I suppose some of it was trial and error. The mother had a couple of reasonable ideas, a lot of screwy ones but a couple of good ones. You know you just, I suppose I picked a lot of it up just by experimentation.* (Ned, interview transcript, Phase 1, July 2023).

Timing of practices determined by quality of fruit and vegetables (temporal dimension)

Almost all participants stored their fruit and vegetables immediately after procurement. The only participant who did not do this was Kasey because she felt that the quality of the fruit and vegetables she procured was so high that she did not need to store her fruit and vegetables immediately:

Kasey: "...if I was to come home from the grocery store and I didn't unpack my fruit and veg and put it straight into the fridge straight away, it starts to get that real fruit and veg smell and it's like it's already not coping. Whereas I could leave my fruit and veg box for three days, not unpacked and it's fine, there's no smell, everything is still perfectly fine. The greens might be looking a little sad but otherwise it's fine, like it's – that's why I'm like there's no urgency to unpack it..."

(Kasey, interview transcript, Phase 1, January 2024).

6.3.3 Preparing fruit and vegetables

‘Preparing fruit and vegetables’ linked to fruit and vegetable planning, procuring, storing and eating (Figure 40). The extent to which participants enjoyed preparing food influenced how much they engaged in the practice, and subsequently how influential its performance was on other practices of fruit and vegetable use.

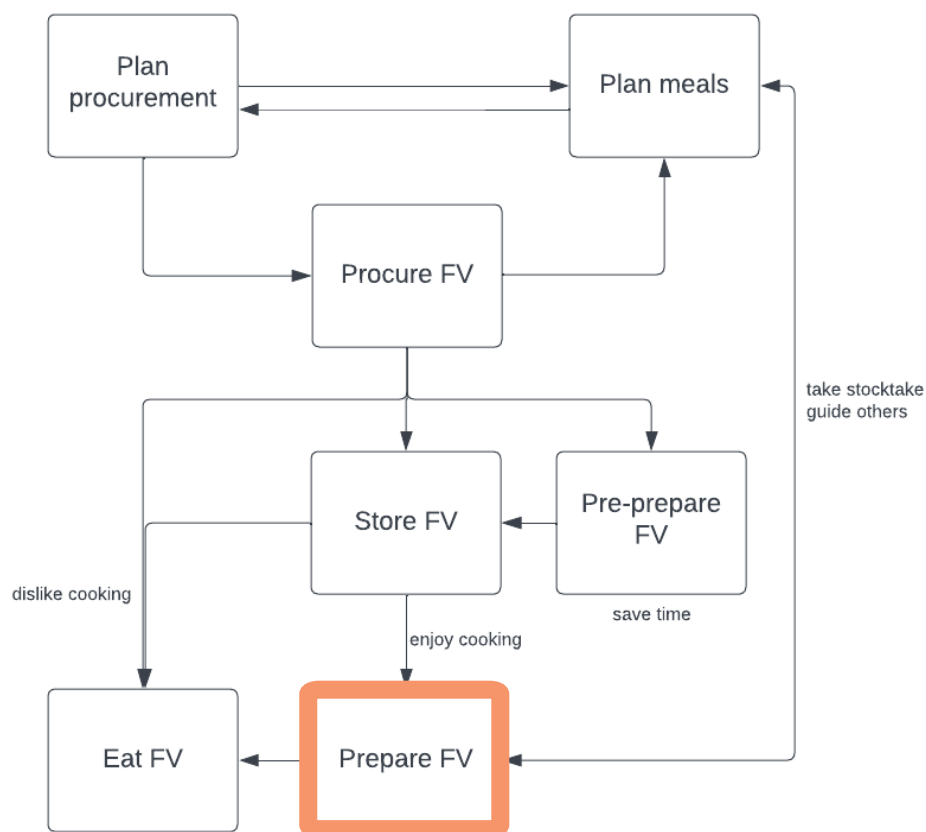


Figure 40: Relationship between planning, preparing, storing, procuring and eating fruit and vegetables

Meanings

Some participants enjoyed preparing meals and took pride in their ability to incorporate fruit and vegetables into 'healthy, tasty meals': "... *I actually really do enjoy cooking, I think it's so fun... I love variety and I love pulling together dishes that are super yummy...*" (Kasey, Interview transcript, Phase 1, January 2024). These participants often engaged in planning meals to a greater extent, and subsequently planned their procurement in greater detail to ensure that they could prepare meals that aligned with their values around feeding themselves and their households. Other participants found preparing fruit and vegetables to be 'tedious', or 'tiresome', and subsequently avoided the practice, skipping it entirely by procuring fruit and vegetables that needed very little, or no preparation (e.g. pre-chopped, pre-cooked), or ordering pre-prepared meals. Regardless of their motivation to prepare fruit and vegetables, several participants pre-prepared fruit and vegetables to reduce the time required to incorporate them into evening meals. For example, some participants chopped, grated, or washed fruit and vegetables prior to incorporating them into meals to 'save time' and reduce the pressure of juggling preparation and other daily tasks at the same time: "... *I normally always grate the carrot and zucchini, cut the mushrooms, and put them in the fridge for when I've got the boys and come home, ready to prep the [meals]...*" (Lucy, interview transcript, Phase 4, November 2023).

Materials & Competences

Materials involved in 'preparing fruit and vegetables' varied considerably across different participants. Those who enjoyed cooking often used more materials, and employed more complex cooking skills when preparing fruit and vegetables such as blenders, knives, chopping boards, steamers, pots, pans, stove-tops, ovens, oven-trays, freezers, fridges, microwaves, and containers. In comparison, participants who did not enjoy fruit and vegetable preparation used less materials and competences. For example, during their participation in this research project, Laura and Tonia started to order lite 'n' easy meals, specifically to avoid preparing fruit and vegetables which they found to be a 'tedious' task. Switching to lite 'n' easy heavily reduced preparation competences for Laura when packing her lunches: "*for lunch I just take them out of the freezer and then I just, I usually put them into a container to take to work for ease and yeah so that's how they come for lunches so I*

just put it in my bag...” (Laura, interview transcript, Phase 4, November 2023). Similarly, participants who did not enjoy fruit and vegetable preparation often planned fruit and vegetable procurement differently, often opting for products that were pre-prepared or frozen, due to the ease of incorporating them into meals: “...we found out for example, [frozen] kale, spinach, already chopped up pumpkin, so everything is already cooked. So it transformed our cooking again... we just throw everything in from those... I made lunch today and I used three blocks of spinach out of the spinach packet and yesterday the girls had salmon and peas and it was just so easy...” (Elanor, interview transcript, Phase 1, October 2023)

Competences of ‘using up’ produce were important for fruit and vegetable preparation if participants valued reducing food waste, or wanted to minimise financial or time-losses due to produce spoiling prior to them preparing it. Sometimes this involved pre-preparing fruit and vegetables to be frozen for later use. Almost all participants who shared fruit and vegetable practices in the household described having to ‘guide others’ on how to ‘use up’ fruit and vegetables that had been procured. This was especially relevant in households where one person was responsible for planning meals and procuring fruit and vegetables, and another was responsible for preparing fruit and vegetables:

Kasey: ... I just have to tell [Justin] what’s in the fridge to use, or...he’s fine in the meats department, he’ll choose what to have but I’m like you know, ‘make sure you cut up the – use tomatoes and the lettuce’ because he would just have meat on a wrap with nothing else...

Interviewer: yeah, so it’s still quite a lot of mental labour for you

Kasey: yeah exactly... because the only thing I like about the coleslaw shredded, packed from Aldi is [Justin] generally will use that because it’s convenient... He obviously doesn’t have to do any preparation for that, so of course he’s gonna choose that option.

(Kasey, interview transcript, Phase 3, January 2024)

'Hiding' and 'disguising' fruit and vegetables in children's meals were also described as competences required for successfully preparing fruit and vegetables for children in some households, however most parents found this to be a minor inconvenience and had little difficulty getting their children to eat fruit and vegetables. Finally, 'taking stocktake' linked preparation to planning, with participants keeping 'mental notes' of fruit and vegetables needing replenishment as they prepared meals throughout the week(s).

Social, spatial & temporal dimensions of preparing fruit and vegetables

The home environment (spatial dimension)

Fruit and vegetable preparation was solely performed in participants' homes, except for Susie, who often stayed in other people's homes due to her job. The materials available within the home influenced how and to what extent participants prepared fruit and vegetables. This then influenced the types of fruit and vegetable products procured. For example, Susie usually 'blitzed' cauliflower in her blender at home, but used pre-'blitzed' cauliflower when she was house-sitting other people's homes.

Juggling household demands (social dimension)

The performer of preparation practices in the household influenced how fruit and vegetable planning and procurement were performed, with participants who shared roles describing having to 'guide' the meal preparer in what to cook and sometimes how to cook it, as described previously. Often, this required participants planning meals to simplify their plan to suit the skills and competences of the meal preparer, for example choosing simple recipes that could easily be adapted using different key ingredients:

Kasey: "...the planning that's required of making sure I've got all those ingredients and going to the shop, I was actually getting super stressed about grocery shopping ... [now we're] just buying meat, vegetables, wraps and a couple other things for breakfasts and school lunches... [it's] yummy that we enjoy but just so simple, and simple enough that my husband can cook it..."

(Kasey, interview transcript, Phase 1, January 2024)

Other adults in the household were important for participants who had children and prepared meals, due to their ability to ‘take the children’ and reduce stress for the person preparing meals: *“I hate being like flustered, stressed in the kitchen... [Justin] will take the kids so I can cook in peace”* (Kasey, interview transcript, Phase 1, January 2024).

Juggling time (temporal dimension)

Almost all participants viewed fruit and vegetable preparation as a time-consuming practice. Fruit and vegetable preparation tasks were often allocated to whoever in the household was perceived to have more ‘free time’: *[Leah]’s a work from home day on Mondays and Tuesdays, so sometimes she cooks on work from home days or weekends and stuff like that, where predominantly if she’s working at the office and stuff like that, I’ll predominately be the cooker, on those days.”* (Connor, interview transcript, Phase 3, August 2023). This was also linked to how enjoyable participants found preparing fruit and vegetables. For example, Laura felt negatively towards daily fruit and vegetable preparation, but enjoyed ‘experimenting’ on weekends when she had more time available to do so. Tonia felt comparatively unphased by the practice and as such prepared most of their fruit and vegetables in the home prior to starting full-time work. Most participants prepared vegetables in the evening, primarily viewing them as an addition to the evening meal, as described in Section 4.3. Some participants allocated time during the day to prepare fruit and vegetables to ensure that they would ‘make it’ into the evening meal, or to eat ‘as a snack’: *“For breakfast I’ll have fruit with my cereal, or a piece of fruit. And then usually vegetables for dinner... Maybe an apple or a banana for a snack, or berries, or whatever is in season.”* (Olivia, interview transcript, Phase 1, September 2023).

‘Eating fruit and vegetables’ linked to fruit and vegetable procurement through the meanings participants attached to fruit and vegetable consumption. These meanings often carried through to other practices, such as planning and preparation, but were not actively considered by participants during the practice of fruit and vegetable procurement. Instead, expectations around eating experiences and outcomes often determined how and where participants procured fruit and vegetables, through their planning activities. Figure 41 shows the relationship between ‘eating fruit and vegetables’ and other practices in the complex of fruit and vegetable use.



Figure 41: Relationship between planning, preparing, storing, procuring and eating fruit and vegetables

Meanings

Participants primarily associated 'eating fruit and vegetables' with meanings of 'health' and 'enjoyment'. While most participants believed that fruit and vegetables were 'healthy', they held varying understandings for how specifically fruit and vegetables contributed to health. Many participants could vaguely recall the recommended daily intake stipulated in the Australian Dietary Guidelines, however most had low confidence in their knowledge, or were confused about how much fruit and vegetables they should ideally be eating. Similarly, it was not clear if participants knew what a 'serve' was, despite mentioning that they should have a certain amount of 'serves' each day. The following excerpts from participant transcripts highlight this confusion and low confidence:

Interviewer: when you say you know you aren't eating, maybe as much as you should, what is that 'should'? Where does that come from?

Laura: It comes from the 'one piece of fruit, 5 servings of vegetables a day'? I think that's what it is?

(Laura, interview transcript, Phase 1, July 2023)

Interviewer: Have you read anything about the dietary guidelines on fruit and vegetables? The Australian Dietary Guidelines?

Connor: um, I would have. Can't really regurgitate anything [laughs]

(Connor, interview transcript, Phase 3, August 2023)

Maggie: ... you see the eat fresh WA stuff sometimes, then you might see the 5 fruit, 2 – ah! 5 veg and 2 fruit - whatever the thing is! I can't remember now. On TV, the health – thing. But that's very rare as well.

(Maggie, interview transcript, Phase 1, May 2023)

Interviewer: When you say “enough” fruit and vegetables, what are you referring to there?

Olivia: What’s it called, the Healthy Eating Guide.

Interviewer: And do you know what the recommendations are?

Olivia: I think it’s two or three serves of fruit a day, and then five serves of veg.

Interviewer: what do you know in terms of the recommendations around fruit and vegetables specifically?

Leah: Ah, so 2 fruit and 5 serves of veg a day? Is that the- right a-breakdown?

(Leah, interview transcript, Phase 1, July 2023)

Several participants felt that the Australian Dietary Guidelines were too confusing or difficult to follow, and favoured diets popular in the media at the time due to their perceived ‘simplicity’ of following them in an otherwise confusing nutrition information environment. The ‘keto’ diet was particularly popular among participants at the time of data collection, with several participants reporting that they followed some version of ‘keto’ or ‘low carb’ dieting, which influenced their fruit and vegetable use:

Connor: “I think I attached myself to keto because it was very simple, very easy to follow rules. It wasn’t ‘you can do this this this and you can’t do that and dah dah dah dah dah, upon stipulation upon stipulation upon stipulation on variable, on variable, on variable...’ I think when you dive into nutritional guidelines and it’s convoluted and difficult to manage... and so it probably got real dry and didn’t stick and [I became] uninterested... people are pretty simple creatures really... if we’ve got a million rules, you can research them but I’m not gonna read them... But if you’ve got one rule it’s like ‘well that’s easy’ you know.

(Connor, interview transcript, Phase 3, August 2023).

While most participants believed fruit and vegetables were healthy, the primary meaning that linked their fruit and vegetable practices was enjoyment of eating experiences. Vegetables were generally viewed as an accompaniment to the evening meal, that were tedious to prepare, and expensive to procure. There was a general perception among participants that they 'should' incorporate fruit and vegetables into the evening meal, whether they wanted to or not. Fruit was perceived to be suitable as a snack for children, and tropical and highly seasonal fruits, such as stone fruit, berries, mango, and pineapple, were viewed as 'special' and therefore more desirable to procure and eat. These associations often resulted in participants procuring larger amounts of fruit because they were desirable, which would eventually be wasted due to not lasting long enough in the home: *"All the grapes, because I bought them for two weeks, because they're out of season they all just went shrivelled. The kids love grapes, so by the time we got to the end with the last few I did end up throwing away."* (Lucy, interview transcript, Phase 4, November 2023).

During phase four, participants became more aware of their actual fruit and vegetable intake, which some found confronting. While some participants thought the tracking activity was enjoyable, and viewed it as a 'challenge' or 'competition' between household members. Because of this, most participants who participated in phase four increased their fruit and vegetable intake while actively participating in this stage of the research project. However, during the phase four discussion, participants reported that they found the idea of increasing their fruit and vegetable intake over the long term 'too difficult'.

Lucy: *"... realistically, the kids don't want to eat fruit and vegetables when they get home... They've always picked toast or cereal on a weekday and on the weekends sometimes pancakes on a Sunday with dad... or bacon and eggs... [Reece] doesn't want to change. For me it's pretty much just snacking on the go... So, honestly, realistically [increasing fruit and vegetable intake is] probably going to be in the too hard basket. We'll just keep going how we are.*

(Lucy, Interview transcript, Phase 4, November 2023)

This was primarily due to concerns about finances, household routines, habits and preferences, and concerns about food waste, procurement schedules, and time available for preparation, as demonstrated in the previous quote.

Materials and competences

Characteristics of fruit and vegetables, such as ‘crunch’, ‘colour’, ‘flavour’ and ‘texture’ were important for participants eating of fruit and vegetables, and highly influenced their planning:

Ned: “[showing an image of meal prepared during the week] ...that’s a Mediterranean salad. I mean what more can you – you’ve got the colour, you’ve got the taste and contrast, and also a challenge to put something on the table that looks good, tastes good, gives nutrition and sort of satisfies all the senses.”

(Ned, interview transcript, Phase 3, August 2023).

Crockery, cutlery, lunchboxes and the kitchen table/counter were all important materials involved in ‘eating fruit and vegetables’, however participants rarely discussed these, likely because the focus of the investigation was on procurement and not ‘eating’. Furthermore, in line with social practice theory, the practice of ‘eating fruit and vegetables’ is routinised in daily life and as such often taken for granted, thus potentially not standing out in participants’ minds during data collection (Neuman, 2019; Maller, 2015; Castello et al., 2021). Competences of eating fruit and vegetables were related to ‘knowing’ how much, when, and how to eat or incorporate fruit and vegetables into meals. Knowing how to make fruit and vegetables more palatable (e.g. by adding sauces/flavours, ‘cooking them right’, or ‘hiding them’) were also important competences, particularly for people who did not inherently enjoy eating fruit and vegetables.

Social, spatial & temporal dimensions of eating fruit and vegetables

Eating location influences what fruit and vegetables are procured (spatial dimension)

Participants ate fruit and vegetables at home, school and work. The location in which they ate fruit and vegetables influenced the type of fruit and vegetables eaten, and hence how they were procured and prepared. For example, participants who had children described procuring additional fruit items for their children's lunchboxes. Work was seen as a prohibitive place for eating fruit and vegetables due to a perceived lack of time to prepare fruit and vegetables in ways that would be suitable to eat during the workday while maintaining the flavour and texture profile that was desired:

Laura: I eat at lunch, so that's the first time I eat something proper... usually it's leftovers from dinner, bar the vegetables... I load up the vegetables for dinner... because I don't like how they reheat, they reheat too soggy, and I go 'ugh' and wiggle them around a little bit like 'bleugh', probably put them in the bin... I try to keep [fruit] up but it's just hard, because a lot of fruit you can't pre-cut for work because it goes brown by the time you eat it

(Laura, interview transcript, Phase 3, August 2023)

Household food preferences influence what fruit and vegetables are procured (social dimension)

Household food preferences influenced how often and to what extent fruit and vegetables were incorporated into meals. This then determined how much fruit and vegetables were eaten, and hence procured, through linkages between eating, planning and procurement practices. Interestingly, the presence of other people in the home often increased fruit and vegetable eating for participants: *"... I definitely don't eat as much vegetables as when [Susie's] not there... I had a pub parmie with chips and I could have had a salad with it, but I thought, 'no stuff that'..." (Bill, Interview transcript, Phase 3, August 2023)*

Time of day influences what fruit and vegetables eaten (temporal dimension)

Different fruit and vegetables were considered appropriate to eat at different times of the day. There was a general understanding among participants that fruit was appropriate to eat as a snack, in a dessert, or for breakfast, whereas vegetables were mostly considered relevant to the evening meal only, depending on the participant and the extent to which they were motivated to 'eat fruit and vegetables': *For breakfast I'll have fruit with my cereal, or a piece of fruit. And then usually vegetables as for dinner... Maybe an apple or a banana for a snack... (Olivia, interview transcript, Phase 1, September 2023).*

6.4 Chapter summary¹³

This chapter explored how fruit and vegetable procurement influenced, and was influenced by, other practices in the broader complex of ‘fruit and vegetable use’. The analysis focuses on the interconnectedness between fruit and vegetable procurement and practices of planning, storing, preparing and eating fruit and vegetables, and explores how the meanings attached to these practices determined their configuration and performance in participants’ day-to-day lives. **Planning** was performed in advance or on-the-go and factors such as time constraints, household preferences and dietary requirements influenced how and in what sequence participants planned meals and procurement. **Storing** practices varied considerably for different fruit and vegetable types, and participants. Participants were motivated to prolong the at-home-life of their fruit and vegetables primarily to avoid food waste and reduce time, effort and financial losses required to procure more fruit and vegetables. **Preparation** of fruit and vegetables was viewed as a timely activity, which required a high level of cooking and collaboration skills, particularly when households shared procurement, planning and preparation tasks. **Eating** fruit and vegetables was linked to meanings of enjoyment and health. While most participants acknowledged that fruit and vegetables had health benefits, there was confusion about what these were, and what information could be trusted. Enjoyment of fruit and vegetables was a greater driver of consumption than health and had a strong influence on participants planning of meals and procurement. Combined with findings from Chapter 5, these results show that how and where fruit and vegetables are procured from has implications for fruit and vegetable use in domestic households, including how participants plan, store, prepare and eat fruit and vegetables.

¹³ Generative AI (Gemini) was used to cross-check the clarity of my writing in this section. An example of this process is supplied in Appendix 6. All work presented in this chapter is my own original thinking and wording.

CHAPTER 7 LIFE COURSE INFLUENCES ON DEVELOPMENT AND MODIFICATION OF FRUIT AND VEGETABLE PRACTICES IN AUSTRALIA

Figure 42 shows the positioning of this chapter in the overall thesis, and provides insight into how the research aims and methods described in Chapter 3 led to the findings presented in this chapter. This figure is repeated in all results chapters, to guide the reader through the thesis.

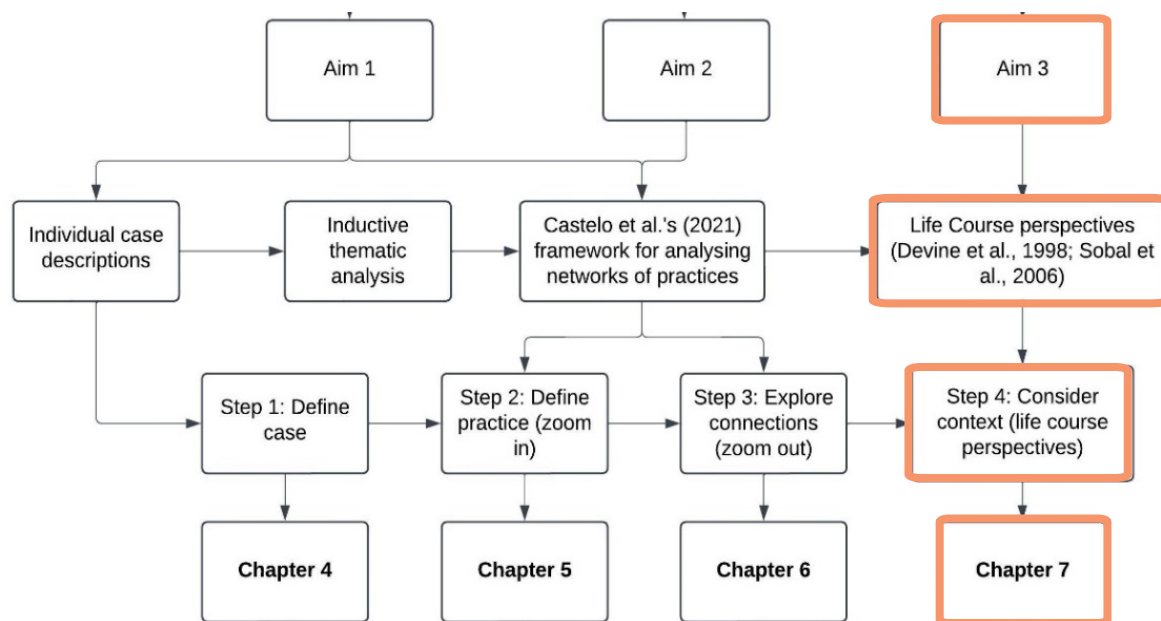


Figure 42: Visual representation of the positioning of Chapter 7 in the broader thesis

7.1 Introduction

This chapter explores how life course events and experiences influence fruit and vegetable use (Aim 3). Findings in this chapter were synthesised by applying concepts from life course perspectives (Devine et al., 1998; Sobal et al., 2006), in addition to social practice theory. This provided insight into how life course events and experiences influenced adaptation and adjustment of fruit and vegetable practices over time (see Section 3.3.3). The addition of life course perspectives builds on step 4 of Castelo et al.'s (2021) framework, in which the context of practices is considered, to provide more nuanced insight into historical factors that influence how fruit and vegetable practices are currently performed (Figure 42).

7.2 Methodology

Findings reported in this chapter were developed through inductive thematic analysis, followed by post-hoc application of social practice theory and life-course perspectives. Data related to life course concepts were obtained through asking participants how they had developed skills, competences and practices related to fruit and vegetable use. Analysis included first using thematic analysis (as described in Section 3.3.3), which resulted in development of a theme titled 'life course'. Codes from this theme were then refined based on their relevance to the coding categories developed for practices which were reported in Chapters 5 and 6. The final stage of analysis involved re-categorising relevant codes according to the life course concepts (food upbringing, roles, health, relocation and immigration, resources, and the food system) defined by Devine et al., (1998), which have been described in Thesis Section 2.4. New and modified categories were also developed during this stage, when the findings from this research did not align with the categories previously reported by Devine et al., (1998).

7.3 Results

The findings from this analysis suggest that early experiences with fruit and vegetables (e.g. during childhood) were important for forming preferences for fruit and vegetables. However, events, experiences and transitions during adulthood impacted participants' use of fruit and vegetables though influencing their development and adaptation of practices related to planning, procuring, storing and preparing fruit and vegetables. Role transitions, moving house and changes in employment, health and illness were particularly influential on practices of fruit and vegetable use throughout participants' life courses. The following sections describe these results in detail.

7.3.1 Early experiences with fruit and vegetables

Childhood was an important time for developing fruit and vegetable eating practices. Several participants described learning their taste preferences for fruit and vegetables during childhood. Most participants thought that their parents and grandparents had influenced their current understanding of fruit and vegetables, in both positive and negative ways. For example, many participants felt conflicted between associations with fruit and vegetables that they had learned as a child, and information they had since learned in

adulthood. This often resulted in participants feeling tension between what they believed they 'should' be doing, and what they had learned to do through observation and experiences in childhood:

Olivia: "I have visions of my dad cooking on the barbeque and bringing... big massive T-bones, and that would be more than half your plate. And then you'd have a potato, and carb food, and then there's only a tiny bit of space left on your plate for a vegetable or salad, or whatever. Vegetables are not half the plate, like it should have been."

(Olivia, Phase 1, September 2023).

Some participants believed that observation of their parents performing procurement practices during childhood had influenced their current practicing of fruit and vegetable procurement, through showing them 'what to do': *"...back in the day watching mum like 'what are you doing, is that a good one?, is that why you're choosing it?'..."* (Laura, interview transcript, Phase 1, July 2023). Others however, felt that their parent's behaviour during childhood served as a guide for 'what not to do' when procuring fruit and vegetables as an adult: *"...I do remember, especially when I became an adult and moved out on my own... thinking, "Holy shit," [mum] would spend so much money at the grocery store with no plan. I don't know actually, where I got it from, my planning and my budgeting... that was never modelled to me."* (Olivia, interview transcript, Phase 1, September 2023)

The transition from child to **young adult** was influential for some participants' fruit and vegetable use, through development of competences beyond 'eating'. Significant transitions that increased participants' independence, such as moving out of the family home and gaining fulltime employment, prompted participants to develop procurement and preparation practices. Most participants recalled this as a 'busy' time in which meal planning and preparation were considered a lower priority than working, socialising, and for some, raising children. As such, many participants described offloading these practices to external services, to reduce the mental and time-bound burden of performing these tasks. Often, this exposed participants to new ways of using fruit and vegetables, which supported them to develop new preparation and procurement competences. For example, Leah described

her experience of ordering HelloFresh during her early 20s: “... *It was a great experience for us, we were terrible cooks when I moved out, I probably could make you some 2-minute noodles, and a toasted sandwich and that’s pretty much it... never had any interest in it and, eating was a means to an end... definitely learned some different techniques that I would’ve used otherwise, and definitely still stuff I use now... it definitely made us a bit more adventurous...*” (Leah, interview transcript, Phase 2, July 2023). Leah and Connor explained that these fundamental skills learned in early adulthood were a core driver of their current fruit and vegetable preparation skills, highlighting the importance of this time period for developing the practice that *lead* to fruit and vegetable use.

7.3.2 Adulthood transitions

Life course transitions such as having children, changing employment, relocating, and changes to health and illness altered how when and where participants performed practices of fruit and vegetable use. Often these transitions altered income and time resources available for fruit and vegetable use, which changed the meanings participants attached to fruit and vegetable practices. Due to the interconnected nature of practices of fruit and vegetable use (reported in Chapter 6), alterations in one practice subsequently altered how other practices were performed. This resulted in a highly complex sequence of changes in how, when and where participants used fruit and vegetables in their day-to-day lives.

Becoming and being a parent

Having children influenced fruit and vegetable use through altering the meanings participants attached to both their children’s, and their own fruit and vegetable intake. Most participants who had children discussed valuing their children’s health, and desired to be positive role models by eating fruit and vegetables and supporting their children to develop preferences for them: “*we had kids and it probably prompted the change, you probably respect your child’s body more than your own... I’ve gotta understand it before I go and teach it you know.*” (Connor, interview transcript, Phase 3, August 2023). To facilitate eating more fruit and vegetables, these participants often engaged in additional planning practices, thus altering their fruit and vegetable procurement and preparation in response. The addition of extra practices, or performance of more competences of these practices often resulted in redistribution of responsibility in the household, with participants

transferring practices to others, or 'working together' to share roles. For example, when Connor stopped working, he took on responsibility for preparing meals in the home. To compensate for this, his wife Leah increased her meal and procurement planning because she felt it gave her a better sense of control and reassurance that everything had been done to her standards: *"...I know what I want and how it's all gonna work... it's probably more of a control thing for me, like I like having all of it ticked off in my head so that I know that it's done..."* (Leah, interview transcript, Phase 2, July 2023).

Changes to income resulting from participants reducing paid work to care for children also shifted responsibility. In most cases, the parent who spent more time at home was responsible for preparing fruit and vegetables. Financial restrictions due to the addition of extra people in the household increased use of budgeting and planning skills to ensure that children were 'fed well' within the confinement of the family budget: *"... we had to look at the budget and that's when we were more mindful of, instead of me just going in the afternoon 'What am I going to make for dinner tonight?', we actually had to plan our meals and work out the ingredients and work out the cost because that's the cheaper way to do it."* (Lucy, Interview transcript, Phase 1, October 2023). This highlights the importance of skills and competences required to practice fruit and vegetable use within the family home.

Changes in employment

Increased income resulting from changes in employment often led participants to plan, procure and eat fruit and vegetables in alignment with motivations of 'enjoyment'. Reduced income however, led participants to associate fruit and vegetable use with meanings of what 'should be done', which often revolved around societal health values. The extent to which participants enjoyed eating fruit and vegetables altered how much participants incorporated fruit and vegetables in their diets. Some participants procured and ate more fruit and vegetables when they had higher income, because they felt they could buy more fruit and vegetables that they enjoyed: *"We grew up shopping for sales, but lately we've started shopping more for what we want instead... we might pay a little more, but we can afford a bit more at the moment so... and it's definitely improved the healthiness of our fridge..."* (Tonia, interview transcript, Phase 3, August 2023). Many participants purchased frozen fruit and vegetables, or produce that was 'on sale' rather than those they enjoyed

eating, to reduce the cost of their fruit and vegetable shopping as highlighted in the following quote: “...I think it wasn’t until maybe around COVID or when [Reece] had his heart attack, we were cutting down on finances, up until that point we never used frozen veg. Ever.” (Lucy, Interview transcript, Phase 4, November 2023). This demonstrates the influence of financial restrictions of fruit and vegetable use and participants’ resulting adaptation of fruit and vegetable practices. Specifically, participants often altered where they procured fruit and vegetables from, or altered the types of fruit and vegetables they procured to adapt to new financial limitations or changes in employment.

Relocating

Moving house, suburb, states, or countries altered the meanings that participants attached to fruit and vegetable use, due to the requirement to adapt to new socio-cultural rules and norms, and new food retail environments. Moving locations within Australia altered how participants thought about fruit and vegetables, often due to feeling they had more, or less access to desirable fruits and vegetables. For example, when moving to Queensland from South Australia, Laura felt that increased access to tropical fruit and vegetables increased her liking and willingness to eat fruit and vegetables more broadly: “just being up here, it just feels fresher and it’s like yeah, I wanna BE fresher up here, you know it just feels... more acceptable to eat fresh.” (interview transcript, Phase 1, July 2023). Often, if participants moved to a new area and felt that the fruit and vegetable offerings were not as desirable as what they had previously accessed, they reduced their procurement and consumption of fruit and vegetables. For example, Connor described his experience with fruit and vegetables after moving to inner-city Melbourne from rural Victoria: “... I moved out and moved down to the city in Melbourne and stuff and you go to the supermarket... and all of a sudden I wasn’t eating fruit and vegetables because it wasn’t as good....” (Connor, interview transcript, Phase 3, August 2023).

Regardless of where participants had relocated to or from, there was a short period of time where they had to ‘learn’ how to procure fruit and vegetables in the new location: “I haven’t really done a full shop here yet... because we moved... I’m still getting to know this area.” (Olivia, interview transcript, Phase 1, September 2023). This process involved feelings of frustration, reliance on foods made elsewhere (e.g. takeout, meals prepared by family or

friends), and reduced, or sporadic fruit and vegetable procurement until participants felt 'familiar' with their new environment:

Interviewer: What's happening now specifically that's different to say, before you moved?... Is there anything that you would like to do with your fruit and vegetable purchasing and use that you're not doing now?

Tom: Oh, just consistency... yeah, purchase them [laughs], my shopping day was yesterday wasn't it, yeah nah, [I'll] go shopping today

Interviewer: So you didn't go shopping yesterday as planned?

Tom: Or the day before, or the day before.

Interviewer: Why is that?

Tom: Dunno... just got busy doing different things and then I was eating elsewhere...

Tom, interview transcript, Phase 1, August 2023.

Relocating also influenced fruit and vegetable preparation for some participants, in which adapting to a new kitchen or living space impacted their ability to prepare fruit and vegetables in the short term: "...because I've moved into the new place, it takes me a little bit to get familiar with the kitchen?... Literally identifying with um where the hell the pots are, and um where the pans are..." (Tom, interview transcript, Phase 1, August 2023). This further limited fruit and vegetable procurement during this time, as participants did not want to 'waste' fruit and vegetables that they did not feel comfortable or capable of preparing in their new living spaces.

Health and illness

Changes in participant's health and illness across their life course influenced the meanings they attached to fruit and vegetable use, particularly around consumption. For example, if participants or their close friends/family members became unwell, participants often became motivated to eat more fruit and vegetables:

Olivia: My whole family, like I've mentioned to you that I have gestational diabetes, and so I have a big history of diabetes on both sides of my family, like Type 2. I suppose it shouldn't have been a shock, but at the same time it was a shock when I was diagnosed with gestational diabetes. I'm under the care of an endocrinologist now, and so when I've finished being pregnant, we'll be in touch around do I have Type 2, and how I can try and reverse that, or prevent that from happening... I'm more cognizant around that. I do feel the same, like it's, "Okay, what vegetable can we add to make the dish more healthy?" ...

Interviewer: ... So you're quite mindful about trying to increase your fruit and vegetables?

Olivia: Yeah, especially with my gestational diabetes. I have to make sure I have protein, and limit the carbs, and then bulk up on the fruit and veg...

Interviewer: So [increasing your fruit and vegetable intake has] really been triggered by the gestational diabetes?

Olivia: Yeah, I think so...

Olivia, interview transcript, Phase 1, September 2023

To ensure that this happened, participants often engaged in additional fruit and vegetable planning (e.g. through use of meal plans) and fruit and vegetable procurement, to support their desired increased fruit and vegetable consumption. Some participants responded to changes in health and illness by altering where they procured fruit and vegetables from, for

example engaging with a fruit and vegetable box or meal delivery services, or markets. While participants believed that fruit and vegetables were generally healthy (see Chapter 4), they changed their procurement location because they perceived the alternate service to offer fruit and vegetables that were of better quality, more affordable, and easier to access than what they traditionally procured from supermarkets:

Mandy: I was also going through endometriosis and some skin allergy stuff and all that sort of thing so I was on a waiting list to get a hysterectomy so during that time I decided to look at what else I could do to try and make myself feel better because I was really unwell... [in addition to seeing a naturopath], I saw this post on the [Facebook] community page... that [a local business] was doing boxes... and she was delivering to my door or I would go and pick up on Friday an organic fruit box. And I did that because I got sick of buying stuff from the supermarket and it either being expensive, or crappy variety, or didn't last very long.

(Mandy, interview transcript, Phase 1, January 2024)

This was perceived to make their diets 'healthier' overall, primarily through supporting or encouraging them to eat more fruit and vegetables:

Interviewer: ...it sounds like getting lite n easy you're sort of consciously thinking of money... time and effort obviously, but also like you've actually thought about fruit and vegetables in choosing that.

Laura: Yeah. Wanting to be healthier. So increasing fruit and vegetable intake but also decreasing how much I'm eating because I've grown up with big plates... [which] wasn't doing anything, but now we've increased on fruit and veg and decreased on portion size. Which was really necessary...

Tonia: Yeah, it's a lot healthier and balanced

Laura & Tonia, interview transcript, Phase 4, November 2023)

Participants also often altered their fruit and vegetable use based on information sought out from friends, family, and online sources related to health concerns. For example, several participants in this research project explained that they tried to procure fruit and vegetables in ways that aligned with a 'keto diet' as this was trending in the public media at the time. As shown in the following quote, many participants avoided eating and procuring fruit and starchy vegetables, and often attempted to procure specific varieties of fruit and vegetables based on information they had read online: *"I read something the other day about carb values in apples, so the gala are the best carb wise, and followed by granny smith... on a keto Facebook page... So yeah, I'm going to, I'll grab those [apples]"* (Sandy, interview transcript, Phase 2, July 2023). This highlights the significant influence of social media on fruit and vegetable practices.

7.4 Chapter summary¹⁴

This chapter explored how participants' fruit and vegetable practices were influenced by life course events and experiences. Childhood experiences were influential on preferences for fruit and vegetables, having both positive and negative influences on procurement and consumption into adulthood. Transitioning to adulthood initiated development of planning, preparation and procurement practices for many participants, despite initial challenges adapting to new demands of life such as full-time work and living independently. Early adulthood was particularly important for developing cooking skills and exploring different ways of incorporating fruit and vegetables into diets. Major life events such as having children, changing jobs, moving, and health concerns influenced the meanings participants attached to fruit and vegetable use, having both positive and negative influences on fruit and vegetable planning, procurement, preparation and eating. Becoming a parent led participants to value fruit and vegetables for health more highly, and often led to increased meal planning and preparation. Reduced time and income resulting from the addition of children, or alterations in employment often limited fruit and vegetable procurement and consumption and led participants to associate fruit and vegetable procurement with what 'should be done' rather than what they would 'like to do'. Adapting to a new environment reduced fruit and vegetable procurement and consumption in the short term, while participants attempted to 'familiarise' with new food retail and home spaces. Health concerns motivated participants to prioritise fruit and vegetable consumption, sometimes altering what and where they procured fruit and vegetables from. The findings from this chapter highlight the complex interplay of individual, social, and environmental factors that influence fruit and vegetable use over time. Findings suggest that there may be benefit in targeting specific practices of fruit and vegetable use, at specific life stages to increase fruit and vegetable use in Australia.

¹⁴ Generative AI (Gemini) was used to cross-check the clarity of my writing in this section. An example of this process is supplied in Appendix 6. All work presented in this chapter is my own original thinking and wording.

CHAPTER 8 DISCUSSION

8.1 Introduction

This thesis explored how Australian people understand and experience fruit and vegetable use, with a focus on procurement. Previous interventions have not achieved long-term success in increasing population-level fruit and vegetable use in Australia (Pollard et al., 2008; Rekhy & McConchie, 2014). As such, the intention behind conducting this research was to provide insight into Australian people's everyday experiences of fruit and vegetable use, to inform more effective fruit and vegetable research, policy and promotion interventions. The specific aims of the research were to:

Aim 1: explore how Australian people understand and experience fruit and vegetable procurement, and determine how food retail environments influence this

Aim 2: determine how fruit and vegetable procurement influences other practices of fruit and vegetable use (such as planning, preparing and eating)

Aim 3: determine how life course events and experiences influence development and modification of fruit and vegetable practices for Australian adults

I developed a novel methodology which used case study research to scaffold four individual research phases. The case study research design facilitated development of a research protocol that was structured enough to fulfill the research aims, while being fluid enough to allow me to investigate the complex daily practices that people perform in their natural settings. The research was conducted through a constructivist worldview and interpretivist theoretical perspective. Data collection methods were drawn from ethnography and food systems research approaches, which were beneficial for facilitating highly contextual conversations about everyday practices that otherwise go unnoticed and taken for granted. Social practice theory and life course perspectives were applied during the analysis stage of the research project, and provided a structured way for analysing otherwise messy and fragmented activities of daily life. Incorporating life course perspectives into social practice theory is a novel method for exploring the contextual development and modification of social practices over time, and highlights the significant contribution of this research to

advancing social practice theory in food research. The design and conduct of this research project were critical to achieving the goals of this thesis, as it allowed exploration of the social and structural factors that influence food behaviours, which are often overlooked in the individual behaviour approaches commonly used in food research.

The results chapters were written according to the three research aims (Figure 43). I first reported how each individual household who participated in this research project approached fruit and vegetable use, and how their unique contexts influenced this. These findings were reported in Chapter 4 and relate to Aim 1. The purpose of this chapter was to provide insight into the uniqueness of each household, so that their individual experiences were not lost in the cross-case analyses. Aim 1 was further explored in Chapter 5, in which I used Castelo et al.'s (2021) theoretical framework for analysing networks of practices to develop an understanding of how participants performed fruit and vegetable procurement. In Chapter 5, I 'zoomed in' on fruit and vegetable procurement, and compared the performance of this practice in different food retail environments. This analysis allowed me to investigate how the different food retail environments used by participants influenced their understanding and experiences of fruit and vegetable procurement. In Chapter 6, I 'zoomed out' and followed participants' fruit and vegetable procurement to 'where it led'. This analysis allowed me to identify a complex of fruit and vegetable practices, which I termed 'fruit and vegetable use'. Using Castelo et al.'s (2021) framework allowed me to then 'zoom in' on each of these practices, providing insight into how, and why these practices were performed in the ways they were. Analysing the data in this way allowed me to determine how fruit and vegetable practices such as planning, storing, preparing and eating influenced, and were influenced by fruit and vegetable procurement, thus allowing me to fulfil research Aim 2. In the final results chapter, I incorporated life course perspectives (Devine et al., 1998; Sobal et al., 2006) into social practice theory, to provide insight into how participants developed and modified their fruit and vegetable practices across their lives, thus fulfilling research Aim 3.

In this Discussion, I discuss the key findings obtained from the research project according to the three research aims. Section 8.2 summarises the results across all four results chapters (4-7) to provide an overarching view of the key findings from the research project. Following this, I explore the strengths and limitations of the research project (Section 8.3), before

summarising the key findings and associated recommendations in a concluding statement (Section 8.4).

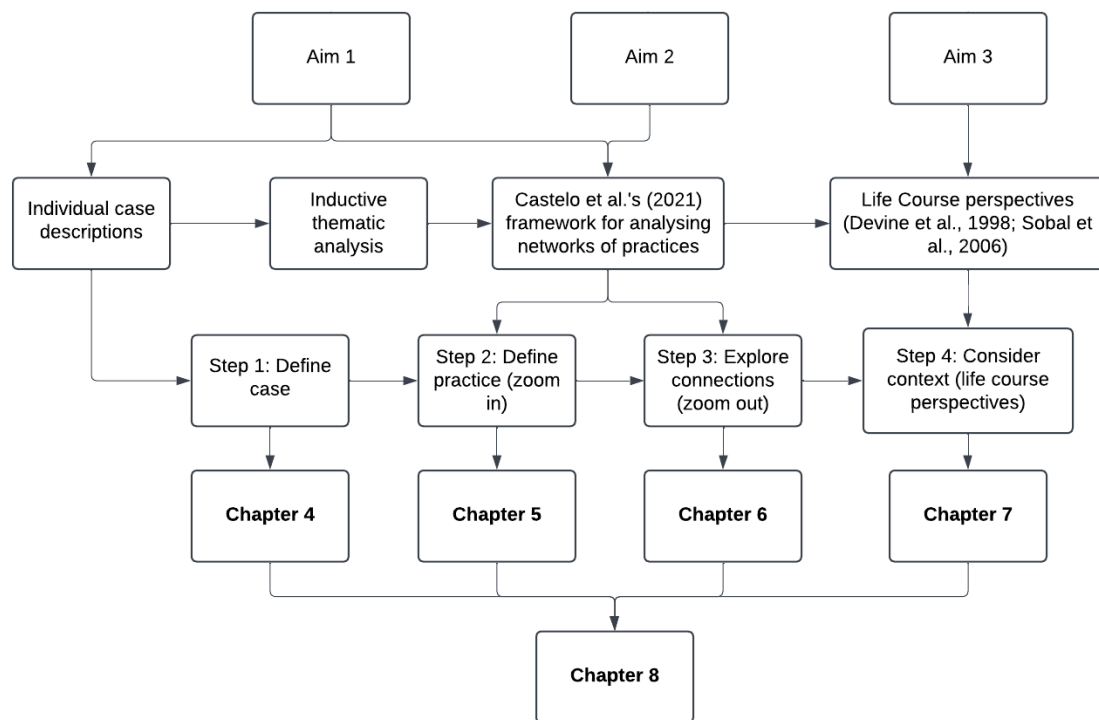


Figure 43: Thesis chapters, research aims, and approaches to analysis contained within this thesis.

8.2 Discussion of the key findings contained within this thesis

This section of the thesis discusses key themes from the findings of this research, and provides recommendations for future fruit and vegetable research, policy and promotion interventions. First, I explore how societal values shaped participants' understanding of fruit and vegetables (Section 8.2.1). Second, I investigate the role of households in shaping long-term fruit and vegetable practices (Section 8.2.2). Third, I explore the role of food retail environments in shaping Australian peoples' experiences with fruit and vegetables (Section 8.2.3). I then explore how these expectations and experiences shaped other practices of fruit and vegetable use, including planning, storing, preparation and eating and propose a theory to explain how food retail environments influence fruit and vegetable use (Section 8.2.4 & 8.2.5). Finally, I discuss the importance of early adulthood for development and modification of the practices that lead to fruit and vegetable consumption (Section 8.2.6). In each of these sections I provide recommendations for future research, policy and promotion of fruit and vegetables in Australia, which are presented in Section 8.2.7. This fulfils the overarching goals of this thesis, through linking the research findings to practicable actions for future research, policy and promotion interventions.

8.2.1 Beyond 'health': understanding the social reality of flavour and cost in fruit and vegetable use¹⁵

Participants in this research project generally understood the importance of eating fruit and vegetables for achieving a healthy diet, and most were motivated to incorporate them into their diets to some extent for this reason. This aligns with existing research, which suggests that people understand the health benefits of fruit and vegetable consumption, and that health goals are strong motivators for food choice (Lea et al., 2005; Pollard et al., 2002b; Verain et al., 2022). However, the strength of health as a motivator for fruit and vegetable consumption has been questioned in recent years, with researchers finding that health motivations primarily drive food choice behaviours of people who are already unwell

¹⁵ Generative AI (Gemini) was used to provide initial ideas for the development of headings for sections 8.2.1-8.2.6. An example of this process is supplied in Appendix 6. All work presented in this chapter is my own original thinking and wording, including the final headings chosen for sections 8.2.1-8.2.6.

(Meijer et al., 2023). While most participants wanted to incorporate fruit and vegetables into their diet for health reasons, their *procurement behaviours* were primarily driven by their anticipated *eating experiences*, in the context of pragmatic reasons such as, money, time and transport (further discussed in the following sections of this Discussion). That is, participants only procured fruit and vegetables if they expected to enjoy, or be satisfied with, their experiences of using them at home. This is consistent with extant literature which reports that there is a gap between stated desire to eat fruit and vegetables for health reasons, and actual consumption behaviours (Hill et al., 2020; Pollard, 2008; Rekhy et al., 2017). Researchers have recently investigated this phenomenon, finding that people often report explicit (conscious) liking for health attributes in research contexts, despite their day-to-day behaviours being primarily driven by implicit (subconscious) liking for taste attributes (Gustavsen, 2020; Meijer et al., 2023; Moser et al., 2011; Stickel et al., 2025; Verain et al., 2022).

Participants in this research project felt tension between their desire to procure fruit and vegetables because they were 'healthy' and their perceived need to procure other foods that were expected to 'taste better' or be more socially desirable. For example, Lucy's children favoured packaged snacks, which they perceived to help them to 'fit in' at school, and Maggie's husband favoured meat and discretionary foods such as soft drink, which he perceived to 'taste better' than fruit and vegetables. These conflicting preferences for foods led Maggie and Lucy to experience feelings of guilt and frustration as they attempted to balance their household's food preferences with their own understandings of what they 'should' be doing for health reasons. This finding is consistent with the concept of 'negotiating values', which is a core component of food choice (Connors et al., 2001; Furst et al., 1996). Health is a particularly complex food value, as people hold varying interpretations of 'health' and 'healthy eating' (Connors et al., 2001). People often experience guilt when negotiating food values, particularly when there is conflict between health values, and enjoyment values, and as such, often seek to reduce tension in food choices, and employ situation-dependent strategies to do so (Daly, Kearney & O'Sullivan, 2024; Connors et al., 2001). Interestingly, participants who procured fruit and vegetables in ways that they felt satisfied their taste preferences spoke more highly of fruit and vegetables, demonstrating a clear desire to procure and eat fruit and vegetables (e.g. Kasey). However, participants who

only associated fruit and vegetables with health goals had lower motivation to procure fruit and vegetables, often feeling it was something that ‘had to be done’ (e.g. Connor, Susie) (Figure 44).

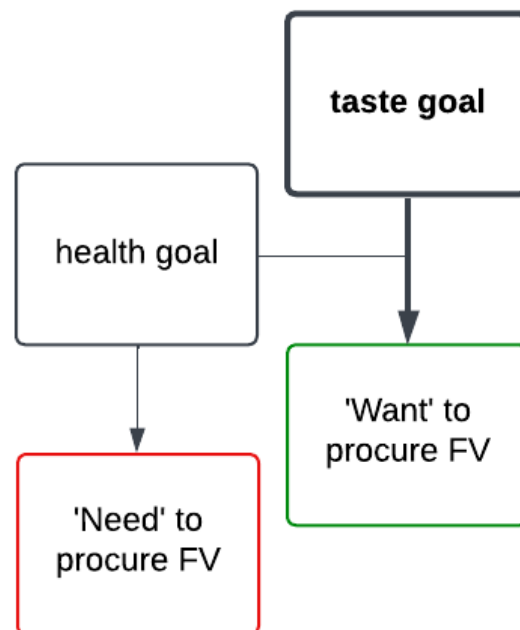


Figure 44: Taste vs health goal and subsequent meanings associated with fruit and vegetable procurement

During value negotiations, many participants removed fruit and vegetables from shopping lists, baskets and trolleys when finances were tight, life became ‘too busy’, or they felt that the materials provided within their chosen food retailer were not supportive of procurement. That is, while health values guided initial planning of fruit and vegetables, social determinants of health such as income and time, and spatial elements such as food retail environments forced participants to negotiate away from their health value (Connors et al., 2001; Friel et al., 2015; Strazdins et al., 2015). In these negotiations, other food items, such as packaged snacks, meat, and dairy foods, which were perceived to be more enjoyable or for some participants, more ‘valuable’ were left in, further highlighting the negotiation between health and enjoyment values (Connors et al., 2001). In addition to negative feelings associated with health messaging of fruit and vegetables, this highlights a societal devaluing of fruit and vegetables compared to other foods sold in Australian food retail environments. This societal devaluing is heavily influenced social determinants of

health and purchase behaviour, including time, income, and structural issues that affect the availability, affordability and acceptability of food, which influence what and how much people eat (Friel et al., 2015; Ravikmar et al., 2022; Strazdins et al., 2015). This is important to consider in future fruit and vegetable research, policy and promotions, as health was not strong enough to motivate participants in this research to procure fruit and vegetables over other foods which were more highly valued in comparison. Findings from this research project and others suggest that health motivations do not translate effectively into the natural contexts and environments that people procure fruit and vegetables from in their day-to-day lives (Rekhy & McConchie, 2014; The Fruit & Vegetable Consortium, 2020). As such more effective strategies to increase fruit and vegetable use could include highlighting the sensory properties of fruit and vegetables, such as their ability to add flavour and colour to meals (Meijer et al., 2023; Moser et al., 2011; Stickel et al., 2025; Verain et al., 2022). However, sensory quality signals are not well established in fruit and vegetable sales, in part due to the highly variable nature of intrinsic sensory cues (e.g. flavour, colour, size) in fruit and vegetable production (Folta & Klee, 2016; Jürkenbeck & Spiller, 2021). As such, researchers have recently used sensory descriptions drawn from wine marketing on fruit and vegetable products in choice experiments, finding that that they were important for food choices regardless of their ‘consumer segment’ (e.g. demographics) (Jürkenbeck & Spiller, 2021). This shows promise for sensory-directed marketing of fruit and vegetables in Australia, however further research is required to determine how effective these interventions are in natural contexts (Jürkenbeck & Spiller, 2021). Furthermore, for sensory marketing of fruit and vegetables to be effective at increasing fruit and vegetable use, fruit and vegetable quality must consistently and sufficiently standardised, and communicated to consumers (Jürkenbeck & Spiller, 2021). This issue, and related recommendations are further explored in section 8.2.6.

Price was also highly important to participants in this research project, and influenced what and how much fruit and vegetables they procured, where they procured them from, and how they felt about the retailer from which they procured. For example, participants often reported that they felt ‘ripped off’ or ‘taken advantage of’ when procuring fruit and vegetables from supermarkets, as they believed that the price they were paying was not reasonable for the quality and experience they were receiving. This had significant

implications for ongoing fruit and vegetable procurement, which is discussed further in Sections 8.2.3 and 8.2.4.

Price is known to have a strong influence on food choices, almost always outweighing higher order values such as those related to health and sustainability (Hoek et al., 2021; Hoek et al., 2017; Ogundijo et al., 2022; Pollard et al., 2002b; Rekhy et al., 2017; Wellard-Cole et al., 2023). However, some researchers have found that this is more relevant for people of lower socio-economic status (Pitt et al., 2017), and that the influence of price on food choices is highly context-dependent (Machín et al., 2014). Other researchers have argued that price is not a primary motivator for fruit and vegetable choices, particularly when compared to taste preferences, and when research studies are not isolated to participants of lower socio-economic status (Owen et al., 2002; Pollard et al., 2002a; Verain et al., 2020). The findings of this research align with the ideas of Kyriacou and Roupael (2018) who state that *“fruit and vegetable consumption is driven primarily by flavour, delivered at affordable prices”* (p464). There is evidence to suggest that strategies targeting pricing and promotion of fruit and vegetables in food retail environments can support increased fruit and vegetable procurement, particularly for people of lower socio-economic status (Friel et al., 2015; Glanz et al., 2012; McGill et al., 2015). However, price promotions are heavily applied to unhealthy food categories in Australian supermarkets, thus promoting unhealthy food choices and likely exacerbating the devaluing of fruit and vegetables compared to other foods in Australian food retail settings (Bennett et al., 2024a; Bennett et al., 2020; Riesenbergs et al., 2019). As such, mandating retailer promotion of product categories in food retail environment, and particularly in supermarkets, is likely to be a highly effective strategy to support increased fruit and vegetable procurement. Such strategies are likely to be highly accepted by Australian people, who are generally supportive of government policy and regulation of unhealthy foods, particularly in supermarket settings and when they perceive food system actors as ‘villains’ (Bennett et al., 2024a; Cullerton et al., 2021; Cullerton et al., 2022; Gomez-Donso et al., 2025). Furthermore, Aldi supermarkets already restrict unhealthy food advertising, exemplifying the active role that supermarket retailers can take in supporting the health of the population (Sacks et al., 2024). Strategies that actively target the promotion of healthy and unhealthy foods in food retail settings could be supported by social marketing and campaigns that increase knowledge and skills about how to effectively

incorporate lower-cost fruit and vegetables into meals, as this has been identified as a barrier to using fruit and vegetables previously (Carty et al., 2017; Lea et al., 2005; Vogel et al., 2019).

The NOURISHING framework, established by the World Cancer Research Fund International, specifies a range of interventions to improve public health nutrition, with varying impacts on fruit and vegetable consumption (Hawkes & Allen, 2013; Wolfenden et al., 2021). This research suggests that combining strategies from both food environment, and behaviour change communication domains in the NOURISHING framework is likely to support increased fruit and vegetable consumption in Australia, which aligns with extant literature (Hawkes & Allen, 2013; Wolfenden et al., 2021). Highlighting the value of frozen and canned fruit and vegetables may also be of benefit, as participants in this research project generally perceived these products to be of lower quality and value than fresh fruit and vegetables, despite acknowledging that they were often cheaper to purchase. In alignment with the earlier paragraphs in this section, these interventions should not be applied in isolation, as taste preferences and societal values are likely to remain a barrier to fruit and vegetable procurement if not addressed through systemic change. As such, the public health discipline also needs to shift attention away from trying to convince people to eat fruit and vegetables because they are ‘healthy’ and focus on creative ways to encourage Australian people to eat fruit and vegetables because they ‘taste good’.

8.2.2 Constructing value: household influences on fruit and vegetable understandings across the life course

Participants in this research project attributed value to fruit and vegetables based on their prior experiences eating, observing, and using fruit and vegetables. Experiences during childhood were particularly important for conditioning beliefs about what fruit and vegetables were acceptable to eat, at what times of the day, how, and in what contexts. At the most basic level, participants believed that vegetables were an ‘add-on’ to meat and carbohydrate foods in evening meals, and fruit was relegated to children’s snacks and flavourings for breakfast meals. Childhood also served as a time in which participants formed their beliefs about how much of their plates should be filled by fruit and vegetables as part of a ‘balanced meal’. This was conditioned primarily through observing family dinner

plates, and had both positive and negative influences on their fruit and vegetable use during adulthood.

Participants' beliefs about how fruit and vegetables should be incorporated into meals stayed with them throughout their adult lives, even if they held knowledge about what they 'should do' based on the Australian Dietary Guidelines. For example, Olivia was responsible for teaching children about the Australian Guide to Healthy Eating in her role as a teacher. She knew the Australian Dietary Guidelines, she knew the fruit and vegetable recommendations, and she knew that half of her plate should ideally be filled with fruit and vegetables during evening meals. However, her experiences of having large plates of meat at the evening meal, with a small amount of salad or vegetables were so salient in her mind that she continued to serve her meals in this way during her adult life, despite 'knowing better'. This suggests that past experiences may be a stronger determinant of current behaviour than the amount of knowledge that people have about fruit and vegetable recommendations and guidelines. While it is alluring to encourage people to eat more fruit and vegetables for health reasons, this research suggests that no amount of 'consumer education' about the healthiness of fruit and vegetables, or the amount that they 'should' eat, will lead them to eat fruit and vegetables if they do not believe they will 'taste good', or have not been exposed to positive role-modelling as a child.

Recent Australian fruit and vegetable initiatives have primarily focussed on increasing children's liking for fruit and vegetables, and increasing their understanding of the recommended daily intake, often in school settings (Briggs, 2024; McKinna et al., 2020; Wolfenden et al., 2021). While school-based interventions can effectively enhance children's knowledge and liking for fruit and vegetables, they often overlook the significant influence of parents and the home environment have on children's capacity and opportunity to perform healthy eating behaviours, such as eating fruit and vegetables (Godrich et al., 2018b; Godrich et al., 2017; Michie et al., 2011; Watts et al., 2015). This is important as fruit and vegetable availability, accessibility, and parental role-modelling predict children's consumption, regardless of liking (Cullen et al., 2003; Goldman et al., 2012). Furthermore, in their 2023 position statement, the Vegetable Intake Strategic Alliance (VISA) highlight the importance of addressing children's fruit and vegetable liking across multiple settings, particularly in Australia (Cox et al., 2023).

It is often assumed that health education and behaviours learned in schools are ‘filtered through’ to the home context, through children educating their parents (Godrich et al., 2018b). However, the efficacy of this strategy for changing household eating behaviours has been questioned, with experts believing that children have difficulty translating skills learned in education settings to real life situations (Godrich et al., 2018b). Children’s interactions and experiences in home settings have lasting impacts on their long-term relationship with fruit and vegetables, as evidenced by this research project and others (Makhal et al., 2021; Makhal et al., 2020; Pearson et al., 2010; Pearson et al., 2009b; Cox et al., 2023). As such, researchers have called for healthy eating interventions to go beyond school settings. Multi-component interventions are likely to be useful, particularly where they incorporate parental provision of healthy food (such as fruit and vegetables) in the home environment, among other settings known to influence children’s fruit and vegetable use (Godrich et al., 2018a; Cox et al., 2023; Ilić et al., 2022).

To address the challenges identified in this section, future research, policy and promotion efforts regarding fruit and vegetable use should go beyond children’s liking and school settings, and target household level influences on fruit and vegetable use (Godrich et al., 2018a). Promoting positive role-modelling through significant adults such as parents and grandparents is likely to be particularly important, as these adults have lasting impacts on peoples’ perceptions of fruit and vegetables (Godrich et al., 2018a; Godrich et al., 2018b; Godrich et al., 2017; Makhal et al., 2021; Makhal et al., 2020). This is echoed by findings from this research, which showed that parents and grandparents significantly influenced how participants thought about fruit and vegetables, especially when considering how to incorporate vegetables into family meals.

Family-based interventions that target both parents and children have demonstrated success in improving health behaviours related to both dietary intake and physical activity (Cullen & Thompson, 2008; Rodearmel et al., 2006; Wang et al., 2025). For example, a family-based newsletter intervention in the United Kingdom effectively increased fruit and vegetable consumption among both parents and adolescents, highlighting its potential value as a low-cost intervention for promoting fruit and vegetable use (Pearson et al., 2010). The Brighter Bites program in the United States builds on this approach by combining provision of fruit and vegetable produce boxes, nutrition education for children, and nutrition

education and support for parents, through schools (Kwentua et al., 2025). Evaluation of the Better Bites program shows sustained positive changes to fruit and vegetable procurement and demonstrates the importance of addressing fruit and vegetable procurement as a key practice of broader fruit and vegetable use (Kwentua et al., 2025). Specifically, the program increased exposure to new fruit and vegetables, and reduced barriers (such as time and income) to procurement, which were both identified as key influences on participants' fruit and vegetable use in this research project (Kwentua et al., 2025). Furthermore, the Better Bites program successfully demonstrates how schools can be utilised as a leverage point for interventions that target the household at multiple levels of influence, rather than relying on the transfer of information from children to parents to drive changes in fruit and vegetable consumption (Kwentua et al., 2025). This is important as findings from this research show that the home environment has significant influences on practices of fruit and vegetable use, particularly planning practices. As such, the Better Bites program provides a useful model for developing household-level interventions that target the broader complex of fruit and vegetables, at multiple levels, and across multiple household members. Similar programs could be developed and implemented in Australia, utilising key institutions such as workplaces and schools as access points for intervention. This would likely support development of fruit and vegetable practices beyond eating, which is further discussed in Section 8.2.6.

8.2.3 Considering the 'consumer journey' of fruit and vegetable procurement in Australian food retail environments

Participants procured fruit and vegetables in diverse ways. The meanings participants attached to fruit and vegetable procurement were varied, complex, and unique to their personal experiences and worldviews. Recent developments in consumer research emphasise the importance of considering the 'consumer journey', which involves looking beyond peoples' experiences with products towards their interactions with the people and places in which products are procured (Cronin Jr et al., 2000; Hamilton & Price, 2019; Mazhar et al., 2022; Tueanrat et al., 2021). This thesis provides a unique and novel contribution to this emerging field of research through theorising the Australian 'consumer journey' of fruit and vegetable procurement.

Despite the varied ways in which participants approached and conceptualised fruit and vegetable procurement, there was a common theme of frustration and disappointment, particularly when participants discussed supermarket procurement. This dissatisfaction stemmed not only from their experiences of using the fruit and vegetables they procured, but also from their experience of performing fruit and vegetable procurement, representing a negative consumer journey (Tueanrat et al., 2021). This is consistent with extant literature which reports that Australian people perceive shopping at supermarkets to be ‘alienating’ and ‘a means to an end’ (O’Kane & Pamphilon, 2020). Regardless of where participants procured fruit and vegetables from, their understanding and experiences of fruit and vegetable procurement were highly influenced by their previous experiences of procurement in supermarkets. For example, almost all participants referred to the major supermarkets (especially Coles and Woolworths) as a point of comparison from which they judged the quality, service, ethics, and morals, of all other food retail environments. As such, their expectations for service and quality were conditioned by their experiences of fruit and vegetable procurement in supermarkets. This is consistent with other practice-centred research which found that initial experiences of food procurement shaped participants’ ongoing expectations for what grocery shopping ‘should be’ (Puljiz, 2024).

When participants’ experiences of fruit and vegetable procurement service and quality did not match their expectations, they felt negatively about the retailer from which they procured their fruit and vegetables, which is consistent with the concept of ‘negative disconfirmation’ (Bell & Zemke, 1987; Mazhar et al., 2022). Negative disconfirmation is a concept drawn from expectancy-disconfirmation theory, and refers to the phenomenon of people receiving less than expected (Bell & Zemke, 1987; Mazhar et al., 2022). Negative disconfirmation leads to dissatisfaction, and results in negative feelings towards both the product(s) procured, and the service through which they were obtained (i.e. a ‘negative consumer journey’) (Bell & Zemke, 1987; Mazhar et al., 2022). Conversely, when experiences match or exceed expectations, people experience a state of neutral or positive disconfirmation, which results in feelings of satisfaction (i.e. a ‘positive consumer journey’) (Figure 45) (Bell & Zemke, 1987; Mazhar et al., 2022). I have woven these concepts into an emergent theory of fruit and vegetable procurement in Australian food retail settings, which is described in the following sections of this Discussion.

$Service + outcome = expected$ = neutral = "I got what I expected, no more, no less"

$Service + outcome < expected$ = negative disconfirmation = dissatisfaction

$Service + outcome > expected$ = positive disconfirmation = satisfaction

Figure 45: Summary of expectancy-disconfirmation theory (Bell & Zemke, 1987; Mazhar et al., 2022)

8.2.4 Choice vs dependence: the role of negative disconfirmation, resource constraints, and supermarket dependence in shaping fruit and vegetable expectations and experiences

Negative disconfirmation led participants to feel negatively not only about their experience of fruit and vegetable procurement, but also about fruit and vegetable use more broadly. For example, when Laura found the green beans she intended to use had spoiled in her fridge, she felt frustrated by the inconvenience of not being able to use them when she wanted to, and irritated by the process of obtaining them which had cost her time, money and energy. This irritation extended to her experience within the supermarket, and subsequently influenced her future approaches to fruit and vegetable procurement and storage, through altering what types, and how much fruit and vegetables she procured, and how she chose to prepare and store them at home. While Laura was not satisfied with her experience of fruit and vegetable procurement, she felt that her experience was inevitable if she wanted to continue procuring fruit and vegetables, as most people do, from her local supermarket, highlighting a lack of autonomy to 'switch' retailers in the Australian food retail system.

In competitive markets, negative disconfirmation and feelings of dissatisfaction, such as those experienced by Laura, is said to drive people to 'switch' to an alternative retailer (Mazhar et al., 2022). While Laura was not able to 'switch', participants such as Maggie and Kasey were. These participants felt negatively about their experience of procuring fruit and vegetables from supermarkets, but unlike Laura, had the resources (time, finance, knowledge/skills) required to 'switch' to an alternative retailer that better satisfied their expectations. Upon switching, they compared their new experiences of fruit and vegetable procurement to their previous experiences in supermarkets, both finding their new

experience to exceed their expectations, thus resulting in positive disconfirmation, and subsequent satisfaction (Bell & Zemke, 1987; Mazhar et al., 2022). This represented a positive 'consumer journey', in which these participants became more motivated to continue procuring fruit and vegetables in this way. This then created a cycle in which these participants felt more motivated to use fruit and vegetables in their daily practices, including planning, procuring, storing, preparing and eating (Figure 46). It should be noted here that some participants occupied a neutral position, accepting that fruit and vegetable procurement in supermarkets 'is what it is' (e.g. Susie, Leanne). These participants represented a state of neutrality (i.e. not satisfied or dissatisfied) and as such, expressed little desire to shop elsewhere, thus falling into a similar pattern to those who experienced positive disconfirmation (Figure 46).

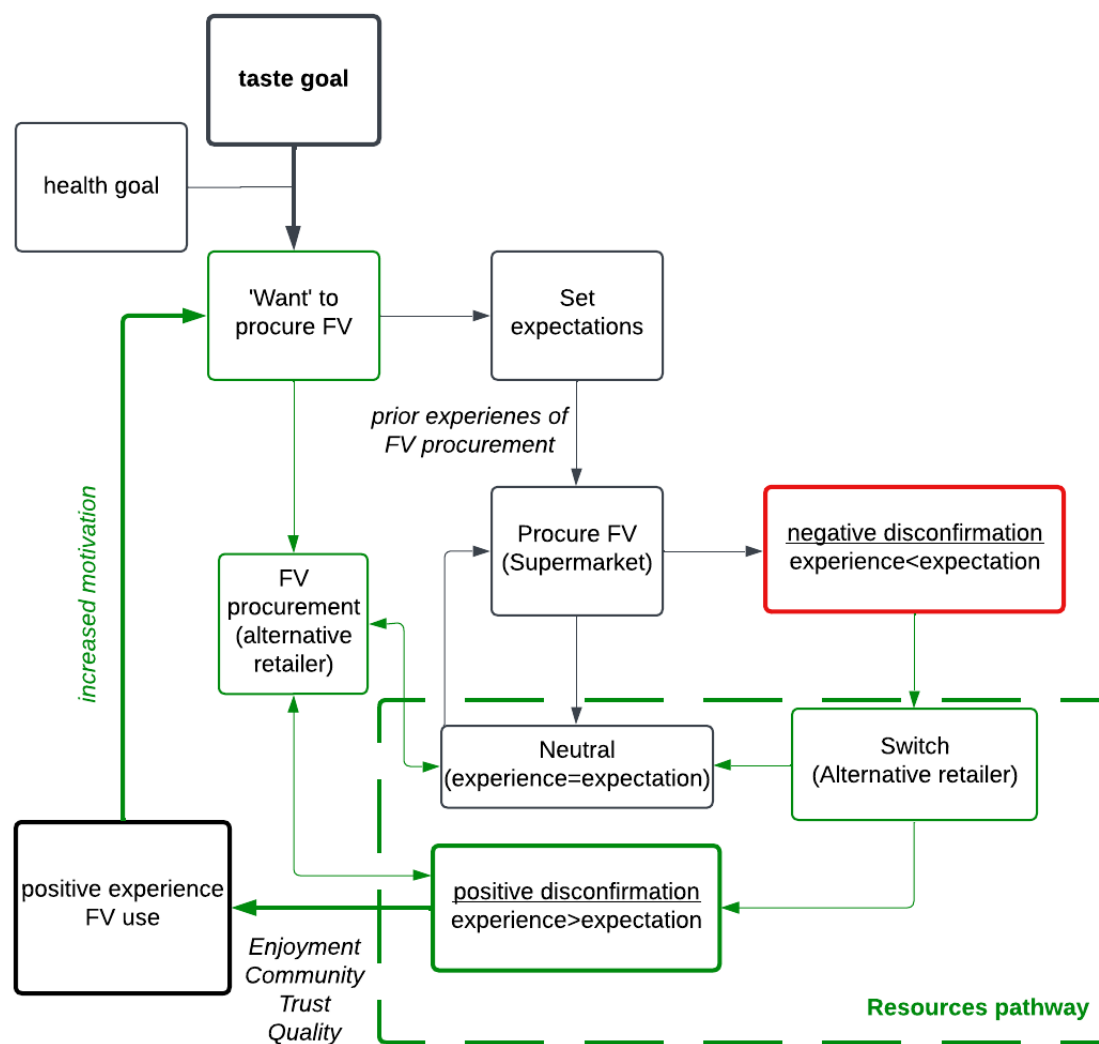


Figure 46: Positive disconfirmation pathway of fruit and vegetable procurement

Figure 46 shows the positive disconfirmation pathway of fruit and vegetable procurement. Despite being dissatisfied with their experiences of supermarket fruit and vegetable procurement, participants who had switched to alternate retailers continued to procure fruit and vegetables from supermarkets, albeit less often, and in smaller amounts than others. This continued reliance on supermarkets highlights an issue of dependence on supermarkets in the Australian food retail system, even for those who are motivated and have the resources required to access more desirable alternatives. Participants who did not perceive switching as a viable option (often due to lack of resources), also continued to procure fruit and vegetables from supermarkets, despite likening them to “convenient pond-scum”. This further demonstrates participants’ feelings of dependence, in which they recognised their dissatisfaction, but felt constrained to supermarket shopping. These feelings of dependence have been echoed by participants in similar research studies, in which Australian people felt negatively about supermarket shopping, but continued to use them due to their convenience (O’Kane & Pamphilon, 2020). While Australian people idealise the quality and ethics of alternate food retailers when procuring fruit and vegetables, the convenience of supermarket shopping almost always outweighs these values in the context of their daily lives (Machín et al., 2014; O’Kane & Pamphilon, 2020; Pearson, 2001; Pitt et al., 2017; Verain et al., 2020). As such, continued fruit and vegetable procurement from supermarkets despite dissatisfaction was influenced by both a perceived lack of suitable alternatives (largely related to the convenience of supermarket shopping and overwhelming presence of the dominant retailers in Australia – e.g. Coles and Woolworths), and perceived lack of resources required to navigate alternate procurement avenues. This dependence on supermarkets negatively influenced fruit and vegetable procurement, and subsequently broader use, through perpetuating a cycle of negative disconfirmation. The remainder of this section describes these concepts in greater detail, and provides an emergent theory of how Australian food retail environments influence fruit and vegetable use.

As described in Section 2.3, Australia’s food retail system is dominated by a small number of retailers, who hold significant power over the supply, quality and standards set for fruit and vegetable retail in Australia (Glanz et al., 2012; Nakandala et al., 2020; Pulker et al., 2018; Wardle & Baranovic, 2009). This inflated market power reduces the agency of individual

people to 'choose' the best alternative retailer, forcing them into a relationship of dependence in which they are unable to act on feelings of trust, or their past experiences (Mazhar et al., 2022; Meyer & Ward, 2009). In this situation, people are exposed to an 'illusion of choice' in which there appears to be many viable alternatives, but their ability to choose is negated by their dependence on supermarkets. As such, most participants felt negatively about procuring fruit and vegetables from supermarkets and expressed a desire to switch, but continued to procure from supermarkets because they felt they had 'no other choice'. This had negative flow-on effects for other practices connected to fruit and vegetable procurement, which is discussed further in the following sections of this Discussion.

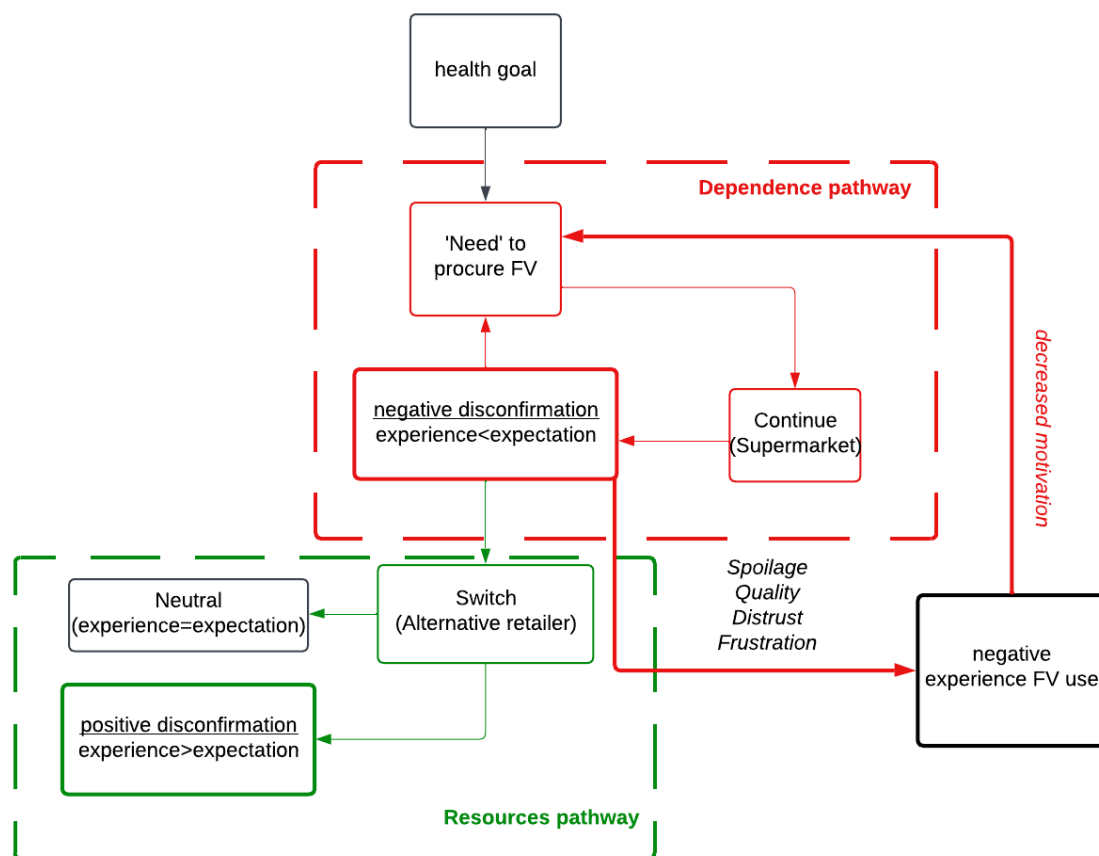


Figure 47: Negative disconfirmation pathway of fruit and vegetable procurement

Figure 47 highlights the negative disconfirmation pathway of fruit and vegetable procurement. As discussed previously, the participants who did 'switch', all had adequate resources to do so. For example, Kasey had time and skills to prepare meals and 'use up' the produce supplied in her fruit and vegetable delivery box, and Maggie had the finance, knowledge, skills, and time required to grow her own fruit and vegetables at home. This is highlighted in the green 'resources pathway box' in Figure 47. However, several participants did not feel that 'switching' was attainable for them, due to a perceived (or real) lack of resources required to do so, forcing them into the 'dependence pathway', as shown in the red box in Figure 47. For example, Lucy was not satisfied with her experiences of fruit and vegetable procurement at supermarkets and expressed a strong desire to procure organic fruit and vegetables from her local markets instead. While she had the knowledge and skills to do this, and had done previously, lack of time and income resources prevented her from doing so. Similarly, Elanor reported feeling 'guilty' about her family's procurement of fruit and vegetables from supermarkets, but continued to procure from supermarkets as she felt she did not have 'enough time' to visit the markets on weekends. Lack of resources is a known barrier to accessing alternative food systems, despite switching to alternative food retailers often being promoted as the 'best alternative' to supermarket shopping for both health and sustainability-related goals (Carty et al., 2017; Markow et al., 2014; Mazhar et al., 2022). As such, considering resources required to 'switch' retailers is likely to be important in shaping any future fruit and vegetable interventions that intend to alter the locations from which people procure fruit and vegetables. While it is tempting to place the responsibility for 'switching' on individual people, findings from this research project show that supermarket dependence is a real issue that influences fruit and vegetable procurement.

Australian people experience an 'illusion of choice' of both fruit and vegetable retailers and products, when in reality their agency to choose within these environments is highly limited, due to the power that these institutions hold over the broader food retail system, and perceived (and real) lack of resources to make changes (Meyer & Ward, 2009). The following quote from a study conducted by O'Kane and Pamphillion (2020) highlights how Australian people beyond this study conceptualise the issues of supermarket power and dependence:

“I worry that the big supermarkets take so much of the market and even I, I guess, I add to it because I continuously go back for convenience; but I worry that one day there’ll be nothing else and that we will have no choice and we’ll have to go to them and there’ll be all imported vegetables and fruit, that we have no control over; about how they’re grown, what chemicals they use...” (O’Kane & Pamphilon, 2020, p. 377)

Current discourse around food choice gives little attention to the limitations of individual agency, despite expecting people to ‘act with their purchasing power’ to drive changes in healthy and environmentally sustainable food behaviours (McGill et al., 2015; Tripathy et al., 2022). As such, low-agency interventions, which require less knowledge, skills and self-efficacy of individual people, are required to shift the environments in which fruit and vegetables are procured to be more health enabling and supportive of fruit and vegetable procurement. Given the power of supermarkets in the Australian food retail system, it is unlikely that this dependence will shift in the immediate future, even with Government intervention (Sacks et al., 2024). As such, these intervention points will require collaborative action from the public health discipline, food retailers, the horticulture industry, and government, which is discussed in greater detail in the following sections of this Discussion.

8.2.5 The cost of negative disconfirmation: flow-on effects of procurement experiences to fruit and vegetable use in Australian households

Participants in this research project continued to procure fruit and vegetables from supermarkets, even when their experiences were negative, due in part to a lack of autonomy within a highly powerful food retail system (see ‘dependence pathway’ in Figure 47). This is consistent with existing research about Australian peoples’ interactions with supermarkets, in which researchers found that supermarket shoppers feel alienated and irritated by supermarket shopping but continued to do so because they believe they lack the resources required to shop elsewhere (O’Kane & Pamphilon, 2020). Based on the findings reported in this thesis, I propose that continued negative experiences of procurement of fruit and vegetables from supermarkets perpetuates a cycle of dissatisfaction with fruit and vegetable use. That is, dissatisfaction related to supermarket fruit and vegetable procurement extends not only to other practices of fruit and vegetable use, but also feeds into further dissatisfaction with the act of fruit and vegetable procurement itself. Dissatisfaction caused participants to feel less motivated to procure and use fruit and

vegetables, thus reducing fruit and vegetable consumption in the long-term. This section unpacks these issues in greater detail and leads to the development of a proposed theory of how food retail environments influence fruit and vegetable use in Australia (Figure 48). Implications and recommendations based on these developments are provided where relevant throughout the following sections.

Fruit and vegetable procurement influenced, and was influenced by, practices of planning, storing, preparing, and eating fruit and vegetables. The links between these practices were highly co-dependent, and often difficult to separate (i.e. 'sticky'), which is consistent with the concept of a 'complex of practices' as defined by Castelo et al., (2021). Participants who were satisfied with their fruit and vegetable procurement (positive disconfirmation) often enjoyed planning and preparing meals. They found storing fruit and vegetables at home to be easy and effective at reducing waste and time spent grocery shopping, and primarily attributed this to their belief that the produce obtained from alternative retailers was of superior quality to fruit and vegetables sold in supermarkets. Participants who experienced positive disconfirmation in fruit and vegetable procurement also enjoyed eating fruit and vegetables and were highly motivated by their desire to 'eat tasty food'. Kasey, Ned, and Maggie represent good examples of this experience (see Chapter 4). Participants who were not satisfied with their fruit and vegetable procurement (negative disconfirmation) were often disinterested in practices of fruit and vegetable use. They felt impartial, or apathetic towards eating fruit and vegetables and viewed it as something they 'should do' rather than something they *wanted* to do. This feeling that they 'should' eat fruit and vegetables was almost always linked to their understanding that fruit and vegetables were 'healthy'. Exposure to messaging and education consistent with the Australian dietary guidelines exacerbated this belief. For example, several participants referred to the message of eating '2 and 5', or similar, when discussing their feelings of guilt about not doing what they 'should' for health reasons. This further highlights the potential negative implications of continued health messaging around fruit and vegetables, in support of Section 8.2.1.

Participants who experienced negative disconfirmation often found incorporating fruit and vegetables into daily routines to be 'boring', or 'tedious'. Because of this, they avoided engaging in competences of fruit and vegetable planning, storing and preparation. When they felt they had no other choice but to engage in these practices (for example to achieve

health goals), they attempted to reduce the mental and physical burden of having to use fruit and vegetables, often by procuring pre-prepared fruit and vegetable products or meals. Leanne and Laura are good examples of participants who represent this experience (see Chapter 4). In alignment with the discussion reported in Section 8.1.1, it appears that continued health messaging exacerbated participants' feelings of guilt, without changing their behaviour, thus increasing their negative feelings about fruit and vegetable use. This further supports the recommendations presented in Section 8.1.1, in which the public health discipline need to shift attention away from health attributes, towards increasing the social value of fruit and vegetables through taste and desirability.

While participants from both groups (positive, and negative disconfirmation) procured fruit and vegetables from supermarkets, those who procured from alternative retailers (e.g. Kasey, Maggie) consistently felt more positive about their fruit and vegetable procurement when *not* procuring from supermarkets. This is demonstrated in both Maggie & Kasey's descriptions of the high value fruit and vegetables they procured from their supermarket-alternatives (fruit and vegetable delivery service and home garden respectively). Both Maggie and Kasey described being more motivated to use fruit and vegetables because they believed they lasted longer, tasted better, and connected them more to their family or community than supermarket produce. Based on these findings, I argue that participants' experiences of fruit and vegetable procurement in supermarkets conditioned their expectations for both the practice of fruit and vegetable procurement, and practices of fruit and vegetable use more broadly. That is, supermarkets primed participants' expectations for fruit and vegetable quality, prices, and the outcome and experience of procuring and then using them at home (Glanz et al., 2012; Nakandala et al., 2020; Pulker et al., 2018; Wardle & Baranovic, 2009). This is represented in Figure 48, which combines the findings reported throughout Sections 8.2.1-8.2.5 into a proposed theory of how food retail environments influence fruit and vegetable procurement and subsequent use.

which exacerbated negative feelings and expectations and contributed to ongoing negative disconfirmation and experiences with fruit and vegetable use.

Based on these findings, any future fruit and vegetable interventions must consider both expectations, and experiences of fruit and vegetable procurement and use. Findings from this research project, and extant literature suggest that fruit and vegetable quality has a strong influence on consumption, and that supermarket produce is considered to be of low quality (Briggs, 2024; Glasson et al., 2011; Kyriacou & Roupael, 2018; Lea et al., 2005; Pitt et al., 2017). Because participants were more driven by taste expectations than health expectations, interventions that seek to improve the inherent eating quality of fruit and vegetables sold in Australian supermarkets are therefore likely to be of value (Glasson et al., 2011; Kyriacou & Roupael, 2018, Appleton et al., 2017). The responsibility for improving the supply of fruit and vegetables in Australia rests on the shoulders of the entire fruit and vegetable supply chain (Kyriacou & Roupael, 2018). Sensory properties have not historically been a priority in fruit and vegetable production, coming second to yield, disease-resistance, size, storability and transportability, largely driven by industry-demand (Folta & Klee, 2016; Bowen & Grygorczyk, 2021). While the horticulture industry has been gradually shifting towards more value-added and branded options, sensory properties of fruit and vegetables continue to be a challenging component in the acceptance of new fruit and vegetable cultivars (Bowen & Grygorczyk, 2021). This is primarily due to high natural variability in fruit and vegetable products, including different stages of maturity and ripeness, and post-harvest handling operations (Bowen & Grygorczyk, 2021). This highlights the importance of addressing fruit and vegetable quality across the supply chain, and not in isolation to one particular actor. For example, fruit and vegetable growers, handlers and sellers must all be involved in improving sensory quality of fruit and vegetables.

While changes are required across the fruit and vegetable supply chain, findings from this research project suggest that supermarkets in Australia condition expectations and experiences of both fruit and vegetable procurement, *and* subsequent practices of fruit and vegetable use. This, combined with the power that major supermarket retailers have in the Australian food retail system suggests that any changes implemented at this point in the supply chain are likely to have flow-on effects to all other actors in the supply chain, thus likely having a positive influence on fruit and vegetable use for Australian people. As such,

interventions targeting supermarket retailers are likely to be critical to improving fruit and vegetable use in Australia. Food system interventions to increase fruit and vegetable use have previously been under-utilised and evaluated highlighting an important area for future research, policy and promotion (Wolfenden et al., 2021).

Participants had low levels of trust for supermarket retailers, further pushing them towards a relationship of dependence in which their 'consumer power' was rendered ineffective. Because supermarkets hold substantial power, and through this power play a significant role in determining food preferences, standards, quality and prices, they must be actively involved in, and held accountable for improving fruit and vegetable supply in Australia (Glanz et al., 2012; Halloran et al., 2014; Pulker et al., 2018; Wardle & Baranovic, 2009; Willett et al., 2019). This is likely to require government intervention as voluntary actions taken by supermarket retailers in previous years have failed to meet international targets for healthy food retailing (Sacks et al., 2024).

In recent years, independent retailers have utilised collective 'better choice' campaigns to support healthy food sales (Briggs, 2024). While there is no publicly available evaluation of these campaigns, anecdotal evidence suggests that people who procure fruit and vegetables from stores using a 'Better Choice' campaign purchase over 50% more fruit and vegetables than those who shop at supermarkets (Briggs, 2024). Furthermore, there is a growing body of literature supporting healthy food retail interventions, particularly in small stores and remote communities (Brimblecombe et al., 2024; Vargas et al., 2022). However, there remains a paucity of evidence guiding interventions in larger food retail settings, particularly when considering fruit and vegetables specifically. The Healthy Food Retail Best Practice Guidelines were published during the writing stage of this thesis (Scapin et al., 2025). These guidelines provide an important starting point for guiding healthier food retail interventions in large supermarkets in Australia, however research and evaluation are required to determine if, and how these interventions influence fruit and vegetable procurement specifically. Regardless, Government can support healthier food retail through mandating and enforcing implementation of these guidelines, and through supporting public health policy and programs based on the findings from this emerging body of literature. The public health discipline can support these interventions through working collaboratively with the horticulture industry, food retailers, and government policy makers to design, implement

and evaluate healthy food retail initiatives, thus contributing to more effective interventions in the long-term (Rekhy & McConchie, 2014).

Changing fruit and vegetable quality and retail practices in isolation will not likely resolve the issues identified in this research, given that participant expectations for fruit and vegetable quality and service were equally as important as their experiences in determining their satisfaction with fruit and vegetable use. As such, any food retail interventions should be coupled with interventions that educate and guide the public about what can realistically be expected of fruit and vegetable supply in terms of quality, flavour, and seasonality (Kyriacou & Roupheal, 2018). Social marketing campaigns may assist in increasing the social value of fruit and vegetables, if more effectively targeted (i.e. by focussing on sensory attributes rather than health attributes) (Rekhy & McConchie, 2014).

Values, motives, ideals, and beliefs are known to influence fruit and vegetable decision making (Farragher et al., 2016; Nijmeijer et al., 2004; Rekhy & McConchie, 2014; Worsley et al., 2011). Values are abstract, desirable goals that reflect what people consider important, and evoke feelings when activated (Roccas & Sagiv, 2017; Schwartz, 2012), and are said to influence action when they are relevant to the context and important to the person (Schwartz, 2012). The data reported in Chapters 4-7 highlight how values such as supporting local farmers influenced participants feelings and approaches to fruit and vegetable use, with varying impacts. For example, several participants felt disconnect between their values and actions, believing that external constraints prevented them from acting in alignment with their values (e.g. Elanor, Lucy), while others believed that their values guided their actions (e.g. Kasey).

Values are sometimes considered to be beliefs (Roccas & Sagiv, 2017), which are referred to as internally held understandings that are filtered through peoples' worldviews (Brown et al., 2014). Beliefs are particularly important to nutrition-related topics because they can influence the ways people interpret information (Brown et al., 2014). Similarly, ideals, which incorporate symbolic meanings derived from sociocultural factors, reflect values and therefore influence expectations and assumptions about food (Furst et al., 1996). As shown in the scoping review reported in Section 2.2, Australian people hold varying perceptions of fruit and vegetable characteristics, and often link these perceptions to their beliefs and

ideals about the world, thus supporting extant literature about the role of values in food choice (Furst et al., 1996; Schwartz, 2012). As such, there may also be opportunity to enhance perceptions of supermarket produce through strategies that support Australian people to understand how produce available does or does not align with their values. Information about the likeliness of products to align with ideals and beliefs about foods can be communicated through extrinsic cues, as explained in Section 2.2 (Oude Ophius & Van Trijp, 1995; Becker, 2020; Grunert, 2002). Food packaging labels are a tangible source of information that people use to identify and validate characteristics that align with their values, beliefs and ideals (Wu et al., 2021). These characteristics are generally credence attributes, such as production methods and nutrition content (Oude Ophius & Van Trijp, 1995). However, trust for food labels communicating information about credence attributes is low, especially in Australia (Tonkin et al., 2016; Wu et al., 2021). That is, Australian people feel that food labellers deliberately prevent them from making choices that reflect their values through misleading labelling (Tonkin, 2016). Furthermore, fruit and vegetables are largely sold loose and unlabelled in Australia (Briggs, 2024; Pearson, 2003), and Australian people have varying perceptions and conscious awareness for labels and signage related to credence attributes, as shown by participants ignoring or not noticing signage during Phase 2 of this research. Unfortunately, this research project did not collect enough data about individual participants' values to determine the extent to which values influenced their performance of practices. The work of Schwartz (Schwartz, 2012; Schwartz & Cieciuch, 2022) may be useful for defining and applying value-based theory to models of food choice, such as that of Connors et al., (2001), or Furst et al., (1996).

Researchers have previously advocated for increased fruit and vegetable advertising and marketing to increase consumption (Morgan & Worsley, 2011; O'Kane & Pamphilon, 2020; Pollard et al., 2002a). Drawing from healthy retail best practice guidelines and frameworks are likely to support retailers to do this (Scapin et al., 2025; Wansink, 2017). However, fruit and vegetables in Australia are primarily sold loose, unlabelled, and in packaging that is lacking sufficient branding to influence sales (Briggs, 2024). Furthermore, advertising of unhealthy foods has been identified as a barrier to fruit and vegetable consumption, and retailer understanding of this issue remains relatively unknown in academia (Bagheri et al., 2021; Chan et al., 2021; Gerritsen et al., 2019).

Retailer advertising of unhealthy foods (often through food labels) exacerbates distrust for food retailers, as demonstrated by participants in this research project and others (Tonkin et al., 2016). Furthermore, trust in labels communicating information about credence attributes (often related to higher-order values such as health, safety and sustainability) is generally low, especially when provided by product manufacturers or retailers (Hoek et al., 2017; Moser et al., 2011; Steenkamp, 1989; Tonkin et al., 2016; Wu et al., 2021). Distrust for food retailers leads to distrust for all food promotion strategies and messages, regardless of their truth and accuracy (Tonkin et al., 2016). This was highlighted in this research project through participants' distrust of provenance and production labels present near fruit and vegetable displays in supermarkets, as described in Chapters 2 and 5. Lack of trust in the Australian food retail system has been identified as a key issue for public health in previous research (Tonkin et al., 2016). Furthermore, trust for alternative food retailers, such as market stall holders and greengrocers, was identified to have a strong influence on satisfaction of fruit and vegetable procurement both in this research (Chapter 5), and extant literature (Garner, 2022; Markow et al., 2014; Nakandala et al., 2020; Wertheim-Heck et al., 2014). As such, to ensure that any retailer-led strategies are effective at increasing fruit and vegetable use in Australia, supermarket retailers must do extensive work to build trust with the Australian population. Strategies that concurrently address peoples' expectations and experiences with fruit and vegetables procured in supermarkets are likely to be more influential on their perceptions of retailers, including how trustworthy they perceive them to be and hence influencing satisfaction (Figure 48).

Improving trust in the Australian food retail system would not only benefit the public, but also fruit and vegetable retailers and the horticulture industry. While business outcomes resulting from healthy food retail interventions are highly variable, and poorly defined in academic literature (Blake et al., 2019; Tran et al., 2021), several researchers evaluating healthy food retail interventions have found that increasing the healthiness of food retail environments has either a neutral or positive impact on retailers, including increasing sales and profit (Blake et al., 2019; Tran et al., 2021; Williams et al., 2021). Furthermore, increasing fruit and vegetable sales by half a serve per day in Australia has been predicted to generate industry returns of \$643 million annually, which would be shared amongst all members of the food supply chain, including retailers and growers (McKinna et al., 2020). As

such, there is a strong case for retailer investment into strategies to increase public trust, and fruit and vegetable procurement amongst the Australian population.

Researchers have argued that while there are several solutions for promoting healthy food retail in academic research, these do not translate well to retail managers, due to a perception among retailers that strategies are too difficult or costly to implement (Blake et al., 2019; Gupta et al., 2022; Wansink, 2017). Recently, there have been developments in healthy food retail in remote Australian food retail stores, with the draft National Code of Practice for Remote Store Operations restricting promotion of unhealthy foods. Whilst this code is voluntary, it is linked to incentives to participate, which may be transferrable to larger supermarkets in urban Australia (National Indigenous Australians Agency, 2025). However, voluntary action in major Australian supermarkets has not succeeded at aligning retail practices with best practice guidelines (Sacks et al., 2024). As such, there is a need to determine how food retailers conceptualise and respond to the issues reported in this thesis, and how they can more effectively be engaged in fruit and vegetable, and broader healthy food retail interventions, which has been identified by several researchers previously (Blake et al., 2019; Chan et al., 2021; Gupta et al., 2022; Rekhy & McConchie, 2014). Co-creation is increasingly being used to support development of healthier food retail environments in low socio-economic populations, and in remote Aboriginal and Torres Strait Islander community contexts (Brimblecombe et al., 2024; Ferguson & Brimblecombe, 2021; Vargas et al., 2022). Much of the success of healthy food retail interventions in small stores in remote Aboriginal and Torres Strait Islander Communities is attributable to the interest and engagement of store directors who view the health of their community as a key priority in policy and decision making (ALPA, n.d.; Brimblecombe et al., 2024). As such, determining how, and to what extent larger food retailers are motivated by the health and wellbeing of their community may be of benefit to informing future fruit and vegetable retail interventions. Increasing fruit and vegetable procurement will benefit Australian fruit and vegetable users, retailers, and the Horticulture Industry. However, this hinges on motivating retailers to create and maintain healthier food retail environments. Applying lessons from remote Australia and employing co-creation strategies will likely support this goal (Brimblecombe et al., 2024; Vargas et al., 2022). Therefore, the next step from this research

is to take these learnings to retailers, including the major supermarkets, to understand their perspectives on ways forward.

8.2.6 Early adulthood and the development of practices that lead to fruit and vegetable consumption

This research project showed that past experiences of fruit and vegetable use influenced how participants performed practices throughout adulthood. Early childhood was an important time in which participants developed their taste preferences for fruit and vegetables, which is consistent with existing research (Braune et al., 2024; Chadwick et al., 2013; Reinaerts et al., 2007). Furthermore, as described in Section 8.2.1, childhood was an important time in which participants' developed understandings about what, how, and when fruit and vegetables should be incorporated into daily routines. That is, participants developed their competences of 'eating fruit and vegetables' early in life, based on their observation of parents, and grandparents in the family home. Significant adults are known to influence childhood food preferences, particularly through role-modelling behaviours, and determining the availability and accessibility of foods in households (Braune et al., 2024; Chadwick et al., 2013; Karademir Hazır, 2024; Ravikumar et al., 2022; Reinaerts et al., 2007). Furthermore, participation in family activities involving fruit and vegetables, and pleasurable memories of fruit and vegetable taste/flavour at a young age have been found to form lasting 'food roots' upon which adulthood fruit and vegetable attitudes and behaviours are built (Bagheri et al., 2021; Devine et al., 1998; Godrich et al., 2018b; Makhal et al., 2021). In recent years, there has been an influx of interventions which aim to increase children's liking, and consumption of fruit and vegetables, particularly in school settings in Australia (Briggs, 2024; McKinna et al., 2020; Wolfenden et al., 2021). The benefits and challenges of this approach have been discussed in section 8.2.1. While there is evidence that these interventions are effective at developing children's positive attitudes towards eating fruit and vegetables, and sometimes increasing their consumption, they seldom address the practices that *lead* to eating fruit and vegetables (e.g. planning, procuring, preparing and storing) (Rekhy & McConchie, 2014; Wolfenden et al., 2021). This is important to consider as findings from this research project suggest that these practices are primarily developed in early adulthood, highlighting a crucial life course transition for fruit and vegetable interventions.

A unique strength of this research project is that it went beyond fruit and vegetable consumption and investigated the practices that *lead* to eating fruit and vegetables (i.e. planning, procuring, storing and preparing). This allowed me to gain a much deeper insight into *why* Australian adults do not consume the recommended amounts of fruit and vegetables stipulated in health and sustainability guidelines. Importantly, this research project identified that the practices that *lead* to fruit and vegetable eating were primarily developed in early adulthood, and mostly through ‘trial and error’. That is, most participants developed practices of fruit and vegetable procurement and preparation quickly, and suddenly, in response to leaving their family homes. This life course transition has previously been associated with decreased fruit and vegetable consumption, highlighting the importance of investigating this life stage for its role in developing life-long fruit and vegetable behaviours (Winpenney et al., 2018). Lower consumption of fruit and vegetables during young adulthood is often attributed to a lack of food preparation skills (Blichfeldt & Gram, 2013; Byrd-Bredbenner, 2004, 2005; Seabrook et al., 2019). However, Blichfeldt & Gram (2013) explain that young adults approach their transition to living independently with varying levels of food skills, which are deeply embedded within their parent’s food practices (Blichfeldt & Gram, 2013).

Regardless of the skills they take with them when leaving the family home, young adults recognise this transition as an opportunity to develop their ‘own’ food preferences and habits, independent of those learned (or not) from their parents (Blichfeldt & Gram, 2013). This again highlights the importance of the family home in shaping fruit and vegetable practices, in alignment with the discussion presented in section 8.2.1, and is consistent with findings from this research project. For example, some participants recalled learning to store or prepare fruit and vegetables from observing their parents or grandparents in childhood (e.g. Maggie, Laura). However, many participants in this research project felt that they did not have a ‘roadmap’ of competences to follow for practices of planning, procurement, or preparation (e.g. Leah, Olivia), or instead viewed their parent/guardian’s behaviour as a guide for ‘what not to do’ (e.g. Olivia, Ned). As such, when transitioning to living independently, and developing their own practices of fruit and vegetable use, participants often sought external information. For example, some participants researched information online (e.g. recipes, ‘how-to’ guides) to support their development of fruit and

vegetable procurement and preparation practices (e.g. Ned, Laura). Some participants felt so overwhelmed that they explored novel forms of fruit and vegetable procurement to support their skill development. For example, Leah and Connor used meal preparation kits when they first moved out of home, which facilitated their development of cooking skills, and exposed them to new ways of eating and preparing fruit and vegetables through provision of recipes and guidelines for 'how to use' fruit and vegetables supplied.

While most participants were able to recall how they learned fruit and vegetable storing and preparation practices, procurement and planning practices were almost always developed through 'trial and error'. Participants developed these practices through performing them, and the environments in which they first did this played a critical role in determining what they believed to be the 'right way' to perform fruit and vegetable procurement and preparation. This is consistent with similar research conducted in Europe which found that early adulthood is a critical time in which people developed their practices of food procurement, and that their first experiences of doing so shape their ongoing expectations for what grocery shopping 'should be' (Puljiz, 2024). These findings are important because researchers have previously found that young adults who are more engaged in grocery shopping and meal preparation are more likely to eat fruit and vegetables (Vanderlee et al., 2018), although their engagement in such tasks is often low (Larson et al., 2012; Larson et al., 2006).

Combined, the findings discussed in this chapter suggest that if Australian people are having negative experiences of fruit and vegetable procurement in early adulthood, their continued expectations for fruit and vegetable procurement and subsequent use is likely to be negative (see Section 8.2.5). As such, it is important that any future research and interventions consider how this life-stage can be targeted more effectively to support development of the practices that lead to fruit and vegetable consumption. Interventions which target societal norms and values, and alter food retail environments to be more supportive of fruit and vegetable procurement, have been proposed to be useful for increasing fruit and vegetable procurement in young adulthood (Graham et al., 2013; Michie et al., 2011; Puljiz, 2024). Furthermore, findings from this sample of participants suggest that being exposed to new ways of cooking, eating, and preparing fruit and vegetables, through meal and ingredient delivery services may be beneficial for this purpose. This has

been echoed by a recent review which found that meal kit subscription services are useful tools for providing healthy meals and reducing stress around family meal planning, that can also support increased food literacy and confidence to prepare foods (Bennett et al., 2024b). However, meal kit subscription services in Australia provide only a portion (2-3 serves) of the recommended daily intake of vegetables on average, highlighting a need to explore the effectiveness of these tools for increasing fruit and vegetable consumption overall (Bennett et al., 2024b). These services are also primarily used by people of higher socio-economic position, as people of lower socio-economic position tend to be more wary of online services (Bennett et al., 2024a). Furthermore, the acceptability of these tools among young adults is unknown, beyond the small number of participants who reported using them in this research project. As such, further research is required to determine how young adults conceptualise and experience fruit and vegetable procurement. This will provide insight into entry points for interventions that are supportive of developing positive fruit and vegetable experiences while practices are being developed. Exploring the impact of meal- and ingredient- kit subscription services on fruit and vegetable intake across the life course may also be of benefit to informing novel ways to increase fruit and vegetable use, through supporting development of the practices that *lead* to fruit and vegetable consumption, particularly in young adulthood.

8.2.7 Key recommendations for future fruit and vegetable research, policy and promotion in Australia

Table 6 summarises the key issues identified in this thesis, and the related recommendations for future fruit and vegetable research, policy and promotion in Australia. This table is separated into three sections, with key findings and related recommendations reported according to each of the three individual research aims:

Aim 1: explore how Australian people understand and experience fruit and vegetable procurement, and determine how food retail environments influence this

Aim 2: determine how fruit and vegetable procurement influences other practices of fruit and vegetable use (such as planning, preparing and eating)

Aim 3: determine how life course events and experiences influence development and modification of fruit and vegetable practices for Australian adults

Table 6: Key findings and recommendations for future fruit and vegetable research, policy and promotion

| <i>Understanding & experience of fruit and vegetable use (Aim 1)</i> | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FINDINGS | RECOMMENDATIONS |
| Despite understanding that fruit and vegetables are healthy, procurement decisions are primarily driven by anticipated eating enjoyment. Continuous health messaging can be harmful to fruit and vegetable use, due to exacerbated feelings of guilt when unable to do what they 'should do'. | <p><i>Shift public health messaging away from health attributes towards sensory attributes (e.g. taste, colour, flavour)</i></p> <p><i>Implement systemic strategies to address fruit and vegetable understandings across multiple household members and settings. Extend fruit and vegetable interventions beyond childhood alone.</i></p> |
| Price plays a significant role in peoples' understanding of fruit and vegetables, often leading to dissatisfaction and devaluing of fruit and vegetables compared to heavily promoted packaged foods in Australian supermarkets. | <ul style="list-style-type: none"> • <i>Social marketing may support shifting the perceived value of fruit and vegetables compared to other foods.</i> • <i>Combine this with strategies that increase public perceptions of affordability and accessibility of fruit and vegetables, and mandate retailer promotion of fruit and vegetables in supermarkets.</i> • <i>Provide education on cost-effective ways to incorporate fruit and vegetables into daily routines, including through frozen and canned options.</i> • <i>Implement family-based interventions drawing lessons from successful interventions such as 'Better Bites' (USA). Utilise key institutions such as schools and workplaces as access points for interventions that target household practices.</i> |
| Early experiences with fruit and vegetables have both positive and negative impacts on adult fruit and vegetable use. Knowledge of dietary guidelines does not override habits and preferences learned in childhood. | |

Food retail environments (Aim 2)

| FINDINGS | RECOMMENDATIONS |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Supermarkets condition expectations for fruit and vegetable quality, price, and experience, often leading to dissatisfaction | <p><i>Address the role of food retail environments in shaping peoples' experiences of fruit and vegetable procurement through multi-level, systemic strategies.</i></p> <p><i>Hold supermarkets accountable for supporting healthy food choices</i></p> <ul style="list-style-type: none"> • <i>Government policy and action are required to mandate food retailer activities</i> • <i>Increasing the quality of fruit and vegetables available for procurement may support increased sales, couple with education about what can realistically be expected from supermarket produce</i> • <i>Consider co-creation of feasible and cost-effective strategies</i> • <i>Leverage the mutual benefit of increased fruit and vegetable sales for the Australian public, retailers and the Horticulture Industry</i> |
| Negative fruit and vegetable procurement experiences lead to decreased motivation to use fruit and vegetables more broadly. This creates a cycle where negative experiences undermine fruit and vegetable use in the home. | |
| Dependence on supermarkets reinforces negative experiences, through limiting peoples' ability to 'choose' and 'switch'. Distrust of supermarket retailers limits effectiveness of marketing strategies employed by retailers to connect with the public and provide information to support informed choices about fruit and vegetable procurement. | <p><i>Extensive work is required to build Australian peoples' trust for supermarket retailers.</i></p> <ul style="list-style-type: none"> • <i>Draw on lessons learned in Remote Australia and follow supermarket retail best practice guidelines (see section 8.2.5).</i> • <i>Focus on facilitating better communication and connection between retailers and the public</i> |
| Resource constraints including time, finance and knowledge/skill limit Australian peoples' ability to switch to alternative retailers in times of dissatisfaction with supermarket fruit and vegetable procurement. This perpetuates a cycle of negative disconfirmation in which people continue to procure fruit and vegetables from supermarkets despite dissatisfaction. | <p><i>Future research should explore how food retailers conceptualise Australian peoples' fruit and vegetable procurement, and the issues reported in this thesis</i></p> <p><i>Support and promote alternative food retailers where feasible; simultaneously address resource constraints that limit peoples' ability to switch retailers.</i></p> <ul style="list-style-type: none"> • <i>Conduct research into the feasibility of fruit and vegetable, ingredient and meal delivery kits for increasing fruit and vegetable use</i> • <i>Consider utilising important institutions (e.g. workplaces and schools) as access points to reduce time and income burden.</i> |

| Life course (Aim 3) | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FINDINGS | RECOMMENDATIONS |
| Early adulthood, and particularly the transition to independent living is a crucial time for developing the practices that <i>lead</i> to fruit and vegetable consumption. | |
| Many young adults lack a 'roadmap' for development of fruit and vegetable practices, thus resorting to trial and error, or online sources such as online information or meal delivery services | <p><i>Further research is required to determine how young adults conceptualise and experience fruit and vegetable procurement.</i></p> <p><i>Develop interventions that support young adults to develop positive fruit and vegetable practices during the transition to independent living</i></p> |
| Negative experiences with fruit and vegetable procurement have lasting impacts on fruit and vegetable use. Supermarket experiences have a strong influence on long-term expectations of fruit and vegetable use due to their dominance in the Australian food retail system. | <i>Modify food retail environments to be more supportive of positive experiences with fruit and vegetable procurement for young adults.</i> |

This table highlights the unique contribution to knowledge that this thesis provides, including its relevance and importance to applied public health nutrition. It also provides a concise summary of how the research contained within this thesis contributes to the overall thesis goal, which was *“to explore how Australian people understand and experience fruit and vegetable procurement, and associated practices, to provide insight into potential improvements for fruit and vegetable policy and promotion interventions”*.

8.3 Strengths and limitations

8.3.1 Strengths

The strengths of this research lie in its identification and response to current research gaps, novel theoretical approach, and extensive use of qualitative research methods and rigour. Incorporating social practice theory into a case-study research methodology allowed for deep and thorough data collection and analysis, that was highly contextual to the research aims. This was important as it showed that increasing fruit and vegetable consumption is not as simple as telling people to 'eat more', and highlighted the complex interplay between the practices that lead to fruit and vegetable consumption. Furthermore, shifting my focus to the practices that lead to fruit and vegetable consumption allowed me to consider the elements, and social, spatial and temporal dimensions that determine how these practices are performed, thus contributing to deeper understanding of how fruit and vegetable policy and promotions can be enhanced to achieve better outcomes for the Australian population.

Employing a social constructionist worldview, and interpretivist theoretical perspective facilitated a nuanced understanding of the diverse ways in which participants understood and experienced fruit and vegetable use, overcoming many of the challenges common to research in this field, which is dominated by positivist worldviews (Crotty, 1998; Dzurec & Dzurec, 1992). The integration of life course perspectives into social practice theory was a novel theoretical development which allowed me to build upon the social practice theory approach, and actively consider how practices were developed and modified in response to life course events and experiences. The extensive use of methods of rigour including prolonged engagement and rich descriptions, led to development of research findings that participants felt accurately represented their understandings and experiences, which is in alignment with the theoretical approaches upon which the project was built. Furthermore, the use of reflexivity journalling throughout the project allowed me to gain insight into my own interpretations and influence on the research outcomes, which is reported in the preface. The incorporation of this information allows readers of this thesis to make informed decisions about the quality and transferability of the research, thus strengthening its value and application to future research, policy and practice. These factors combined have led to development of a thesis that contains a coherent and meaningful narrative

about fruit and vegetable use, which not only accurately represents participants' understandings and experiences, but also closes research gaps, and builds social theory.

8.3.2 Limitations

Despite the strengths in this research design, there were also several limitations. Firstly, the application of life course perspectives relied on participants' ability to reflect and report their historical experiences accurately. Longitudinal research would be more effective for investigating the influence of life course events and experiences on the development and modification of fruit and vegetable practices over time. However, it was not realistic, nor achievable for this research project to be conducted over such an extended timeframe. Secondly, the participants recruited for this research project do not accurately represent the opinions and experiences of the entire Australian population. Instead, this sample was recruited with the intention of representing a diverse range of perspectives, based on extant research findings. Thirdly, due to the methods of recruitment, the sample is at risk of self-selection bias (Lamb et al., 2020). Many participants who volunteered to participate had an active interest in health and/or nutrition, which may have skewed the findings to be more relevant to people who are motivated by health values than the broader population. While not generalisable to the entire Australian population, the findings from this research project provide an emerging theory of how Australian people understand and experience fruit and vegetable use, and how food retail environments influence this. This provides an important starting point for further research, in which larger-scale studies, which can incorporate more generalisable samples, can test these theoretical developments.

A core limitation of this research is that it was limited to the Australian public's understandings and experiences of fruit and vegetable use, and that the sample was limited to English-speaking participants. That is, there is no representation of Australian people who do not speak English, nor key stakeholders in fruit and vegetable procurement practices, such as food retailers and producers, in this thesis. In the initial stages of my candidature, I had attempted to recruit food retailers to provide their perspectives on the issues investigated in this thesis. However, gaining access was difficult due to issues around retailer confidentiality, and lack of permission from institutional management boards. Future research should focus on exploring how food retailers, producers, and other

stakeholders in the fruit and vegetable supply chain view fruit and vegetable retail and procurement, to build on the emergent theory presented in this thesis.

Finally, while the research was primarily qualitative, a quantitative component was incorporated into Phase 4, which provided insight into how fruit and vegetable procurement influenced fruit and vegetable consumption. This quantitative component allowed me to compare fruit and vegetable procurement across four consecutive weeks, and to quantitatively determine if there was any relationship between the amount of fruit and vegetables procured and the amount of fruit and vegetables consumed across the four weeks of Phase 4. While these quantitative results are not reported in this thesis, they were used to guide conversations with participants, which have been incorporated into findings reported in Chapters 4-7. Initially, I had avoided directly measuring fruit and vegetable intake due to the risk of self-reported data being biased towards what participants felt was 'socially desirable' (Schoeller, 1995; van de Mortel, 2008). Previous experiences using the fruit and vegetable tracker in my dietetics work indicated that using the exercise could increase fruit and vegetable consumption in the short-term. To address these weaknesses, I focussed on observing and discussing procurement practices in participants' 'natural settings' prior to starting Phase 4. Participants were also engaged in discussions about the process of completing the fruit and vegetable tracker activity, which allowed me to identify if they perceived their behaviour had been influenced by the research methods. All participants in phase four reported that the tracker activity increased their motivation to eat fruit and vegetables during phase four. While this finding is beneficial for health professionals seeking to increase fruit and vegetable intake through individual behaviour counselling, it raises concerns about the reliability of tracking tools in measuring 'normal' behaviour. The incorporation of prolonged engagement and observation in this research project were critical for overcoming these challenges, and should be considered in any future research seeking to track 'normal' consumption of foods.

8.3.3 A note on context

During my PhD candidature, there was ample conversation among the Australian public about the cost of living, which has been a significant concern for many Australians since the Covid-19 pandemic reached Australia in early 2020. During this time, the Australian

Competition and Consumer Commission (ACCC) analysed price gouging and pricing practices used by big businesses in Australia, including the Australian supermarkets (particularly Coles and Woolworths) (Australian Competition & Consumer Commission, 2025). Resulting media reports suggested that these supermarkets have been increasing prices of essential items beyond what can be attributed to inflation alone, and that these price increases may be linked to corporate gouging, greed and 'profit-pushing' of companies that have 'too much market power' (Shine & Ainsworth, 2024). Fruit and vegetables were a particularly popular topic at this time due to previous disruptions in the supply of fresh produce resulting from natural disasters such as floods, and bushfires, and the Covid-19 pandemic (Candy et al., 2015; Siddeek, 2020). As a result, there were numerous news and media articles in circulation during the time of data collection, which likely influenced participants' thoughts and feelings about fruit and vegetables, procurement, and supermarkets in Australia. It was not the purpose of this thesis to assess the truth in these claims, nor to explore participant's beliefs about these claims. However, it is important to understand that these claims were very present in the social world in which participants were using fruit and vegetables, and therefore likely influenced their thoughts and feelings about fruit and vegetable use at the time. Finally, this research is highly specific to the Australian context. It is likely that findings may be transferrable to other demographically and politically similar locations such as Canada, the USA and the UK for example, however the unique context of power in the food retail system has likely had a large influence on the findings reported in this thesis. Further research investigating how the emergent theory developed does or does not apply to other geographic locations is likely to be of benefit to determine how contextually bound the research findings are. One of the strengths of the naturalistic approach taken in this research project is that it observes these contextual shifts, and how they influence fruit and vegetable use over time. In line with other recommendations presented in this discussion, longitudinal research which considers these social and environmental changes, and how they influence practices over time are likely to be of benefit to understanding how fruit and vegetable use changes over time, and in response to the social world.

8.4 Concluding Statement

This research demonstrates that fruit and vegetable consumption is more than just the act of 'eating' fruit and vegetables. Exploring the practices that *lead* to fruit and vegetable

consumption through a novel research methodology has allowed me to develop a deep understanding of the complex and multifaceted ways in which people understand and experience fruit and vegetable use. Targeting only one practice of fruit and vegetable use is likely to be ineffective in achieving long-term change in fruit and vegetable use, due to the sticky links between practices of planning, procuring, storing, preparing and eating. Participants' understanding and experiences of fruit and vegetable use were significantly shaped by their childhood and young adult experiences, supermarket retail environments, and resource constraints. The public health discipline must shift their attention away from health messaging and consider new approaches to fruit and vegetable promotion that prioritise sensory appeal. Continued interventions in childhood school settings are unlikely to achieve long-term success due to the development of the practices that *lead* to fruit and vegetable procurement being developed in early adulthood and in response to leaving the family home. Further research is required to determine how young adults conceptualise and experience fruit and vegetable procurement during this critical life course transition. Doing so will inform more effective fruit and vegetable interventions for this cohort. Supermarket dependence is an issue of high concern for future fruit and vegetable policy and promotion. Participants did not trust supermarket retailers, and their negative experiences with fruit and vegetable procurement undermined fruit and vegetable use in the home setting. Structural and political interventions are required to address supermarket power, and increase peoples' autonomy to 'switch', while simultaneously addressing the resources required to do so. Furthermore, there is ample opportunity for Australian supermarket retailers to harness their power to support of positive change in fruit and vegetable procurement and subsequent use, particularly through collaboration with other key stakeholders such as the Horticulture Industry and public health discipline. Within the supermarket environment, fruit and vegetable quality should be improved, and the Australian public should be educated on what can realistically be expected from fruit and vegetable procurement, to reduce negative disconfirmation and ongoing dissatisfaction with fruit and vegetable use more broadly. Future research in this space should consider longitudinal approaches to peoples' interactions with fruit and vegetable procurement, and food retail environments, and how food retailers and producers conceptualise these issues. Table 6 summarises the key findings and associated recommendations discussed in this concluding chapter.

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APPENDIX 1: Research Protocol for “Consumer Perceptions of Fruit and Vegetable Characteristics in Australia and New Zealand: A Scoping Review”

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Abstract

Objective: This review seeks to map the extant literature regarding consumer perceptions of fruit and vegetable attributes in Australia and New Zealand.

Introduction: Australian and New Zealand diets currently do not meet recommendations for fruit and vegetable intake. This is an issue for health and sustainability targets in both countries. Understanding consumer perceptions of fruit and vegetable attributes may assist in developing public health policy, guidelines, and interventions and thus, may assist in increasing intake of fruit and vegetables in Australia and New Zealand. There are no current reviews that broadly investigate consumer perceptions of fruit and vegetable attributes in Australia or New Zealand.

Inclusion Criteria: The population for this scoping review is limited to Australian and New Zealand consumers of fresh fruit and vegetables due to the similarity in their dietary guidelines, intake patterns and food regulation. Fresh fruit and vegetables were chosen as these products are often unlabelled, making identification of some attributes difficult for consumers. Frozen, processed, canned, and dried fruit and vegetable products will be excluded, along with Australian and New Zealand fresh fruit and vegetable products sold in export markets.

Methods: The following electronic databases will be searched: Scopus, Web of Science, Informit, Emerald Insight, EconLit, Medline, CINAHL, Business Source Complete and PsycINFO. Reference lists of included articles will be hand searched. Grey literature will be identified through Google searches and handsearching of Trove and ProQuest Theses and

Dissertations. Hand searching of relevant government, industry and consumer advocacy groups will also be completed to identify additional articles located in grey literature. Data will be extracted and summarised using a data extraction tool, and narratively synthesised.

Keywords:

Fresh produce, understanding, interpretation, purchaser, decision making, horticultural products, consumer

Introduction

Background

Healthy and sustainable diets are becoming an increasingly popular topic among academic and public health disciplines, and health and environment advocacy groups. The recent EAT-Lancet commission report (2019) states that a global transition to healthy and sustainable diets is achievable but will require substantial shifts towards healthy diet patterns, large reductions in food losses and waste, and major improvements in food production practices (Willett et al., 2019). The authors suggest that increased consumption of plant-based foods and substantially reduced consumption of animal source foods will reduce environmental effects and improve health outcomes (Willett et al., 2019). Australia and New Zealand are among some of the highest meat consumers in the world, consuming approximately 120kg and 100kg per person, per year respectively (Ritchie & Roser, 2017). Conversely, both populations struggle to meet their recommended intake for fruit and vegetables. Both Australia and New Zealand have dietary guidelines that recommend the adult population consume 5-7.5 serves of vegetables and 2 serves of fruit daily to maintain weight and reduce risk of chronic disease (Ministry of Health, 2020; National Health and Medical Research Council, 2013). Despite several public health campaigns aiming to increase fruit and vegetable consumption (for example, Go for 2&5 in Australia and 5+ A Day in New Zealand), intakes remain below recommendations in both countries. Only 52% of New Zealand adults consumed the recommended serves of fruit and 53% consumed the recommended serves of vegetables in 2018-2019 (Ministry of Health, 2020). Australians consumed even less with only 51.3% and 7.5% consuming the recommended serves of fruit and vegetables respectively in 2017-2018 (Australian Bureau of Statistics, 2018). A recent

study compared data from the 2011-2012 Australian Nutrition and Physical Activity Survey to the most current version of the Australian Dietary Guidelines (2013) and the EAT-Lancet Planetary Health Diet (2019) and found that Australian diets did not achieve the recommended fruit and vegetable targets for either dietary guideline (Hendrie, 2022). As such, finding novel ways to influence Australian and New Zealander consumers to eat more fruit and vegetables is essential for public and planetary health.

Fruit and vegetable attributes

Understanding consumer perceptions of fruit and vegetable attributes is a fundamental starting point to influencing increased consumption. One approach to understanding consumer perception of fruit and vegetable attributes is the perceived quality approach outlined by Oude Ophuis & Van Trijp (1995). The perceived quality approach considers quality dependent on the consumers' judgement of the attributes of the product (Oude Ophuis & Van Trijp, 1995). These attributes can also be considered as cues, signifying that the product will or will not meet the consumers expectations of the product and attributes within. Attributes and cues will both be referred to as 'attributes' for the remainder of this protocol, to avoid confusion between terms. An attribute can be intrinsic to the product (e.g. colour, shape, smell) or extrinsic to the product (e.g. labelling information, brand, price). Intrinsic attributes are integral to the product itself and therefore cannot be changed or manipulated without changing the physical characteristics of the product itself (Grunert, 2002; Olson & Jacoby, 1972; Oude Ophuis & Van Trijp, 1995). Extrinsic attributes are related to the product but not always inherent to the physical product (Olson & Jacoby, 1972). As a result, extrinsic attributes can be manipulated in ways that can affect the consumer's experience (Olson & Jacoby, 1972; Oude Ophuis & Van Trijp, 1995). For example, a consumer may perceive a fruit labelled as exotic (extrinsic attribute) to taste better (intrinsic attribute) than a fruit of the same variety without a label. Intrinsic and extrinsic attributes can be either revealed or hidden (Pearson, 2003; Szybillo & Jacoby, 1974). Revealed attributes can be identified by the buyer at the time of purchase or before consumption (e.g. smell, colour, brand) (Pearson, 2003). Hidden attributes can be broken down into two subcategories: experience attributes and credence attributes. Experience attributes cannot

be ascertained until the fruit or vegetable has been used or consumed (e.g. taste, convenience) (Oude Ophuis & Van Trijp, 1995). Credence attributes cannot be validated by the consumer independently, even after consumption (Grunert, 2002; Oude Ophuis & Van Trijp, 1995). Credence attributes can be intrinsic (e.g. high in vitamin C) or extrinsic (e.g. environmentally friendly production). An example of how attributes have been categorised and considered for this review is provided in Figure 1.

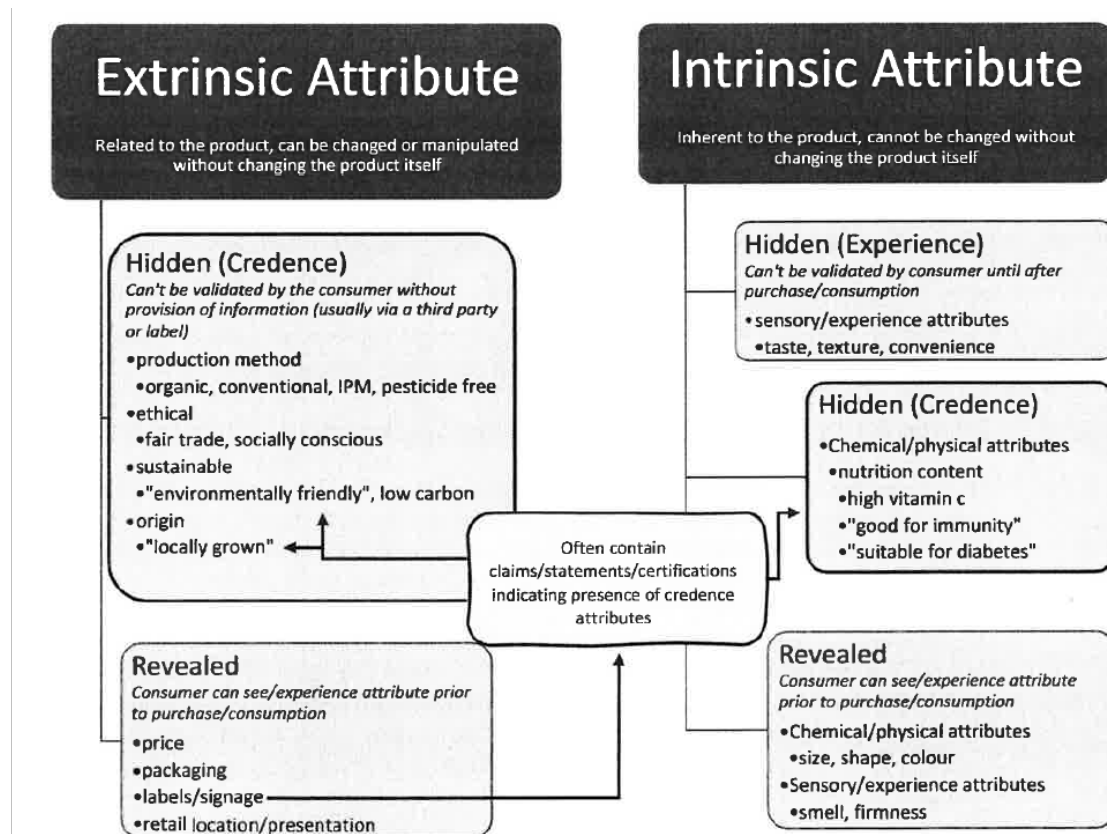


Figure 1: fruit and vegetable attribute categorisation examples

Communication of fruit and vegetable attributes in Australia and New Zealand

The most common way for attribute information to be communicated in current fruit and vegetable retail outlets is through food labelling (Grunert, 2002). Australia and New Zealand have both introduced mandatory Country-of-Origin labelling (CoOL) for fresh fruit and vegetables, requiring all fruit and vegetables, including those that are unpackaged, to have a label displayed on, or close to the product (Australian Competition & Consumer Commission, 2020; New Zealand Legislation, 2021). Prior to the introduction of mandatory CoOL, Consumer New Zealand conducted a survey, finding that 65% of New Zealand shoppers looked for labelling information on fresh fruit but only 32% always found it. Even

fewer consumers (29%) always found labelling information for fresh vegetables when searching for it (Consumer NZ, 2018). Similar mandatory labelling requirements also exist for foods that have been irradiated, however only a small quantity of irradiated fresh produce is available (FSANZ, 2016). Outside of these regulations, fruit and vegetables in Australia and New Zealand are largely not subject to mandatory labelling. Forming quality expectations and making purchase decisions is difficult for consumers where information regarding hidden attributes is not provided (Grunert, 2002; Pearson, 2003). Thus, in the absence of food labelling conveying information about hidden attributes consumers must infer information from revealed attributes to determine their purchase decision (Pearson, 2003). Consumers may also infer information about hidden attributes from their own prior experience or, seek information from the retailer directly (Pearson, 2003).

Previous reviews of consumer perception for fresh fruit and vegetable attributes

A preliminary search of Scopus, the Cochrane Database of Systematic Reviews, JBI Evidence Synthesis and Google Scholar was conducted 12/4/22 and no current or underway systematic or scoping reviews on the topic were identified. Kjeldal (1998) completed a selective literature review, including a critical analysis of methodologies employed in existing fruit and vegetable research in Australia. The review found that there was a limited amount of descriptive data regarding consumer perceptions of fresh fruit and vegetables in existence at the time. The author also suggested that the methods of hypothesis-testing used were not appropriate at that time given the paucity of underlying descriptive data (Kjeldal, 1998). Kjeldal's (1998) selective literature review was not systematic in nature and thus potentially excludes relevant information regarding consumer perceptions of fruit and vegetable attributes. Kjeldal's (1998) review provides a useful starting point for research regarding consumer perceptions of fruit and vegetable attributes in Australia and New Zealand however there is need for a review of contemporary research that has emerged since 1998. No other relevant reviews set within the context of Australia and New Zealand were identified.

Another review by Moser, Bond & Thilmany-McFadden (2011), explored consumer preference for credence-based attributes in fruit and vegetables globally. The authors found that many studies included in their review used hypothetical choice experiments and contingent valuation methods which did not adequately address the intention-behaviour gap (Moser et al., 2011). The authors also reported that the included studies used varying definitions of attributes that overlap and when compared, presented mixed results (Moser et al., 2011). Thus, they concluded that the results were not generalisable or comparable. These findings are consistent with other reviews of consumer preference and perception not specific to fruit and vegetable products including: preference for nutrition, environmental and social responsibility in food labelling (Tobi et al., 2019), sustainable product attributes (Bangsa & Schlegelmilch, 2020), CoOL for food (Umberger, 2010), importance of food naturalness (Román et al., 2017), organic food price (Rödiger & Hamm, 2015), and acceptance for nutritionally-modified dairy products (Bimbo et al., 2017) among others. Therefore, it was identified that most existing reviews focus on specific individual attributes (e.g. organic, healthy, sustainable, price) or, specific food types (e.g. organic food, nutrition-modified dairy products). While some of these reviews may include fresh fruit and vegetables as a component of their investigation, only Moser, Bond and Thilmany-McFadden (2011) explicitly discuss their findings relevant to fresh fruit and vegetable products. Furthermore, Moser, Bond and Thilmany-McFadden's (2011) report their by 'macro regions' where Australia is grouped with the USA, Canada and Argentina, making separation of results relevant to Australia impossible. New Zealand was not mentioned within their review.

Justification for scoping review

Grunert (2002) states that the mainstream academic approach to studying consumer behaviour is through market research. Grunert (2002) suggests that a multi-disciplinary approach that includes economics, psychology, sociology and other social sciences is more appropriate. Public health and nutrition perspectives would also add value due to their role in promoting fruit and vegetable intake. Given the challenges identified in previous reviews, it was determined that a scoping review would be best suited to investigate consumer

perceptions of fruit and vegetable attributes in Australia and New Zealand. The scoping review approach will allow for a broad exploration of the extant literature that considers multi-disciplinary perspectives. The review will also explore the ways in which research regarding consumer perceptions of fruit and vegetable attributes is conducted and framed across different disciplines. Combining these findings will provide context and depth which may inform future research and help to guide public health policy and interventions relating to fruit and vegetable intake. This is of particular relevance as the National Health and Medical Research Council has recently engaged in a \$2.5 million review of the Australian Dietary Guidelines (NHMRC, 2022).

Aim

This review is proposed to answer the following research question: *What is the nature and extent of research investigating consumer perceptions of fresh fruit and vegetable attributes in Australia and New Zealand?* Specifically, the review will study the attributes that have been investigated, the methods used, and the spread of research across different disciplines and theoretical backgrounds. Key findings relating to consumer perceptions of fruit and vegetable attributes will also be explored.

Methods

This scoping review protocol has been prepared according to the JBI methodology for scoping reviews (Peters et al., 2020).

Eligibility Criteria

Population & Context

Research involving consumers of fruit and vegetables in Australia and New Zealand will be included. Consumers that are defined as eaters, purchasers or similar will be included. Articles that study Australian or New Zealand fresh fruit and vegetables in foreign or international markets will be excluded. Articles reporting on consumer perception of attributes from the perspective or opinion of a third party (e.g. fruit grower, retailer) will also be excluded. Second party perspectives (e.g. mother talking about her children's

perception of fruit attributes) will be considered for inclusion, with these consumers defined as 'purchasers'.

Food preferences are initially developed in childhood and continue to change throughout adolescence and adulthood (Ventura & Worobey, 2013). Children also influence purchasing and consumption of foods in the home (Wingert et al., 2014). It is important to consider preferences, perceptions and attitudes towards fresh fruit and vegetables across the lifespan when conducting research intended to inform public health interventions. Thus, articles regarding adult and child participants will both be considered for inclusion provided the article reports on the perception or interpretation of the attribute from the participants' perspective.

Concept

This scoping review seeks to map the extant literature regarding consumer perceptions of fruit and vegetable attributes.

Articles that directly measure, explore, or investigate consumer perception, interpretation or understanding of fresh fruit and vegetable attributes will be included. The study must report on minimally processed fresh fruit and vegetable products including (but not limited to):

- Minimally processed fresh fruit and vegetable products (e.g. pre-cut fruit and vegetables)
- Pre-packaged fresh fruit and vegetables (e.g. convenience pack pears, school pack apples)
- 'Ugly' or 'wonky' fruit and vegetable products or product lines (e.g. 'odd bunch')
- Foreign or exotic fresh fruit or vegetables sold in Australian/New Zealand markets including fruit and vegetables grown in Australia/New Zealand or imported from overseas (e.g. Indonesian star fruit variety grown in Australia and sold at Australian farmers market; Australian stone fruit sold in New Zealand green grocer; orange grown in California, sold in Australian supermarket)

Articles that report on any fruit or vegetable product that is not considered 'fresh' or 'raw' will be excluded including products that are:

- Canned
- Frozen
- Dried
- Pre-cooked
- Fermented, brined, or pickled
- Part of a meal (e.g. vegetable soup, fresh fruit salad pack with yoghurt and muesli)
- Moderately-highly processed beyond what has been defined as minimally processed but still considered 'fresh' or 'raw' (e.g. cold-pressed juice, smoothie, cold soups)
- Primarily consisting of fresh fruit or vegetables but containing non-fruit/vegetable ingredients (e.g. Caesar salad)

Articles will be considered for inclusion if they report on attributes (e.g. taste, colour, origin, label, brand, sustainability) whether categorised or uncategorised (e.g. hidden, revealed, intrinsic, extrinsic, experience or credence attributes). Articles that do not mention attributes directly or do not provide sufficient information for attributes included to be categorised will be excluded. For example, an article that reports on Australian consumer perceptions of ethical labelling on fresh apples will be included. An article that reports on Australian consumer preference for apples with ethical labels (e.g. by analysing purchase data), without specifying the consumers' interpretation or understanding of the ethical label, or exploring why the consumer prefers the apple with the ethical label, will be excluded.

Sources

Original research and systematic reviews published in academic journals and grey literature will be considered for inclusion in this scoping review. Grey literature may include theses, industry and government reports and market research reports.

Search strategy

An initial limited search of Scopus and Google Scholar was undertaken to identify articles on the topic. Keywords contained in titles and abstracts of relevant articles and index terms used to describe the articles were used to develop a complete search strategy for Scopus (appendix 1a). The search strategy will be adapted for each included database and information source. The reference list of all included sources will be screened for additional articles not identified in the preliminary search.

Studies published in English language will be included. As this scoping review is limited to Australian and New Zealand populations only, it is expected that only articles published in English will be relevant for inclusion. The search will not be limited by publication date. Databases to be searched include Scopus (Reed Elsevier), Web of Science (Thompson Scientific), Informit Data (Informit), Emerald Insight (Emerald), EconLit (Ovid), Medline (Ovid), CINAHL (EBSCO), Business Source Complete and PsycINFO (Ovid). Trove and ProQuest Dissertations & Theses will be hand searched for additional literature.

Grey literature will be identified through broad google searches containing combinations of key words selected from the database search strategy. Browser location tracking will be turned off to ensure results are not limited to the authors residential location. Search combinations are shown in appendix 1b. The first ten pages of results from each google search will be screened by one reviewer and potentially relevant articles will be extracted into a working document (Microsoft Word). Relevant sources (e.g. authors, industry groups) that have not previously been considered, but appear in google searches, will be added to a list for further screening of publications/reports. Publications and reports by relevant industry and government bodies will be hand searched including horticulture research and development groups and industry bodies (e.g. HortInnovation, AUSVEG, Horticulture NZ), consumer advocacy groups (e.g. CHOICE, Consumer NZ) and food standards and regulatory bodies (e.g. FSANZ).

Article Screening

All citations extracted from database searching will be collated and uploaded into EndNote X9 (The EndNote Team, 2013) and duplicates removed. Articles will be imported into Covidence (Veritas Health Innovation, 2022) for title and abstract screening against the inclusion criteria by one reviewer, with 30-50% of citations screened by a second reviewer. Disagreement will be resolved through discussion between the two reviewers and the research team. The same process will be followed for full text screening. Frequent meetings will be held with the research team throughout the screening process to report and discuss progress and findings and reach consensus on decisions.

One reviewer will screen title and abstract or the summary page of the article for grey literature articles at the time of searching. The same reviewer will then re-screen the articles against the inclusion criteria, looking at the full text of each article to determine its relevance to the research question. Articles that are to be considered for inclusion, and those that the reviewer is uncertain about will be added to Covidence at the full text screening stage. Reasons for exclusion of articles during full text screening will be recorded. Results of the search and study inclusion process will be reported in full in the final scoping review and presented in a Preferred Reporting Items for Systematic Reviews and Meta-analyses extension for scoping review (PRISMA-ScR) flow diagram (Tricco et al., 2018).

Data Extraction

Data will be extracted from articles by one reviewer, using a data extraction tool developed by the reviewer. It is expected that there will be significant heterogeneity between included articles. Thus, the data extraction tool may be modified to suit different article types or study designs (e.g. version x for industry reports and version y for peer reviewed literature) as required. Data extraction will include specific details about the discipline/theoretical background, participants and sample demographics, fruit and vegetable attributes studied, methods used and, key findings regarding consumer perceptions of included attributes. A draft data extraction tool is provided in appendix 2. Changes made to the data extraction tool will be recorded and reported in the final scoping review. Where the researcher

completing data extraction is uncertain, they will hold discussions about the data and issues therein with the research team (n=4) until a conclusion and agreement is reached.

Data Analysis

Extracted data will be collated and summarised narratively. Findings will be discussed in relation to the implications for public health policy, guidelines and interventions. Limitations and gaps in the current literature will also be identified and discussed.

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Conflicts of interest

There is no conflict of interest in this project.

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APPENDIX 1a: Search Strategy

SCOPUS search strategy

Tested 19/4/22 - 635 document results

(TITLE-ABS-KEY ((consumer* OR shopper* OR purchas* OR buy*) AND (prefer* OR attitude* OR behavio* OR perception* OR perceive* OR choice* OR "willingness-to-pay" OR "willingness-to-buy" OR acceptance OR expect* OR value* OR priori* OR seek OR search OR demand* OR view* OR inten* OR opinion* OR interest* OR experience* OR evaluat* OR decision* OR importance OR use* OR understand*)) AND TITLE-ABS-KEY (fruit* OR veg* OR "horticultur* product*" OR "fresh produce") AND TITLE-ABS-KEY (australia* OR "new zealand*" OR aotearoa))

Grey Literature Searches

Google

First 10 pages of results screened

Location tracking setting turned off

1. "fresh horticultural products/produce consumer Australia New Zealand"
2. "fruit and veg consumer Australia New Zealand"
3. "Fruit attribute preference Australia"
4. "Veg attribute preference Australia"
5. "Veg attribute preference New Zealand"
6. "Fruit attribute preference New Zealand"
7. "fresh produce perception Australia"
8. "fresh produce perception New Zealand"

APPENDIX 1b: Draft Data Extraction Tool

Current at 12/5/22; Covidence

General Information

- Aim/purpose/research question
- Discipline/theoretical background

Population

- Country (Australia / New Zealand)
- Location
- Sample Demographics
- Sample Size
- Age
- Gender
- Income
- Education Level
- Participant type (consumer / purchaser/ second party/ other)
- Main shopper? (Y/N)

Concept

- Fruit or vegetable product(s)
- Attribute(s)
- Justification/description of attribute(s)

Methods

- Study Design
- Method of recruitment
- Data collection
- Frequency and duration

Results

- Key findings
- Author conclusion/implications for practice

Risk of Bias

- Funding source
- Conflict of interest

Notes

APPENDIX 2: DATA SYNTHESIS TABLE – AUSTRALIAN & NEW ZEALANDER PERCEPTIONS OF FRUIT AND VEGETABLE CHARACTERISTICS (SCOPING REVIEW)

Australian and New Zealander people's perceptions of intrinsic cues

| Citation | Product | Cue | Perception | Perception category | Formed through | Influenced by |
|------------------------------------|------------------------|----------|--------------------|---------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| (Makhal et al., 2020a) | Fruit (apple/ Kiwi) | Firmness | Indicates ripeness | Quality assessment | Learned from information provided by parents | Individual factors - Past experience Socio-cultural environment - Family |
| (Hamblin and Colmar Brunton, 2020) | Nashi pear | Firmness | Indicates ripeness | Quality assessment | Not described | |
| (Makhal et al., 2020a) | Apple | Firmness | Indicates crunch | Eating experience | Learned through observation of parent's behaviour in choosing f+v | Socio-cultural environment - Family |

| | | | | | | |
|---------------------------|----------------------|-----------------------|----------------------------------------------------------|--------------------|-----------------|---------------------------------------------------------------------|
| (Adams et al., 2013) | Capsicum | Firmness | Indicates crunch | Eating experience | Not described | Context - Specific usage event (meal requiring raw capsicum) |
| (Ipsos New Zealand, 2014) | Papaya | Firm, juicy texture | Indicates satisfaction | Eating experience | Not described | |
| (Ipsos New Zealand, 2014) | Papaya | Firmness | Indicates time within which product needs to be used | Quality assessment | Not described | |
| (Owen et al., 2002) | Rockmelon | Appearance (external) | Visually appealing but doesn't indicate taste accurately | Eating experience | Past experience | Individual factors - Past experience |
| (McKinna, 1980) | Fruit and vegetables | Appearance (external) | Visually appealing but doesn't indicate anything | Quality assessment | Not described | |

| | | | | | | |
|---------------------------|----------------------|-----------------------|-----------------------------------------------------------------------|--------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | beyond visual appeal | | | |
| (Olsen, 1999) | Tomato | Appearance (external) | Visually appealing but doesn't indicate anything beyond visual appeal | Quality assessment | Not described | |
| (Ipsos New Zealand, 2014) | Papaya | Appearance (external) | Doesn't indicate interior quality | Quality assessment | Not described | |
| (Makhal et al., 2020b) | Fruit (apple/orange) | Bruise/blemish | Poses health risk | Health/safety | Not described | Individual factors <ul style="list-style-type: none"> - Demographics (7-9yo children) - Past experience Socio-cultural environment <ul style="list-style-type: none"> - Family |
| (Hamblin and Colmar) | Nashi pear | Bruise/blemish | Indicates produce is unclean, may be | Safety | Not described | Individual factors <ul style="list-style-type: none"> - Past experience (familiarity) |

| | | | | | | |
|------------------------|--------|----------------|---------------------------|-------------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Brunton, 2020) | | | contaminated with insects | | | |
| (Makhal et al., 2020a) | Banana | Bruise/blemish | Indicates health benefit | Health | Not described | Individual factors <ul style="list-style-type: none"> - Demographics (9yo girl) Socio-cultural environment <ul style="list-style-type: none"> - Social pressure/norms - Family (baking) |
| (Makhal et al., 2020a) | Banana | Bruise/blemish | Indicates sweet taste | Eating experience | Participation in baking allows parents and caregivers to teach children about the different ways of repurposing suboptimal produce | Individual factors <ul style="list-style-type: none"> - Demographics (children) - Past experience Socio-cultural environment <ul style="list-style-type: none"> - Family |

| | | | | | | |
|------------------------------------|----------------------|----------------|------------------------------------|--------------------|---------------|----------------------------------------------------------------------------------|
| (Makhal et al., 2020b) | Fruit and vegetables | Bruise/blemish | Indicates freshness | Quality assessment | Not described | Individual factors - Demographics (children) |
| (Makhal et al., 2020b) | Fruit and vegetables | Bruise/blemish | Does not affect taste | Eating experience | | Individual factors - Past experience - Demographics (children) |
| (Hamblin and Colmar Brunton, 2020) | Nashi pear | Bruise/blemish | Off-putting | Experience | Not described | |
| (Makhal et al., 2020b) | Apple | Size (small) | Less nutritious than large produce | Health/nutrition | Not described | Individual factors - Demographics (8yo boy) |
| (Woodley and Pipicella, 2014) | Broccoli | Size (small) | Reduces waste | Environment | Not described | Context - Specifically discussing meal for 2 people Individual Factors |

| | | | | | | |
|-------------------------------|------------|---------------------|-------------------------------|----------------|---------------|------------------------------------------------------------------------------------------------------------------------|
| | | | | | | - Values/belief - limit vegetable purchase to reduce food waste |
| (Woodley and Pipicella, 2014) | Vegetables | Size (small) | Associated with being gourmet | | Not described | |
| (Woodley and Pipicella, 2014) | Vegetables | Size (small) | Exciting | Experience | Not described | |
| (Colmar Brunton, 2014) | Vegetables | Size (small) | Fun, not overwhelming | Experience | Not described | Individual factors - Demographics- Melbourne, 25-40yo Context - For children who lose interest in eating |
| (FiftyFive5 and Hort | Apple | Size (small-medium) | Ideal size for snacking | Usage occasion | Not described | |

| | | | | | | |
|--------------------------------------------------|------------|--------------|-----------------------------------------------------------------------------|----------------------|---------------|----------------------------------------------------|
| Innovation, 2020a) | | | | | | |
| (FiftyFive5 and Hort Innovation, 2020a) | Apple | Size (small) | Easy to transport, convenient | Usage occasion | Not described | |
| (Woodley and Pipicella, 2014) | Vegetables | Size (small) | More convenient and better value without compromising freshness | Value assessment | Not described | |
| (FiftyFive5 and Hort Innovation, 2020a) | Apple | Size (small) | More likely to be crunchy, juicy | Eating experience | Not described | |
| (FiftyFive5 and Hort | Apple | Size (small) | Less likely to make a mess | Convenience | Not described | Individual factors - Personality ('foodie') |

| | | | | | | |
|-------------------------------|--------------|------------------|-------------------------------------------------------------|-------------------|---------------|---------------------------------------------------------------------------------------------|
| Innovation, 2020a) | | | | | | Context <ul style="list-style-type: none"> - Eating on the go, at work |
| (Woodley and Pipicella, 2014) | Vegetables | Size (small) | Too large (in the context of personal usage of the product) | Usage occasion | Not described | Context <ul style="list-style-type: none"> - Food waste |
| (Woodley and Pipicella, 2014) | Celery | Size (regular) | Too large, inconvenient due to need to process | Convenience | Not described | Individual factors <ul style="list-style-type: none"> - Attitude – 'lazy' |
| (Colmar Brunton, 2014) | Carrots | Size (regular) | Too large for school lunch, wasteful | Waste | Not described | Context <ul style="list-style-type: none"> - Child's eating habits at school |
| (Henderson et al., 2012) | Sweet potato | Size (large/fat) | Starchy, not as tasty | Eating experience | Not described | |

| | | | | | | |
|---------------------------|----------|--------------|----------------------------------------------------------|-------------------|----------------------------------------|-----------------------------------------------------------------------------------------------|
| (Ipsos New Zealand, 2014) | Papaya | Size (large) | Not as tasty as small, flavour spread out more | Eating experience | Not described | |
| (Makhal et al., 2020a) | Capsicum | Size (large) | Better value | Value assessment | Learned from instructions from parents | Individual factors - demographics (6yo girl) Socio-cultural environment - Family |
| (Ipsos New Zealand, 2014) | Papaya | Size (large) | Perceived to cost more but taste better for what is paid | Value assessment | Not described | |
| (McDougall, 2012) | Lettuce | Size (large) | 'rip-off' due to not being able to use a whole lettuce | Value assessment | Not described | Individual factors - Demographics (couples without children/single people) |

| | | | | | | |
|--------------------------|--------------|-------------------|------------------------------------------------|-------------------|---------------|---------------------------------------------------------------------------------------|
| (Olsen, 1999) | Strawberries | Size (large) | Perceived to be sprayed to enhance size | Production | Not described | |
| (Makhal et al., 2020b) | Carrot | Shape (irregular) | Imperfect appearance does not impact nutrition | Health | Not described | Individual factors - Demographics (11yo boy) |
| (Makhal et al., 2020a) | Banana | Shape (irregular) | Doesn't impact taste | Eating experience | Not described | Individual factors - Demographics (10yo boy) Context - Discussing food waste |
| (Henderson et al., 2012) | Sweet potato | Shape (irregular) | Woody texture | Eating experience | Not described | |
| (Makhal et al., 2020b) | Carrot | Shape (irregular) | Harder to eat | Eating experience | Not described | Individual factors - Demographics (8yo boy) |

| | | | | | | |
|------------------------------------|----------------------|--------------------|------------------------------------------------------------------------------|-------------------|---------------|------------------------------------------------------------|
| (Makhal et al., 2020b) | Carrot | Shape (irregular) | Indicates negative taste | Eating experience | Not described | Individual factors - Demographics (10yo girl) |
| (Makhal et al., 2020b) | Fruit and vegetables | Shape (irregular) | Personified to have human-like characteristics or resemble inanimate objects | Experience | Not described | Individual factors - Demographics (children 5-10yo) |
| (Makhal et al., 2020b) | Fruit and vegetables | Shape (irregular) | Disgusting | Experience | Not described | Individual factors - Demographics (7yo boy) |
| (Henderson et al., 2012) | Sweet potato | Shape (consistent) | Raises speculation about growing practices | Production | Not described | |
| (Hamblin and Colmar Brunton, 2020) | Nashi pear | Shape (round) | Associated with crunch of apples | Eating experience | Not described | |

| | | | | | | |
|--------------------------|--------------|--------------------------------|------------------------------------------------|-------------------|---------------|----------------------------------------------------------------------------|
| (Henderson et al., 2012) | Sweet potato | Shape (regular size – torpedo) | Easy to prepare, convenient | Convenience | Not described | Context - Preparing a meal for 2 |
| (Henderson et al., 2012) | Sweet potato | Colour (orange) | Indicates presence of vitamins (not specified) | Health | Not described | |
| (Colmar Brunton, 2014) | Vegetables | Colour (orange) | Improve eyesight | Health | Not described | |
| (Henderson et al., 2012) | Sweet potato | Colour (orange) | Adds visual appeal to meals | Usage occasion | Not described | |
| (Adams et al., 2013) | Capsicum | Colour (red) | Ensures nice flavour | Eating experience | Not described | Context - Selecting a capsicum for a meal that requires raw produce |
| (Owen et al., 2002) | Capsicum | Colour (red) | More visually appealing in meals | Usage occasion | Not described | |

| | | | | | | |
|-----------------------------------------|------------|---------------------------------|---------------------------------------------------------|-------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (Makhal et al., 2020a) | Carrot | Colour (yellow) | Fun, tastes good | Eating experience | Past experience eating home grown produce | Individual factors <ul style="list-style-type: none"> - Demographic (6yo boy) - Past experience 4. Socio-cultural environment <ul style="list-style-type: none"> - Family |
| (FiftyFive5 and Hort Innovation, 2020a) | Apple | Colour (pink with green flecks) | Expected to be ripe, crispy, mature, friendly, exciting | Eating experience | Not described | Individual factors <ul style="list-style-type: none"> - Demographics (single/double income no kids) - Personality ('foodie') |
| (Hamblin and Colmar Brunton, 2020) | Nashi pear | Colour (green/pale yellow) | Fresh, crisp, crunchy, sweet | Eating experience | Not described | |

| | | | | | | |
|-----------------------------------------|----------------------|---------------------|--------------------------------------------------------|--------------------|------------------------------------------------------|-------------------------------------------------------------------|
| (McDougall, 2012) | Lettuce | Colour (yellow) | Indicates produce is old, harvested up to a week ago | Production | Not described | |
| (Makhal et al., 2020b) | Fruit and vegetables | Colour (green) | Indicates poor quality – unripe or affected by insects | Quality assessment | Not described | Individual factors - Demographics (8yo boy) |
| (Owen et al., 2002) | Lemon Capsicum | Colour (green) | Indicates ripeness, perceived to last longer at home | Quality assessment | Not described | |
| (FiftyFive5 and Hort Innovation, 2020a) | Apple | Colour (consistent) | ‘too perfect’, ‘fake’ | | Not described | |
| (Dresler et al., 2017) | Fruit and vegetables | Colour (general) | Indicates disliked taste present for all | Eating experience | They assumed a dislike due to their established view | Individual factors - Demographics (child) - Past experience |

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|------------------------------------|--------------|------------------|-------------------------------------------------|--------------------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | fruit/vegetables of that colour | | of green fruits and vegetables. | |
| (Hamblin and Colmar Brunton, 2020) | Nashi pear | Colour (brown) | Indicates ripening | Quality assessment | Not described | |
| (Makhal et al., 2020a) | Oranges | Colour (general) | Indicates ripening | Quality assessment | Observations of how parents choose produce | Individual factors <ul style="list-style-type: none"> - Past experience - Demographics (children) Socio-cultural environment <ul style="list-style-type: none"> - Family |
| (Colmar Brunton, 2014) | Vegetables | Colour (general) | Associated with health benefits (not specified) | Health | Not described | |
| (Henderson et al., 2012) | Sweet potato | Colour (general) | Heuristic to ensure variety of | Health | Not described | |

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|--------------------------------------------------|--------------|-----------------------------------------------|---------------------------|----------------------|---------------|--|
| | | | vitamins consumed | | | |
| (Henderson et al., 2012) | Sweet potato | Colour (deep orange, almost red/purple) | Fresher, tastier | Eating experience | Not described | |
| (Ipsos New Zealand, 2014) | Papaya | Colour (deep) | Indicates sweet taste | Eating experience | Not described | |
| (Henderson et al., 2012) | Sweet potato | Colour (deep orange, almost red/purple) | Nutritionally superior | Health | Not described | |
| (FiftyFive5 and Hort Innovation, 2020a) | Apple | Colour (bright) | Associated with health | Health | Not described | |
| (FiftyFive5 and Hort | Apple | Colour (bright) | Indicates ripeness | Eating experience | Not described | |

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|--------------------------------------------------|--------|---------------------------------------|--------------------------------------------------|-----------------------|---------------|--------------------------------------------------------|
| Innovation, 2020a) | | | | | | |
| (FiftyFive5 and Hort Innovation, 2020a) | Apple | Colour (dull/faded) | Signifies product is past shelf life | Quality assessment | Not described | |
| (FiftyFive5 and Hort Innovation, 2020a) | Apple | Colour (dull/faded) | Indicates product is best for cooking with | Usage occasion | Not described | |
| (Makhal et al., 2020b) | Apple | Colour (dull/faded) | Less appealing than bright colours | Visual appeal | Not described | Individual factors - Demographics (9yo girl) |
| (Makhal et al., 2020b) | Orange | Colour (discolouration – brown) | Indicates poor taste | Eating experience | Not described | Individual factors - Demographics (6yo girl) |

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|------------------------|----------------------|----------------------------------|--------------------------|--------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| (Makhal et al., 2020b) | Orange | Colour (discolouration – brown) | Indicates food is mouldy | Quality assessment | Not described | Individual factors - Demographics (5yo boy) |
| (Makhal et al., 2020b) | Fruit and vegetables | Colour (defect) | Do not affect taste | Eating experience | Previous taste experiences led children to confirm that colour deviations do not affect taste. | Individual factors - Past experience - Demographics (8yo girls) |
| (Makhal et al., 2020b) | Fruit and vegetables | Colour (discoloured/ Bicoloured) | Indicates sour taste | Eating experience | Past experience | Individual factors - Demographics (children) - Past experience |

Australian and New Zealander people's perceptions of extrinsic cues

| Citation | Product | Attribute | Perception | Perception category | Formed through | Influenced by |
|----------------------|------------|-------------------|-------------------------------------------------------|---------------------|----------------|---------------------------------------------------------------------------------------------------------------------|
| (McDougall, 2012) | Lettuce | Presence of roots | Signifies vegetable was grown in water | Production | Not described | |
| (McDougall, 2012) | Lettuce | Presence of bugs | Indicates vegetable hasn't been sprayed with chemical | Production | Not described | Indirect environment - Geographical area |
| (Ekman et al., 2014) | Vegetables | Presence of bugs | Indicates vegetable hasn't been sprayed with chemical | Production | Not described | Individual factors - Knowledge of vegetable growing |
| (McDougall, 2012) | Lettuce | Presence of bugs | Indicates produce is contaminated, poses health risk | Health/safety | Not described | Individual factors - Demographics (young women) Socio-cultural environment - Social pressure/norms |

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|------------------------------------|----------------------|----------------------------------|---------------------------------------------------------------------------------------------------|--------------------|---------------|--|
| (Colmar Brunton, 2014) | Vegetables | Display (ice/sprayed with water) | Reduces at-home life | Quality assessment | Not described | |
| (McKinna, 1980) | Fruit and vegetables | Display (ice/sprayed with water) | Produce will have short at-home life; sprays/ice is perceived to deceive consumer about freshness | Quality assessment | Not described | |
| (Hamblin and Colmar Brunton, 2020) | Nashi pear | Display (low stock) | Remaining fruit has been 'sitting' on shelf or rejected by others | Quality assessment | Not described | |
| (Hamblin and Colmar Brunton, 2020) | Nashi pear | Display (box/basket) | Indicates produce is 'exclusive' | | Not described | |

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|------------------------|----------------------|------------------------------|---------------------------------------------------|--------------------|---------------|--|
| (Colmar Brunton, 2014) | Vegetables | Display (pick 'n' mix) | Associated with health/safety concerns | Safety | Not described | |
| (Colmar Brunton, 2014) | Vegetables | Display (refrigerated units) | Maintains vegetable freshness | Quality assessment | Not described | |
| (Colmar Brunton, 2014) | Vegetables | Display (refrigerated units) | Reduces contamination from handling | Safety | Not described | |
| (McKinna, 1980) | Fruit and vegetables | Display (coloured lights) | Artificially enhances apparent quality of produce | Quality assessment | Not described | |
| (McKinna, 1980) | Fruit and vegetables | Price (low) | Indicates produce is in season | Production | Not described | |
| (Colmar Brunton, 2014) | Vegetables | Price (high) | Subject to more 'treatments' | Production | Not described | |

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|------------------------------------|------------|---------------------------------|---------------------------------------------------------------------------------|----------------|---------------|--|
| (Ipsos New Zealand, 2014) | Papaya | Price (high) | Risky | | Not described | |
| (Ipsos New Zealand, 2014) | Papaya | Cost | Indicates usage situation – papaya is a treat rather than a staple fruit | Usage occasion | Not described | |
| (Colmar Brunton, 2014) | Vegetables | Cost (expensive) | Indicates usage occasion – occasional purchase | Usage occasion | Not described | |
| (Colmar Brunton, 2014) | Vegetables | Cost (cheaper) | Indicates usage occasion – staple purchase, regular use | Usage occasion | Not described | |
| (Hamblin and Colmar Brunton, 2020) | Nashi pear | Price (higher than other fruit) | Indicates usage occasion – only suitable for occasional purchase/consumption | Usage occasion | Not described | |

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|-----------------------------------------|----------------------|-------------------------------|--------------------------------------------------------|--------------------------|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (FiftyFive5 and Hort Innovation, 2020b) | Fruit and vegetables | Packaging | Ensures freshness | Quality assessment | Not described | |
| (Woodley and Pipicella, 2014) | Carrot | Packaging (orange-tinged bag) | Keeps produce fresher for longer | Quality assessment | Not described – past experience alluded to | |
| (Colmar Brunton, 2014) | Vegetables | Packaging (compostable bag) | Convenient packaging that is safe for the environment | Convenience, environment | Not described | Individual factors <ul style="list-style-type: none"> - Personality ('cynical' and 'set in my ways') - Values/beliefs (concerned about the environment) |
| (Goldring, 2019) | Fruit and vegetables | Packaging | Driven by retailers and suppliers, not consumer demand | Belief | Not described | Context <ul style="list-style-type: none"> - Discussing waste |
| (Hamblin and Colmar) | Fruit/nashi pears | Packaging | Excessive, wasteful | Waste, environment | Not described | Individual factors |

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|---------------------------------------------|-------------------------|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|-----------------------|--------------------------------------------------|-------------------------------------------------|
| Brunton, 2020) | | | | | | - Values/beliefs (care about environment) |
| (Hamblin and Colmar Brunton, 2020) | Nashi pears | Packaging | Increases cost | Value assessment | Not described | |
| (Goldring, 2019) | Fruit and vegetables | Packaging | Increases cost | Value assessment | Not described | |
| (McKinna, 1980) | Fruit and vegetables | Packaging (coloured plastic bags or bags made opaque by markings or opaque strips) | Deceives consumer – hides quality of produce from consumer assessment | Quality assessment | Not described – alludes to past experience | |
| (Hamblin and Colmar | Nashi pear | Packaging (protective wrapping) | Limits bruising, protects produce, less likely to be | Quality assessment | Not described | |

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|------------------------------------|-------------|-------------------------------------|------------------------------------|------------------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------|
| Brunton, 2020) | | | damaged or overripe, good quality | | | |
| (Hamblin and Colmar Brunton, 2020) | Nashi pears | Packaging (protective wrapping) | Conceals bruising/blemishes | Quality assessment | Not described | |
| (Hamblin and Colmar Brunton, 2020) | Nashi pears | Packaging (protective wrapping) | More hygienic | Safety | Not described | Context <ul style="list-style-type: none"> - Covid 19 |
| (Colmar Brunton, 2014) | Vegetables | Processing (heat and eat) | Treat | Usage occasion | Not described | Individual factors <ul style="list-style-type: none"> - Demographics (40+yo) - Personality ('lazy') |
| (Colmar Brunton, 2014) | Vegetables | Processing (casserole/soup mix bag) | Speeds up home cooking, saves time | Usage occasion / convenience | Not described | Individual factors <ul style="list-style-type: none"> - Consumer segments |

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|------------------------|------------|----------------------------------|----------------------------------------------------------------------------|-------------|---------------|-----------------------------------------------|
| (Colmar Brunton, 2014) | Vegetables | Processing (roasting vegetables) | Easy, quick, convenient | Convenience | Not described | Individual factors - Consumer segments |
| (Colmar Brunton, 2014) | Vegetables | Processing (stir fry mix) | Saves time, reduces storage space required, more convenient/easier to cook | Convenience | Not described | Individual factors - Consumer segments |
| (Colmar Brunton, 2014) | Vegetables | Processing (salad packs) | Convenient for work and eating on the go | Convenience | Not described | Individual factors - Consumer segments |
| (Colmar Brunton, 2014) | Vegetables | Processing (salad packs) | Healthy and fresh | Health | Not described | Individual factors - Consumer segments |

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|-------------------------------|----------------|--------------------------------|--------------------------------------------------------------------------------------------------------|--------------------|---------------|--------------------------------------------------|
| (Colmar Brunton, 2014) | Carrots (baby) | Processing (snack pack) | Not actually 'baby carrots' – just large carrots processed to look smaller, likely to have added sugar | Mistrust | Not described | Individual factors - Demographics (30+yo) |
| (McKinna, 1980) | Vegetables | Processing (removal of leaves) | Reduces ability to judge quality | Quality assessment | Not described | Individual factors - 'housewives' |
| (Wood et al., 2017) | Potato | Processing (removal of skin) | Reduces nutrition | Health | Not described | |
| (Woodley and Pipicella, 2014) | Vegetables | Processing (pre-cut) | Reduced freshness | Quality assessment | Not described | |
| (Goldring, 2019) | Vegetables | Processing (pre-cut) | Lazy, expensive, less fresh | Quality assessment | Not described | |

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|-----------------------------------|------------|----------------------|----------------------------------------------------------------------------|--------------------|---------------|--|
| (Ipsos New Zealand, 2014) | Papaya | Processing (pre-cut) | No longer fresh | Quality assessment | Not described | |
| (Witham and Colmar Brunton, 2016) | Vegetables | Processing (pre-cut) | Reduced freshness (whole vegetables expected to last 50-100% times longer) | Quality assessment | Not described | |
| (Ipsos New Zealand, 2014) | Papaya | Processing (pre-cut) | Assumed to be suboptimal produce and hence have inferior taste | Eating experience | Not described | |
| (Witham and Colmar Brunton, 2016) | Vegetables | Processing (pre-cut) | Convenient | Convenience | Not described | |
| (Woodley and Pipicella, 2014) | Vegetables | Processing (pre-cut) | Easier to transport and store | Convenience | Not described | |

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|-------------------------------|----------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|--------------------------------------------------|
| (Colmar Brunton, 2014) | Vegetables | Processing (pre-cut) | Waste of money | Value assessment | Not described | Individual factors - Demographics (30+yo) |
| (Ipsos New Zealand, 2014) | Papaya | Processing (pre-cut) | Cheaper than whole fruit, therefore lower risk | Value assessment | | |
| (Woodley and Pipicella, 2014) | Vegetables | Processing (pre-cut) | Increased cost | Value assessment | Not described | |
| (McKinna, 1980) | Fruit and vegetables | Processing (pre-packaged) | Deceiving, poor-quality produce mixed with better quality but believe that only good produce can be viewed through produce | Quality assessment | Not described | Individual factors - 'housewives' |

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|------------------------|----------------------|----------------------------------------|---------------------------------------------------------------------------|--------------------|---------------|--------------------------------------------------------------------|
| (McDougall, 2012) | Fruit and vegetables | Processing (pre-packaged) | Poor-quality produce hidden inside packaging to deceive consumers | Quality assessment | Not described | |
| (McKinna, 1980) | Potatoes | Processing (pre-packaged) | Forces consumers to buy more than they need resulting in waste | Waste/belief | Not described | |
| (Colmar Brunton, 2015) | Potatoes | Processing (pre-packaged) | Smaller bags (2kg) are ideal due to large sizes having shorter shelf life | Value assessment | Not described | |
| (Goldring, 2019) | Carrots, potatoes | Processing (pre-packaged) | Cheaper, better value than loose, more likely to be on sale | Value assessment | Not described | |
| (Goldring, 2019) | Fruit and vegetables | Processing (pre-packaged) -bulk packs) | Cheaper than personal factors price per kg produce | Value assessment | Not described | Individual factors - Demographics (lower income households) |
| (FiftyFive5 and Hort | Apples | Processing (pre-packaged) | More convenient but lower quality | Value assessment | Not described | |

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|-------------------------------|------------|---------------------------|--------------------------------------------------------------------|--------------------|--------------------------------------------|-------------------------------------------------------------------------|
| Innovation, 2020a) | | | | | | |
| (Olsen, 1999) | Vegetables | Processing (pre-packaged) | Convenient for occasions e.g. BBQ at a friend's house | Convenience | Not described | |
| (Woodley and Pipicella, 2014) | Vegetables | Processing (pre-packaged) | Poor-quality – used by retailers as a 'quick sale' for old produce | Quality assessment | Not described | |
| (Woodley and Pipicella, 2014) | Vegetables | Processing (pre-packaged) | Variable quality – contains different sizes and thicknesses | Quality assessment | Not described – alludes to past experience | |
| (Colmar Brunton, 2014) | Vegetables | Processing (pre-packaged) | Likely to go off quickly | Quality assessment | Not described | Individual factors - Personality ('cynical' – consumer segments) |

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|------------------------|----------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|--|
| (Olsen, 1999) | Vegetables | Processing (pre-packaged) | Reduced freshness, overpriced | Value assessment | Not described | |
| (Goldring, 2019) | Fruit and vegetables | Processing (pre-packaged) | More expensive than loose items | Value assessment | Not described | |
| (Colmar Brunton, 2014) | Lettuce | Processing (pre-packaged) | More economic, more expensive than whole lettuce but better for personal usage situation (due to being able to eat entire portion) | Value assessment | Not described | |
| (McDougall, 2012) | Lettuce | Processing (pre-packaged) | Expected to be washed, prepared, free of bugs | Quality assessment | Not described | |
| (Ekman et al., 2014) | Fruit and vegetables | Processing (pre-packaged) | Assumed to be pre-washed and checked, should be ready to eat and free from contamination | Quality assessment | Not described | |

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|-----------------------------------|------------------------------------|---------------------------|----------------------------------------------------------|---------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| (Witham and Colmar Brunton, 2016) | Vegetables | Processing (pre-packaged) | Expected to be washed and ready to eat | Quality assessment/ convenience | Not described | |
| (Goldring, 2019) | Salad leaves | Processing (pre-packaged) | Contain chemicals, nitrogen or gas to maintain freshness | Safety | Not described | |
| (Colmar Brunton, 2014) | Vegetables | Processing (pre-packaged) | Tampered with, rotten, mislabelled, or have additives | Safety | Motivation comes from past experience with packaged or pre-prepared products that were disappointing. | Individual factors - Personality ('cynical' – consumer segments) |
| (Dresler et al., 2017) | Vegetables (broccoli, cauliflower) | Processing (pre-packaged) | Indicates eating experience (negative) | Eating experience | Not described – alludes to past experience | |

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|-------------------------------|----------------------|------------------------|-------------------------------------------------------------|--------------------|---------------------------------------------|-----------------------------------------|
| (Mulcahy, 2012) | Fruit and vegetables | Retailer (supermarket) | Dictate terms to farmers and squeeze them on price unfairly | Ethical production | Not described – alludes to prior experience | |
| (Goldring, 2019) | Fruit and vegetables | Retailer (supermarket) | Assumed to be bulk stored for long periods of time | Production | Not described | |
| (Ipsos New Zealand, 2014) | Papaya | Retailer (supermarket) | Hygienic | Safety | Not described | |
| (Ekman et al., 2014) | Fruit and vegetables | Retailer (supermarket) | Clean, hygienic | Safety | Not described | |
| (Woodley and Pipicella, 2014) | Vegetables | Retailer (supermarket) | Increases waste due to only offering large or bulk portions | Waste | Not described | |
| (Lea et al., 2005) | Vegetables | Retailer (supermarket) | Reduced flavour (compared to home | Eating experience | Not described | Individual factors - Past experience |

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|-------------------------------|----------------------|-------------------------|-------------------------------------------------|--------------------|---------------|-----------------------------------------|
| | | | grown) and tastes plastic-y | | | - Demographics (females) |
| (Woodley and Pipicella, 2014) | Vegetables | Retailer (supermarket) | Not as fresh (as other retailers) | Quality assessment | Not described | |
| (Adams et al., 2013) | Asian greens | Retailer (supermarket) | Poor quality – look limp, sparse | Quality assessment | Not described | |
| (Woodley and Pipicella, 2014) | Vegetables | Retailer (supermarkets) | Poor quality – look old, sad | Quality assessment | Not described | Individual factors - Past experience |
| (Goldring, 2019) | Fruit and vegetables | Retailer (supermarket) | Less fresh, shorter lifespan (than greengrocer) | Quality assessment | Not described | |
| (Ipsos New Zealand, 2014) | Papaya | Retailer (supermarket) | Good quality – undamaged | Quality assessment | Not described | |

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|-------------------------------|----------------------|------------------------|------------------------------------------|--------------------|---------------|-----------------------------------------------------------------------------------------------------------|
| (Ipsos New Zealand, 2014) | Papaya | Retailer (supermarket) | Pre-ripened, increased longevity | Quality assessment | Not described | |
| (Lea et al., 2005) | Fruit and vegetables | Retailer (supermarket) | Convenient – due to longer opening hours | Convenience | Not described | Individual factors - Consumer who prefers to purchase from greengrocer - Demographics (females) |
| (Ipsos New Zealand, 2014) | Papaya | Retailer (supermarket) | Convenient | Convenience | Not described | |
| (Woodley and Pipicella, 2014) | Vegetables | Retailer (supermarket) | Convenient | Convenience | Not described | |
| (Woodley and Pipicella, 2014) | Vegetables | Retailer (supermarket) | Cheaper (than other retailers) | Value assessment | Not described | |

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|---------------------------|----------------------|------------------------|-----------------------------------------------------------------------------|--------------------------|---------------|-----------------------------------------------------------------------------------------|
| (Ipsos New Zealand, 2014) | Papaya | Retailer (supermarket) | More expensive (than other retailers) | Value assessment | Not described | |
| (McDougall, 2012) | Lettuce | Retailer (supermarket) | Cheaper (than other retailers) | Value assessment | Not described | Context - Used to shop at Harris farm, shops at Woolworths since having children |
| (Goldring, 2019) | Fruit and vegetables | Retailer (greengrocer) | Use more 'ecofriendly' packaging e.g. Paper bags, cardboard trays and boxes | Environmentally friendly | Not described | |
| (Ipsos New Zealand, 2014) | Papaya | Retailer (greengrocer) | Fruit is local (from NZ) and imported | Provenance | Not described | |
| (Hamblin and Colmar | Nashi pear | Retailer (greengrocer) | Fruit is local and imported, more likely to | Provenance | Not described | |

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|------------------------------------|----------------------|------------------------|----------------------------------------|--------------------|---------------|--|
| Brunton, 2020) | | | be imported than supermarket | | | |
| (Woodley and Pipicella, 2014) | Vegetables | Retailer (greengrocer) | Freshest (compared to other retailers) | Quality assessment | Not described | |
| (Goldring, 2019) | Fruit and vegetables | Retailer (greengrocer) | Fresher – lasts longer at home | Quality assessment | Not described | |
| (Hamblin and Colmar Brunton, 2020) | Nashi pear | Retailer (greengrocer) | Fresher than supermarket | Quality assessment | Not described | |
| (Woodley and Pipicella, 2014) | Vegetables | Retailer (greengrocer) | Less likely to be processed | Value assessment | Not described | |
| (Hamblin and Colmar | Nashi pear | Retailer (greengrocer) | Better quality | Quality assessment | Not described | |

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|---------------------------------------------|-------------------------|---------------------------|-----------------------------------------------------------|-----------------------|---------------|--|
| Brunton, 2020) | | | | | | |
| (Ipsos New Zealand, 2014) | Papaya | Retailer (greengrocer) | Lower quality – more likely to be damaged, overripe | Quality assessment | Not described | |
| (Hamblin and Colmar Brunton, 2020) | Nashi pear | Retailer (greengrocer) | Bigger size than supermarket | Quality assessment | Not described | |
| (Goldring, 2019) | Fruit and vegetables | Retailer (greengrocer) | More expensive than supermarket | Value assessment | Not described | |
| (Ipsos New Zealand, 2014) | Papaya | Retailer (greengrocer) | Cheaper than supermarket | Value assessment | Not described | |
| (Hamblin and Colmar | Nashi pear | Retailer (greengrocer) | Cheaper than supermarket | Value assessment | Not described | |

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|---------------------------------------------|-------------------------|---------------------------|--------------------------------------------------------------------------------|---------------------------|---------------|--|
| Brunton, 2020) | | | | | | |
| (Hamblin and Colmar Brunton, 2020) | Nashi pear | Retailer (greengrocer) | Less convenient | Convenience | Not described | |
| (Ipsos New Zealand, 2014) | Papaya | Retailer (market) | Fruit is local (from NZ) | Provenance | Not described | |
| (Ipsos New Zealand, 2014) | Papaya | Retailer (market) | Fruit is assumed to be more natural – no chemical/ripening retardants | Production | Not described | |
| (Ekman et al., 2014) | Fruit and vegetables | Retailer (market) | Straight from the farm | Production, provenance | Not described | |

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|-----------------------------------|----------------------|-------------------|--------------------------|------------------------|---------------|--|
| (Henryks and Pearson, 2010) | Fruit and vegetables | Retailer (market) | Local, organic | Production, provenance | Not described | |
| (Woodley and Pipicella, 2014) | Vegetables | Retailer (market) | Fresher | Quality assessment | Not described | |
| (Ipsos New Zealand, 2014) | Papaya | Retailer (market) | Fresh | Quality assessment | Not described | |
| (Witham and Colmar Brunton, 2016) | Vegetables | Retailer (market) | Fresh | Quality assessment | Not described | |
| (Ipsos New Zealand, 2014) | Papaya | Retailer (market) | Cheaper than supermarket | Value assessment | Not described | |

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|-----------------------------------|------------|-------------------|------------------------------------------------------------------------|----------------------------|---------------|--|
| (Woodley and Pipicella, 2014) | Vegetables | Retailer (market) | Cheaper than other retailers | Value assessment | Not described | |
| (Woodley and Pipicella, 2014) | Vegetables | Retailer (market) | Increases waste due to only offering large or bulk portions | Waste | Not described | |
| (Witham and Colmar Brunton, 2016) | Vegetables | Retailer (online) | Sceptical about freshness, quality | Quality assessment | Not described | |
| (Batt and Sadler, 1998) | Apple | Label | Do not taste better, look better or store better than unlabelled fruit | Quality, eating experience | Not described | |
| (Batt and Sadler, 1998) | Apple | Label | Does not make purchase decision any easier, does not add any value | Convenience, value | Not described | |

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|------------------------------------|----------------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|---------------|--|
| (Hamblin and Colmar Brunton, 2020) | Nashi pear | Label (descriptive) | Helpful | | Not described | |
| (Batt and Sadler, 1998) | Apple | Label | 57% consumers find a problem with labels – 30% find labels annoying, 10% believe label poses health risk, 7% find labels hard to peel off, 7% believe labels are bad for environment, 6% concerned about adhesive residues remaining after label is removed | Health, convenience, environment | Not described | |
| (Ekman et al., 2014) | Fruit and vegetables | Label - heart foundation tick | Assumed producer has paid for label, untrustworthy, | Trust | Not described | |

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|------------------------|----------------------|-------------------------------|--------------------------------------------------------|-------|---------------|--|
| | | label/low GI symbol | marketing ploy, not much value | | | |
| (McDougall, 2012) | Lettuce | Label - heart foundation tick | Assumed produce has paid for tick, untrustworthy | Trust | Not described | |
| (Pearson, 2001) | Fruit and vegetables | Claim – organic | Untrustworthy – can't guarantee food is pesticide free | Trust | Not described | |
| (Colmar Brunton, 2014) | Vegetables | Claim – superfood | Expensive | Cost | Not described | |

Australian and New Zealander people's perceptions of experience attributes

| Citation | Product | Attribute | Category | Perception | Perception category | Formed through | Influenced by |
|-----------------------------------------|---------|------------------|------------|-----------------------------------------------|---------------------|----------------|----------------------------------------------------------|
| (FiftyFive5 and Hort Innovation, 2020a) | Apple | Floury texture | Experience | Sitting on the shelf for too long, less fresh | Freshness, storage | Not described | |
| (FiftyFive5 and Hort Innovation, 2020a) | Apple | Crunchy texture | Experience | Fresh | Freshness | Not described | Individual factors - 'pragmatic foodie, young family' |
| (FiftyFive5 and Hort Innovation, 2020a) | Apple | Tangy aftertaste | Experience | Refreshing | Eating experience | Not described | Individual factors - 'pragmatic foodie, young family' |
| (FiftyFive5 and Hort | Apple | Tangy aftertaste | Experience | Cleans teeth | Health | Not described | Individual factors |

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|---------------------------------|--------------|-----------------------------|------------|-----------------------------------------------------------------------------------------------|----------------------|------------------|-----------------------------------------------------------|
| Innovation, 2020a) | | | | | | | - 'pragmatic foodie, young family' |
| (Henderson et al., 2012) | Sweet potato | Sweet taste | Experience | Assumed to be sugary and hence unhealthy | Nutrition, health | Not described | Individual factors - Past experience |
| (Ipsos New Zealand, 2014) | Papaya | 'Perfect taste' | Experience | GMO | Production | Not described | Individual factors - irregular eaters of papaya |
| (Kirchhoff et al., 2011) | Vegetables | 'good taste and texture' | Experience | Enjoyable eating experience - maintain emotional wellbeing - maintain active life | Health | Not described | Context - discussing health |

Australian and New Zealander people's perceptions of credence attributes

| Citation | Product | Attribute | Category | Perception | Perception category | Formed through | Influenced by |
|--------------------------|--------------|-----------------------------------|--------------------|------------------------------------------------------------|---------------------|----------------|-------------------------------------------------------|
| (Henderson et al., 2012) | Sweet potato | Low carbohydrate | Credence attribute | Associated with weight control | Health | Not described | Individual factors - women and younger demographic |
| (Wood et al., 2017) | Potato | Carbohydrate content | Credence attribute | Bad for health | Health | Not described | |
| (Henderson et al., 2012) | Sweet potato | Fibre | Credence attribute | Healthier | Health | Not described | Individual factors - Female, hx bowel cancer |
| Kirchhoff 2011 | Vegetables | Fibre | Credence attribute | Avoid constipation, avoid chronic disease → live longer | Health | Not described | Context - Discussing health |
| (Henderson et al., 2012) | Sweet potato | Vitamins, low GI beta-carotene | Credence attribute | Unique | | Not described | |

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|--------------------------|--------------|---------------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (Kirchhoff et al., 2011) | Vegetables | Source of vitamins and minerals | Credence attribute | Organs function properly, boosts immune system, avoid illness, maintains energy and vitality → maintain active life → enjoy life | Health | Not described | Context <ul style="list-style-type: none"> - Discussing health Individual factors <ul style="list-style-type: none"> - Higher than average veg consumption - mostly female |
| (Henderson et al., 2012) | Sweet potato | Low gi | Credence attribute | Satisfying | Eating experience | Not described | |
| (Henderson et al., 2012) | Sweet potato | Low gi, vitamins | Credence attribute | Reinforces consumer is doing right thing | | Not described | |
| (Henderson et al., 2012) | Sweet potato | Low GI | Credence attribute | Reduces guilt around eating | | Not described | Individual factors <ul style="list-style-type: none"> - Female |

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|--------------------------|----------------------|------------------------|--------------------|-------------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------|----------------------------------------|
| (Kirchhoff et al., 2011) | Vegetables | High nutritional value | Credence attribute | Avoid illness, maintain energy and vitality → maintain active life | Health | Not described | Context - discussing health |
| (Kirchhoff et al., 2011) | Vegetables | Absence of fat | Credence attribute | Avoid putting on weight, maintain physical wellbeing, avoid chronic disease → live longer | Health | Not described | Context - discussing health |
| (Makhal et al., 2020a) | Fruit and vegetables | Home-grown | Credence attribute | Superior taste and freshness to store-bought even if suboptimal in appearance | Eating experience | Past experience growing and eating home-grown produce | Individual factors - Children 8-9yo |
| (Kent et al., 2020) | Fruit and vegetables | Regionally grown | Credence attribute | Available at farmers markets | Procurement | Not described | |

| | | | | | | | |
|-----------------------------------------|----------------------|------------------|--------------------|----------------------------------------------|--------------------|---------------|---------------------------------------------------------------------|
| (Kent et al., 2020) | Fruit and vegetables | Regionally grown | Credence attribute | Grown within specific region | Production | Not described | |
| (FiftyFive5 and Hort Innovation, 2020a) | Apple | Locally grown | Credence attribute | Fresh | Quality | Not described | |
| (Godrich et al., 2019) | Fruit and vegetables | Regionally grown | Credence attribute | Fresh (97%) | Quality | Not described | Individual factors - Rural consumers |
| (Godrich et al., 2019) | Fruit and vegetables | Regionally grown | Credence attribute | Supports local farmers (94%)/community (91%) | Ethical purchasing | Not described | Individual factors - main household shoppers are likely to agree |
| (Godrich et al., 2019) | Fruit and vegetables | Regionally grown | Credence attribute | Expensive | Cost | Not described | |
| (FiftyFive5 and Hort) | Apple | Locally grown | Credence attribute | Recently picked | Production | Not described | |

| | | | | | | | |
|-----------------------------------------|----------------------|--------------------|--------------------|-------------------------------------------------------|--------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Innovation, 2020a) | | | | | | | |
| (FiftyFive5 and Hort Innovation, 2020b) | Fruit and vegetables | Grown in Australia | Credence attribute | Supports local farmers | Ethical purchasing | Not described | Context <ul style="list-style-type: none"> - Covid-19 - 2020 bushfires |
| (Colmar Brunton, 2014) | Vegetables | Grown in Australia | Credence attribute | Supports local farmers and broader Australian economy | Ethical purchasing | Not described | |
| (Hamblin and Colmar Brunton, 2020) | Nashi pear | Grown in Australia | Credence attribute | Supports local farmers | Ethical purchasing | Not described | |
| (Ekman et al., 2014) | Fruit and vegetables | Grown in Australia | Credence attribute | Supports local farmers | Ethical purchasing | Not described | Socio-cultural environment <ul style="list-style-type: none"> - Social pressure Individual factors <ul style="list-style-type: none"> - People who were more connected to |

| | | | | | | | |
|-----------------------------------|------------|--------------------|--------------------|------------------------------------------------------------------------------------------------|--------------------|---------------|------------------------------------------------------------------|
| | | | | | | | farmers were more supportive of farmers rights |
| (Ipsos New Zealand, 2014) | Papaya | Grown in NZ | Credence attribute | Supports local economy | Ethical purchasing | Not described | |
| (Colmar Brunton, 2014) | Vegetables | Grown in Australia | Credence attribute | Familiar production methods i.e. Without pollution, dangerous pesticides, genetic modification | Safety | Not described | |
| (Witham and Colmar Brunton, 2016) | Vegetables | Grown in Australia | Credence attribute | Safer, more trustworthy | Safety | Not described | Context - health scare around pre-packaged lettuce early 2016 |
| (Ipsos New Zealand, 2014) | Papaya | Grown in NZ | Credence attribute | Safer | Safety | Not described | Individual factors - NZ consumers |

| | | | | | | | |
|---------------------------|------------|--------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------|-------------|---------------|--------------------------------------|
| (Ipsos New Zealand, 2014) | Papaya | Grown in Australia | Credence attribute | Assumed to have food and productions standards similar to NZ – chemicals/pesticides and production techniques will be safe | Safety | Not described | Individual factors - NZ consumers |
| (Colmar Brunton, 2014) | Vegetables | Grown in Australia | Credence attribute | Reduced carbon footprint than importing | Environment | Not described | |
| (Ipsos New Zealand, 2014) | Papaya | Grown in NZ | Credence attribute | More expensive than imported fruit regardless of season | Cost | Not described | |
| (Ipsos New Zealand, 2014) | Papaya | Grown in Australia | Credence attribute | Produce will be cheap due to proximity between NZ and Australia | Cost | Not described | Individual factors - NZ consumers |

| | | | | | | | |
|------------------------------------|------------|--------------------|--------------------|---------------------------------------------------------------------------------|-------------------|---------------|--|
| (Olsen, 1999) | Tomato | Grown in Australia | Credence attribute | Not always fresh due to large distance transporting produce across country | Quality | Not described | |
| (Hamblin and Colmar Brunton, 2020) | Nashi pear | Grown in Australia | Credence attribute | Fresh | Quality | Not described | |
| (Colmar Brunton, 2014) | Vegetables | Grown in China | Credence attribute | Grown in contaminated soil, subject to unknown treatments *especially garlic | Safety | Not described | |
| (Ekman et al., 2014) | Garlic | Grown in China | Credence attribute | Tasteless | Eating experience | Not described | |

| | | | | | | | |
|------------------------------------|------------|--------------------------------------------------|--------------------|-------------------------------------------------------------------------------------------------------|-------------------|---------------|-----------------------------------------------|
| (Ekman et al., 2014) | Garlic | Grown in China | Credence attribute | Contaminated/subject to unnatural treatment | Safety | Not described | |
| (Hamblin and Colmar Brunton, 2020) | Nashi pear | Grown in China | Credence attribute | Quality standards not as strict | Safety/quality | Not described | Individual factors - Occasional nashi user |
| (Ipsos New Zealand, 2014) | Papaya | Grown in China/other large 'non-western' country | Credence attribute | Suboptimal food safety/handling standards (than NZ); subject to application of 'unapproved' chemicals | Safety | Not described | Individual factors - NZ consumers |
| (Ipsos New Zealand, 2014) | Papaya | Grown in small country e.g. Fiji | Credence attribute | Minimal use of chemical/organic | Safety/production | Not described | Individual factors - NZ consumers |

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|---------------------------|------------|----------------------------------|--------------------|---------------------------------------------------------------------------------------------------------|-------------------|--------------------------------------------|----------------------------------------------|
| (Ipsos New Zealand, 2014) | Papaya | Grown in small country e.g. Fiji | Credence attribute | From small, locally owned farm – supports people not companies | Ethical purchase | Not described | Individual factors - NZ consumers |
| (Ipsos New Zealand, 2014) | Papaya | Grown in small country e.g. Fiji | Credence attribute | Expected to taste better than Australian or Philippine fruit as they are native to climactic conditions | Eating experience | Not described | Individual factors - NZ consumers |
| (Ekman et al., 2014) | Oranges | Grown in the us | Credence attribute | Taste superior to locally grown (Australian) produce | Eating experience | Not described – alludes to past experience | |
| (Colmar Brunton, 2014) | Vegetables | Imported | Credence attribute | Bad for the environment due to carbon emissions from transport | Environment | Not described | Individual factors - Australian consumers |

| | | | | | | | |
|--------------------------------|----------------------|----------------------|--------------------|--------------------------------|-------------------|---------------|------------------------------------------------|
| (Mulcahy, 2012) | Fruit and vegetables | Production (organic) | Credence attribute | Tastes better | Eating experience | Not described | |
| (Batt and Giblett, 1999) | Fruit and vegetables | Production (organic) | Credence attribute | Tastes better | Eating experience | Not described | |
| (Pearson, 2001, Pearson, 2010) | Fruit and vegetables | Production (organic) | Credence attribute | Superior taste | Eating experience | Not described | Individual factors - Organic buyers |
| (Mulcahy, 2012) | Fruit and vegetables | Production (organic) | Credence attribute | Over-priced | Cost | Not described | |
| (Ipsos New Zealand, 2014) | Papaya | Production (organic) | Credence attribute | Expensive | Cost | Not described | |
| (Pearson, 2001, | Fruit and vegetables | Production (organic) | Credence attribute | Higher price than conventional | Cost | Not described | Individual factors - Organic food purchaser |

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|-----------------------------|----------------------|----------------------|--------------------|----------------------------------------------------|---------------|---------------|---------------------------|
| Pearson, 2010) | | | | | | | |
| (Batt and Giblett, 1999) | Fruit and vegetables | Production (organic) | Credence attribute | Higher price than conventional (70%) | Cost | Not described | |
| (Ekman et al., 2014) | Fruit and vegetables | Production (organic) | Credence attribute | Expensive, “rip-off” | Cost | Not described | |
| (Olsen, 1999) | Fruit and vegetables | Production (organic) | Credence attribute | Cost is too high for family use | Cost | Not described | Context - family meals |
| (Mulcahy, 2012) | Fruit and vegetables | Production (organic) | Credence attribute | Looks less appealing - more blemishes/insect bites | Visual appeal | Not described | |
| (Henryks and Pearson, 2010) | Fruit and vegetables | Production (organic) | Credence attribute | Looks less perfect than conventional produce | Visual appeal | Not described | |

| | | | | | | | |
|-----------------------------------|----------------------|----------------------|--------------------|------------------------------------------------------------------------------------|---------------|---------------|----------------------------------------|
| (Olsen, 1999) | Tomatoes | Production (organic) | Credence attribute | Looks less perfect than conventional produce – limp/'holey' | Visual appeal | Not described | |
| (Ekman et al., 2014) | Fruit and vegetables | Production (organic) | Credence attribute | Grown without sprays/chemicals | Production | Not described | |
| (Pearson, 2001, Pearson, 2010) | Fruit and vegetables | Production (organic) | Credence attribute | Grown without chemicals (89%) | Production | Not described | Individual factors - organic buyers |
| (Witham and Colmar Brunton, 2016) | Vegetables | Production (organic) | Credence attribute | Not altered synthetically and genetically with pesticides, hormones or antibiotics | Production | Not described | |
| (Pearson, 2001, | Fruit and vegetables | Production (organic) | Credence attribute | Fresher | Quality | Not described | Individual factors - organic buyers |

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|--------------------------------------------|-------------------------|-------------------------|-----------------------|---------------------------------------------------------------|------------------|------------------|----------------|
| Pearson, 2010) | | | | | | | |
| (Witham and Colmar Brunton, 2016) | Fruit and vegetables | Production (organic) | Credence attribute | Better quality than nonorganic (34%) | Quality | Not described | |
| (Mulcahy, 2012) | Fruit and vegetables | Production (organic) | Credence attribute | Untrustworthy – suspicion about if it really is organic | Trust | Not described | |
| (Ekman et al., 2014) | Fruit and vegetables | Production (organic) | Credence attribute | Untrustworthy – suspicion about if it really is organic | Trust | Not described | |
| (Ipsos New Zealand, 2014) | Papaya | Production (organic) | Credence attribute | Support local or small producers | Ethical purchase | Not described | |
| (Ekman et al., 2014) | Fruit and vegetables | Production (organic) | Credence attribute | Better for the environment | Environment | Not described | Organic buyers |

| | | | | | | | |
|--------------------------|----------------------|--------------------------------|--------------------|----------------------------------------|--------------------|---------------|----------------|
| (Pearson, 2001) | Fruit and vegetables | Production (organic) | Credence attribute | Better for the environment | Environment | | |
| (Batt and Giblett, 1999) | Fruit and vegetables | Production (organic) | Credence attribute | Better nutritional value | Nutrition | Not described | |
| (Ekman et al., 2014) | Fruit and vegetables | Production (organic) | Credence attribute | Better for personal health | Health | Not described | Organic buyers |
| (Batt and Giblett, 1999) | Fruit and vegetables | Production (organic) | Credence attribute | Better for personal health | Health | Not described | |
| (Pearson, 2010) | Fruit and vegetables | Production (organic) | Credence attribute | More healthy | Health | Not described | Organic buyers |
| (Mulcahy, 2012) | Fruit and vegetables | Pest management (chemical use) | Credence attribute | Harmful to personal health (77%) | Health | Not described | |
| (Mulcahy, 2012) | Fruit and vegetables | Pest management (chemical use) | Credence attribute | Makes farming viable, increases yields | Production, belief | Not described | |

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|----------------------------------|----------------------|--------------------------------|--------------------|-------------------------------------------------------------------------------------|----------------------------|---------------|---------------------------------------|
| (Mulcahy, 2012) | Fruit and vegetables | Pest management (chemical use) | Credence attribute | Assumption chemicals are safe if currently in use in Australia | Safety, trust | Not described | |
| (Mulcahy, 2012) | Fruit and vegetables | Pest management (chemical use) | Credence attribute | Dipping produce in chemicals results in excess chemical residue compared with spray | Health, safety, production | Not described | |
| (Richardson-Harman et al., 1998) | Fruit and vegetables | Pest management (chemical use) | Credence attribute | Known risk, associated with harmful effects and low benefits | Health, safety | Not described | |
| (Olsen, 1999) | Fruit and vegetables | Pest management (chemical use) | Credence attribute | Associated with cancer | Health | Not described | Particularly relevant for young women |

| | | | | | | | |
|--------------------------------|----------------------|------------------------------------|--------------------|------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------|--|
| Richardson-Harman, 1998 #1329} | Fruit and vegetables | Production (fertiliser use) | Credence attribute | Less harmful and higher benefits than pesticide use | Health, safety | Not described | |
| (Ekman et al., 2014) | Fruit and vegetables | Production (hydroponically grown) | Credence attribute | Unnatural, potentially injected with unknown substance to make produce grown larger and faster | Trust, safety | Not described | |
| (Olsen, 1999) | Tomato | Production (hydroponically grown) | Credence attribute | Better flavour, easier to cut | Eating experience, convenience | Not described – past experience alluded to | |
| (Batt and Lim, 1999) | Fruit and vegetables | Production (hydropionically grown) | Credence attribute | Superior taste (39%), better quality (15%) (compared to conventional) | Eating experience | Not described | |

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|----------------------------------|----------------------|-----------------------------------|--------------------|------------------------------------------------------------------------|---------------|---------------|--|
| (Batt and Lim, 1999) | Fruit and vegetables | Production (hydroponically grown) | Credence attribute | Superior appearance (23%) (compared to conventional) | Visual appeal | Not described | |
| (Batt and Lim, 1999) | Fruit and vegetables | Production (hydroponically grown) | Credence attribute | High price (33%) | Cost | Not described | |
| (Batt and Lim, 1999) | Fruit and vegetables | Production (hydroponically grown) | Credence attribute | Less pesticides (32%), more productive (18%), artificially grown (14%) | Production | Not described | |
| (Batt and Lim, 1999) | Fruit and vegetables | Production (hydroponically grown) | Credence attribute | More healthy (21%) | Health | Not described | |
| (Richardson-Harman et al., 1998) | Fruit and vegetables | Production (genetic modification) | Credence attribute | Lower risk, higher benefit than irradiation | Safety? | Not described | |

| | | | | | | | |
|---------------|----------------------|----------------------------------|--------------------|--------------------------|-------|---------------|--|
| (Olsen, 1999) | Fruit and vegetables | Production (genetic engineering) | Credence attribute | Unnatural, untrustworthy | Trust | Not described | |
|---------------|----------------------|----------------------------------|--------------------|--------------------------|-------|---------------|--|

Australian and New Zealander people's perception of miscellaneous fruit and vegetable characteristics

| Citation | Product | Cue | Perception | Perception category | Formed through | Influenced by |
|-----------------------------------|------------|----------|------------------------|---------------------|----------------|---------------|
| (Ipsos New Zealand, 2014) | Papaya | Tropical | Exclusive | Ideal/belief | Not described | |
| (Witham and Colmar Brunton, 2016) | Vegetables | Exotic | Assumed to be imported | Provenance | Not described | |

| | | | | | | |
|---------------------------|----------------------|-------------------------|---------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------|------------------------------------|
| (Ipsos New Zealand, 2014) | Papaya | Seasonality | Associated with usage occasion as a 'treat' | Usage occasion | Not described | |
| (Ekman et al., 2014) | Fruit and vegetables | Seasonality (in season) | Tastes better | Eating experience | Not described | |
| (McKinna, 1980) | Fruit and vegetables | Seasonality (in season) | Performs better | Quality assessment | Not described | |
| (Kirchhoff et al., 2011) | Vegetables | Freshness | Indicates high nutritional value → maintains energy and vitality → maintains an active life | Nutrition | Not described | Context - discussing health |
| (Ipsos New Zealand, 2014) | Papaya | Ripeness (ripe) | Refreshing, juicy, sweet | Eating experience | Not described – past experience alluded to | |
| (Hamblin and Colmar | Nashi pear | Skin | Tough, bitter | Eating experience | Not described – past | |

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|-------------------------|------------|--------------|-----------------------------------------------------------------|--------------------|-----------------------------------------------------|--|
| Brunton, 2020) | | | | | experience alluded to | |
| (Ekman et al., 2014) | Vegetables | Smell | Presence of smell/scent indicates produce will taste good | Eating experience | Not described – past experience alluded to | |
| (Lea et al., 2005) | Apple | Cold storage | Artificially kept - reduces freshness | Quality assessment | Not described | |
| (Olsen, 1999) | Tomato | Cold storage | Reduces freshness | Quality assessment | Not described | |
| (McKinna, 1980) | Apple | Cold storage | Reduces freshness, at home life | Quality assessment | Not described | |

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APPENDIX 3: DATA COLLECTION GUIDES

Appendix 3a: Phase 1 data collection guide

Initial meeting, personal food system map task, guided conversation

Objectives:

1. Build rapport with participant.
2. Identify relevant fruit and vegetable locations to be explored in phase 2.
3. Develop shared understanding of participant's use of local fruit and vegetable retail food system between participant and researcher (Wilsey & Dover, 2014).
4. Identify other immediate environment influences on participant's fruit and vegetable purchase and use.
5. Explore participant's stated personal values and behaviours relating to fruit and vegetable purchase and use (Wilsey & Dover, 2014).
6. Gather contextual information for participant's individual case description.

Blue text = data from mapping activity

Black text = prompts for guided conversation with participant

Checklist/notes

Plain language summary/introduction to session

- Thank you for participating in this research
- Introduce self – dietitian background, now doing public health research, focussing on fruit and veg promotion
- Introduce project – looking at how our neighbourhood environments influence fruit and vegetable use, and how we can support people to buy and eat more fruit and veg (if they want to)
- This phase looks at the places you buy and use fruit and vegetables.
- I have brought some paper and pens with me and I am going to ask you to draw a map of the places that you buy fruit and vegetables from.
- I will talk to you while you do this and record what we say so I can write it up later.
- Once you have drawn your map, we will talk a bit more about why you use these places and what you think about fruit and vegetables in general.
- I have a list of questions that I will refer to as we go through. We will add more information to your map and I will also take notes as we go through.
- Can I please confirm that you are still willing to participate in this project?
- When you are answering questions, please be as truthful and honest as possible.
 - a. While I am a dietitian, I am not the ‘food police’ and I am not here to judge or assess your diet. There are no right or wrong answers and the purpose of this research is to understand YOUR story.
 - b. I am here to understand how you think about fruit and vegetables and work out some ways that we can better support you, and other people like you to achieve their goals around fruit and vegetables (if you have any).
 - c. If you are not comfortable answering any questions, please let me know and we can move on straight away. You are also free to withdraw from the project at any time.
- Do you have any questions or concerns?

Date

Consent Form

Participant Information

Name

Age

Gender

| | |
|--------------------------------------------------------------------------------------------------------------------------------------|--|
| Number of people in household and relationship to participant | |
| Main source of income | |
| Average annual income (household) | |
| Estimated hours spent in paid employment | |
| Estimated hours spent in unpaid employment | |
| Highest level of education (self) | |
| Postcode | |
| ^ | |
| ^ | |
| <p style="text-align: center;">***Start recording***</p> <p style="text-align: center;">Advise participant recording is starting</p> | |
| Mapping task (drawing) & Guided Conversation (researcher notes) | |
| What is fruit and veg to you? - What do you think of as fruit and veg (e.g. | |

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p>canned/fresh/frozen). Why?</p> <ul style="list-style-type: none"> - When do you eat fruit and veg? - How do you use fruit and veg? - Do you like/dislike fruit and veg? why? Can you tell me more about this? - What fruit and veg do you typically buy? - How do you decide what fruit and veg to buy? - How do you typically use fruit and veg, where? | |
| <p>How do you feel about your current fruit and veg purchase and use?</p> <ul style="list-style-type: none"> - What would you like to do - What do you feel you should do? - What gets in the way of you doing what you feel you should or would like to do? - How does this make you feel? - What do you know about dietary guidelines around fruit and veg? what do you think about this? | |
| <p>Relevant fruit and vegetable purchase locations for phase 2</p> | |

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p>Why do you choose to buy FV in these locations</p> <ul style="list-style-type: none"> - Why do you choose some locations over others? - What can you tell me about your neighbourhood environment – how does this influence your choice of fruit and veg location? - What can you tell me about the in store environment - does this influence your choice of location to buy from? - What emotions do you experience when you buy fruit and vegetable in these location(s) | |
| <p>What sort of FV do you buy in these locations</p> <ul style="list-style-type: none"> - How much is fresh/canned/frozen/dried etc - How do these locations influence the type of fruit and veg you choose to buy here? | |
| <p>Personal values and behaviours re FV purchase – any gaps/differences?</p> <p>**answers here to be added to phase 2 data collection guide**</p> | |
| <p>How do you think (location) influences your ability to buy the</p> | |

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p>FV you want or feel you should buy?</p> <ul style="list-style-type: none"> - Are there any specific promotions that influence you? - How does the store layout influence your ability to do this? - How do other people in the store influence you - How does lighting/signage/music influence you? | |
| <p>Other immediate environment influences on FV purchase (e.g. home, workplace)</p> | |
| <p>^</p> | |
| <p>^</p> | |
| <p>End recording</p> <p>Reimburse participant</p> <p>****Text Annabelle****</p> | |

^guided conversation topics and prompts will be added and adapted as necessary, to follow themes and concepts that are relevant to the participant

Appendix 3b: Phase 2 data collection guide

Fruit and vegetable shopping activity, guided conversation, store owner/manager checklist

Objectives:

1. Identify and explore aspects of fruit and vegetable retail locations that influence participants thoughts, feelings and behaviours about fruit and vegetable purchase and use.
 - a. Identify and explore differences between different types of fruit and vegetable retail locations (e.g. farmers market vs supermarket) and how this impacts participants' thoughts, feelings and behaviours relating to fruit and vegetable purchase and use.
2. Explore differences between participant's stated desires, obligations and behaviours relating to fruit and vegetable purchase and, their actual thoughts, feelings and behaviour(s) when purchasing fruit and vegetables.
 - a. Determine participants' perceived causes/drivers and consequences of differences between perceived desires, obligations, and behaviours and, their actual thoughts, feelings and behaviours when purchasing fruit and vegetables.
 - b. Identify and explore participants' suggested strategies and solutions to overcome or address differences between perceived desires, obligations and behaviours and, their actual thoughts, feelings and behaviours when purchasing fruit and vegetables.

Blue text – researcher observation

Black text – guided conversation prompts

Yellow highlight – external activities to be completed by researcher

Checklist / notes**Observation & Guided Conversation**

****Text Annabelle****

Plain language summary/introduction to session

- Thank you for participating in this research
- Introduce self – dietitian background, now doing public health research, focussing on fruit and veg promotion
- Introduce project – looking at how our neighbourhood environments influence fruit and vegetable use, and how we can support people to buy and eat more fruit and veg (if they want to)
- This phase looks at how you go about buying fruit and vegetables. Today we are looking at (location) which we discussed in phase 1.
- I am going to observe you while you shop and ask you questions about what you are doing and how you are feeling.
- I will be recording our conversation and will take some photos and notes as we go through.
- Can I please confirm that you are still willing to participate in this project?
- When you are answering questions, please be as truthful and honest as possible.
 - a. While I am a dietitian, I am not the ‘food police’ and I am not here to judge or assess your diet. There are no right or wrong answers and the purpose of this research is to understand YOUR story.
 - b. I am here to understand how you think about fruit and vegetables and work out some ways that we can better support you, and other people like you to achieve their goals around fruit and vegetables (if you have any).
 - c. If you are not comfortable answering any questions, please let me know and we can move on straight away. You are also free to withdraw from the project at any time.
- Do you have any questions or concerns?

Date

Participant Name

Consent form

Location

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Map/layout of retail location (drawn by researcher or supplied by store owner/manager) | |
| healthy stores checklist (separate document – appendix 5) | |
| Store owner interview – separate document/session | |
| <p>**** Start Recording ****</p> <p>Advise participant recording has started</p> | |
| How does the participant seem in this space compared to how they seemed in phase 1? e.g. relaxed, stressed, frantic - | |
| <p>How are they feeling in this space? What emotions are they experiencing?</p> <ul style="list-style-type: none"> - How do you feel in this store compared to other store/work/home - What emotions are you experiencing here? - How does this influence your fruit and vegetable buying? | |
| <p>Observations about placement of fruit and vegetables / display</p> <ul style="list-style-type: none"> - Smells - Colours - Accessories (baskets etc) - Lighting | |

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <ul style="list-style-type: none"> - Signage - Accessibility | |
| <p>Observations about fruit and vegetable promotion</p> <ul style="list-style-type: none"> - Price - Signage - Recipes - Video/audio displayed in store - Taste testing | |
| <p>What is the participant doing?</p> <p>How does this match/differ from what they discuss?</p> | |
| <p>What are they thinking about while selecting fruit or vegetables?</p> <ul style="list-style-type: none"> - How are you feeling right now? - What are you thinking about right now? - I notice you are (behaviour). Can you tell me a bit about what you're thinking while you're doing this? - Why have you chosen this (produce) specifically? - What do you think about this (promotion, sign, price tag, advertisement, display etc) - | |
| <p>Are there any differences between what they spoke about wanting to or actually doing and what they are doing now?</p> | |

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p>***add key findings from phase 1 as prompts prior to data collection***</p> <p>-</p> | |
| <p>What do they think about these (in)consistencies when raised?</p> <ul style="list-style-type: none"> - I noticed you've been doing (this) a lot but in our earlier discussions you have talked about (that). What do you think about this? How does that make you feel? - I can see you're doing (behaviour), can you tell me why? It seems (concept/value/idea/goal) is something that's really important to you, and you mentioned that very early on in this project. Can you tell me a bit more about (behaviour and concept) | |
| <p>What are the consequences of these (in)consistencies?</p> <ul style="list-style-type: none"> - What happens at home/work when you can/can't perform (behaviour)/achieve (goal) - How do you feel when you can/can't perform (behaviour)/achieve (goal) | |
| <p>What are the causes or drivers of these (in)consistencies?</p> <ul style="list-style-type: none"> - How does your family/workplace/ | |

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| neighbourhood/store influence this? | |
| <p>What do they or wish they could do to address these (in)consistencies?</p> <ul style="list-style-type: none"> - What do you think could stop or reduce this from happening - What would help you to perform (behaviour)/achieve (goal) - What do you see as the solution to these inconsistencies? - What needs to change to address these inconsistencies? | |
| ^ | |
| ^ | |
| ^ | |
| <p>End recording</p> <p>Reimburse participants</p> <p>****Text Annabelle****</p> | |

^guided conversation and observation topics will be added and adapted as necessary, to follow themes and concepts that are relevant to the participant and the location that they are operating within.

Appendix 3c: data collection guide phase 2 - Healthy Store Checklist

*** The tool supplied in this appendix was extracted from the sample provided in: Jaenke, R., van den Boogaard, C., McMahon, E., & Brimblecombe, J. (2021). Development and pilot of a tool to measure the healthiness of the in-store food environment. *Public health nutrition*, 24(2), 243–252. <https://doi.org/10.1017/S1368980020002025>. This document was used to facilitate researcher observations in research Phase 2. Assessments of the healthiness of the retail environment was not undertaken through the use of this tool or at any stage in the research project, only the ‘fruit and vegetable’ sample from the tool was utilised.

Aim:

The aim of this tool is to enable an overview of a store’s healthiness taking into consideration: the availability of healthier products, their placement and promotion, as well as limiting availability and activity around less healthy choices

Contents & Instructions

Observational checklist

The 4 P’s

Product

- Consider multiple locations in the store, e.g. fridges, front of store, checkout
- Only consider what is available at the time of completing the tool
- Discussion around usual product availability can be noted at the end

Placement

- Consider the main section as well as any displays

Price

- Refers to price promotion: Sales, discounts, deals, specials that are visibly advertised
- Does not include regular everyday price tickets inserted into shelf stripping
- Does not include pricing policy (i.e. subsidies) unless visibly advertised in-store
- Does not include markdowns (e.g. for “going out-of-date” products) unless there is associated promotion (e.g. clearance display, signage)

Promotion

- Refers to promotional materials or activities NOT relating to price
- Includes posters, signage, ticketing, recipe cards, give-aways and demonstrations
- May include promotional material placed separately from the promoted product (e.g. poster promoting water in the fruit and vegetable section)
- Also includes distributor branding e.g. branded fridges, ice-cream freezer, other displays. Does not include price promotions

1. Fruit & Vegetables

| | Product availability Check fridges, shelves, front of store, checkout | Placement Consider main section and displays | Price | Promotional material or activity |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Fresh fruit | Loose fruit (well stocked)..... Y <input type="checkbox"/> N <input type="checkbox"/> Pre-cut fruit..... Y <input type="checkbox"/> N <input type="checkbox"/> Fruit packs..... Y <input type="checkbox"/> N <input type="checkbox"/> | Visible on entering store. Y <input type="checkbox"/> N <input type="checkbox"/> At or near checkout..... Y <input type="checkbox"/> N <input type="checkbox"/> Well-presented..... Y <input type="checkbox"/> N <input type="checkbox"/> <i>Junk-food in fruit section*</i> Y <input type="checkbox"/> N <input type="checkbox"/> | Is there advertised price promotion on fruit and/or vegetables?..... Y <input type="checkbox"/> N <input type="checkbox"/> Type of price promotion (discounts, deals etc): | Is there promotional material or activity on fruit and/or vegetables?.. Y <input type="checkbox"/> N <input type="checkbox"/> Type of promotion (displays, posters, shelf labels etc): |
| Fresh vegetables | Loose veggies (well stocked)... Y <input type="checkbox"/> N <input type="checkbox"/> Pre-cut vegetables..... Y <input type="checkbox"/> N <input type="checkbox"/> Soup/salad/veg packs..... Y <input type="checkbox"/> N <input type="checkbox"/> | Visible on entering store. Y <input type="checkbox"/> N <input type="checkbox"/> At or near checkout Y <input type="checkbox"/> N <input type="checkbox"/> Well-presented..... Y <input type="checkbox"/> N <input type="checkbox"/> <i>Junk-food in vegetable section*</i> Y <input type="checkbox"/> N <input type="checkbox"/> | Is the price promotion visible/easy to see?..... Y <input type="checkbox"/> N <input type="checkbox"/> | Does the promotion stand out?..... Y <input type="checkbox"/> N <input type="checkbox"/> |
| Frozen fruit and vegetables | Frozen vegetables (well stocked and other than potato chips)... Y <input type="checkbox"/> N <input type="checkbox"/> Frozen fruit..... Y <input type="checkbox"/> N <input type="checkbox"/> | Easy to find..... Y <input type="checkbox"/> N <input type="checkbox"/> At eye level/arm's reach. Y <input type="checkbox"/> N <input type="checkbox"/> | | |
| Fruit: Canned/dried | Tinned fruit in natural juice (well stocked) Y <input type="checkbox"/> N <input type="checkbox"/> Dried fruit (no added sugar/salt)... Y <input type="checkbox"/> N <input type="checkbox"/> | Easy to find..... Y <input type="checkbox"/> N <input type="checkbox"/> At eye level/arm's reach. Y <input type="checkbox"/> N <input type="checkbox"/> | | |
| Vegetables: Canned/dried | Tinned vegetables (well stocked)..... Y <input type="checkbox"/> N <input type="checkbox"/> Legumes (e.g. 4 bean mix, kidney) Y <input type="checkbox"/> N <input type="checkbox"/> | Easy to find..... Y <input type="checkbox"/> N <input type="checkbox"/> At eye level/arm's reach. Y <input type="checkbox"/> N <input type="checkbox"/> | | |

| | | | |
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Appendix 3d: Phase 3 data collection guide

Home observation task, guided conversation, household member interview

Objectives:

1. Expand on phase 1 and 2 findings to increase the depth of understanding relating to participants perceived consequences, causes/drivers and strategies to address differences between what they want or feel they should do and what they actually think, feel and do when purchasing and using fruit and vegetables
2. Determine how the home environment, if at all, influences fruit and vegetable purchase and use
 - a. Determine how household members influence fruit and vegetable purchase and use
 - b. Determine how fruit and vegetable purchaser's decisions and behaviour influence household member fruit and vegetable use
3. Provide participants with an opportunity to reflect on their involvement in the project so far and provide additional information where they feel it is relevant or necessary

Blue text = data from observation

Black text = data from guided conversation

Checklist/notes

Observation & Guided Conversation

Plain language summary/introduction to session

- Thank you for participating in this research
- Introduce self – dietitian background, now doing public health research, focussing on fruit and veg promotion
- Introduce project – looking at how our neighbourhood environments influence fruit and vegetable use, and how we can support people to buy and eat more fruit and veg (if they want to)
- This phase looks at how you think about and use fruit and vegetables at home
- I am going to watch you doing (activity – likely making shopping list/putting groceries/preparing a meal or a combination)
- I will talk to you while you do this and record what we say so I can write it up later.
- I have a list of questions that I will refer to as we go through. I will take notes and photos throughout the session also.
- After your conversation, I will talk to (household member(s)). I have a list of questions for them also.
- Can I please confirm that you are still willing to participate in this project?
- When you are answering questions, please be as truthful and honest as possible.
 - a. While I am a dietitian, I am not the ‘food police’ and I am not here to judge or assess your diet. There are no right or wrong answers and the purpose of this research is to understand YOUR story.
 - b. I am here to understand how you think about fruit and vegetables and work out some ways that we can better support you, and other people like you to achieve their goals around fruit and vegetables (if you have any).
 - c. If you are not comfortable answering any questions, please let me know and we can move on straight away. You are also free to withdraw from the project at any time.
- Do you have any questions or concerns?

Date

Participant Name

Consent form

Who present

Time of day

| | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Activities (e.g. meal prep, shopping list, putting groceries away) | |
| <p>****start recording****</p> <p>Advise participant recording is starting</p> | |
| <p>Who is responsible for what in the household regarding fruit and veg?</p> <ul style="list-style-type: none"> - How do you feel about these role divisions? - What is your role and responsibility regarding fruit and vegetable purchase and use – how do you feel about this? | |
| <p>What does the participant do with the FV when at home/other relevant location</p> <ul style="list-style-type: none"> - How is the purchased FV used? - Did they get all the ingredients they wanted (FV)? - What trade-offs do they make (if any) and why? - Are there any signs of frustration, satisfaction etc? | |
| <p>What are the participants thoughts/feelings while performing these activities?</p> <ul style="list-style-type: none"> - What are you thinking right now? - How are you feeling right now? | |

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| How does the participant seem in this environment compared to how they seemed in the retail environment (e.g. more relaxed, more stressed) | |
| <p>Do they feel any different now to how they did earlier? Why/why not?</p> <ul style="list-style-type: none"> - Do you feel any different now to how you felt when we were shopping/doing the map? How is it different? Why do you think this is? | |
| <p>Are any other household members present? If so – who?</p> <p>Does the other household member(s) seem to influence FV purchase or use/ how?</p> | |
| <p>How do you feel other household members influence your ability to purchase and use FV in ways you want or feel you should?</p> <ul style="list-style-type: none"> - How do you cater to your preferences vs theirs? - Do you have similar preferences? - Have you adapted or changed your preferences to suit theirs? How? Why? - How do children influence your purchase/use of FV – is this the same or different to | |

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p>other adults? Why do you think this is?</p> <ul style="list-style-type: none"> - Do they influence purchase and use the same way or different? How? Can you tell me more about this? - What do you think they want you to do or feel you should do? | |
| <p>Do you have any further ideas, thoughts or comments about topics discussed in other phases?</p> <ul style="list-style-type: none"> - Store environment - Neighbourhood environment - Home environment - Household members - Behaviours - Preferences, attitudes towards FV - Solutions/strategies to increase FV purchase/use/consumption? | |
| <p>Anything else you would like to talk about relating to FV purchase and use?</p> | |
| <p>^</p> | |
| <p>^</p> | |
| <p>Household Member semi-structured interview/guided conversation</p> <p>Plain language summary/introduction to session</p> <ul style="list-style-type: none"> • Thank you for participating in this research • Introduce self – dietitian background, now doing public health research, focussing on fruit and veg promotion • Introduce project – looking at how our neighbourhood environments influence fruit and vegetable use, and how we can support people to buy and eat more fruit and veg (if they want to) | |

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <ul style="list-style-type: none"> • I am going to ask you some questions about how you think about and use fruit and vegetables. I will be recording our conversation and may take some notes and photos if relevant. • Can I please confirm that you are still willing to participate in this project? • When you are answering questions, please be as truthful and honest as possible. <ul style="list-style-type: none"> a. While I am a dietitian, I am not the 'food police' and I am not here to judge or assess your diet. There are no right or wrong answers and the purpose of this research is to understand YOUR story. b. I am here to understand how you think about fruit and vegetables and work out some ways that we can better support you, and other people like you to achieve their goals around fruit and vegetables (if you have any). c. If you are not comfortable answering any questions, please let me know and we can move on straight away. You are also free to withdraw from the project at any time. • Do you have any questions or concerns? | |
| Name | |
| Date | |
| Age | |
| Relationship to main food purchaser | |
| What is fruit and veg to you? <ul style="list-style-type: none"> - What do you think of as fruit and veg (e.g. canned/fresh/frozen). Why? - When do you eat fruit and veg? - How do you use fruit and veg? - Do you like/dislike fruit and veg? why? Can you tell me more about this? - What fruit and veg do you typically buy? - How do you decide what fruit and veg to buy? - How do you typically use fruit and veg, where? | |

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <p>In what ways are you involved in fruit and vegetable purchase and use in your household?</p> <ul style="list-style-type: none"> - How do you feel about these role divisions? - What is your role and responsibility regarding fruit and vegetable purchase and use – how do you feel about this? | |
| <p>What do you think about the location(s) (main food purchaser) buys fruit and vegetables from?</p> | |
| <p>How do you feel about your household's current fruit and veg purchase and use</p> <ul style="list-style-type: none"> - What would you like to do - What would you like food purchaser to do - What do you feel you should do? - What do you feel food purchaser should do - What gets in the way of you doing what you feel you should or would like to do? - What gets in the way of food purchaser doing what they should or you would like them to do - How does this make you feel? - What do you know about dietary guidelines around fruit and veg? what do you think about this? | |

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| How do you believe you influence fruit and vegetable purchasing for this household? | |
| How do you believe (main food purchaser)'s purchasing of fruit and vegetables influences the way(s) you use fruit and vegetables? | |
| How do you believe children (if relevant) influence fruit and vegetable purchasing and use for this household? | |
| What do you think can be done to increase fruit and vegetable purchase and use for your family/neighbourhood? - Do you think this is important? Why/why not? | |
| Do you have any other thoughts or feelings about fruit and vegetable purchasing that you would like to share? | |
| * | |
| <p style="text-align: center;">End recording Reimburse participant(s)</p> | |

^guided conversation and observation topics will be added and adapted as necessary, to follow themes and concepts that are relevant to the participant

*Semi-structured interview script (household members) will be updated to incorporate relevant topics of interest identified through other phases of the research.

All changes made to guided conversation and interview scripts will be recorded and reported where relevant (e.g. in methods section of publication).

Appendix 3e: Phase 4 data collection guide

Name:

Starting date:

Age:

Mark, colour or fill one box for every serve of fruit and vegetable you ate every day for one week. If you had less than one serve, write the amount of a serve that you had (e.g. 1/4 , or 1/2) in the box, OR, only colour half or a quarter etc. of the box. If you had more serves than there are boxes, make a note on the document saying which day it was and how many serves you had (keep fruit and veg separate).

| | Fruit | | | | | | |
|-----------|------------|--|--|--|--|--|--|
| Monday | | | | | | | |
| Tuesday | | | | | | | |
| Wednesday | | | | | | | |
| Thursday | | | | | | | |
| Friday | | | | | | | |
| Saturday | | | | | | | |
| Sunday | | | | | | | |
| | Vegetables | | | | | | |
| Monday | | | | | | | |
| Tuesday | | | | | | | |
| Wednesday | | | | | | | |
| Thursday | | | | | | | |
| Friday | | | | | | | |
| Saturday | | | | | | | |
| Sunday | | | | | | | |

What is a serve of fruit?

A standard serve is about 150g (350kJ) or:

- 1 medium apple, banana, orange or pear
- 2 small apricots, kiwi fruits or plums
- 1 cup diced or canned fruit (no added sugar)

Or only occasionally:

- 125ml (½ cup) fruit juice (no added sugar)
- 30g dried fruit (for example, 4 dried apricot halves, 1½ tablespoons of sultanas)



What is a serve of vegetables*?

A standard serve is about 75g (100–350kJ) or:

- ½ cup cooked green or orange vegetables (for example, broccoli, spinach, carrots or pumpkin)
- ½ cup cooked dried or canned beans, peas or lentils
- 1 cup green leafy or raw salad vegetables
- ½ cup sweet corn
- ½ medium potato or other starchy vegetables (sweet potato, taro or cassava)
- 1 medium tomato



*With canned varieties, choose those with no added salt

Images from: <https://www.eatforhealth.gov.au/food-essentials/how-much-do-we-need-each-day/what-serve>

Pilot notes and outcomes

APPENDIX 4: PILOT OUTCOMES

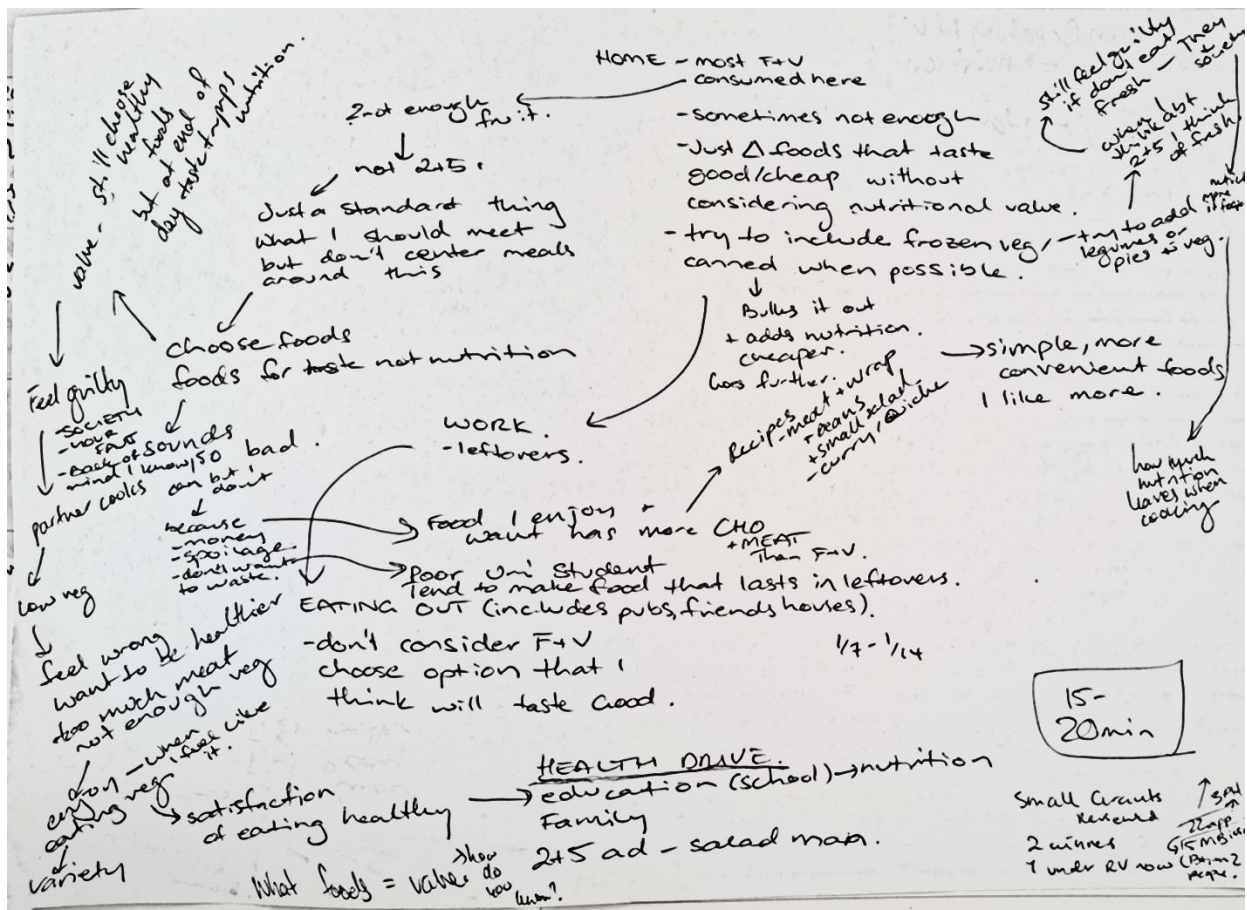
Pilot 1: SW

December, 2022

Participant known to researcher (relative)

Personal food system map only (focus on consumption, also did one for purchase)

Notes – from discussion about consumption areas map



Key findings and changes required

- Map is really useful for engaging participant in the research topic
 - o Really helpful to get them to think broader picture
 - o Locations discussed are very different for purchase vs consumption – e.g. work, home, eating out discussed for consumption; woolworths discussed for purchase

- SW was very forthcoming (other participants may not be), was really easy to prompt into her values and behaviours using the map.
- Would be helpful to annotate map with participant as I go through (use butchers paper, lots of colours) to build story then extract notes later.
- Audio record the session because a lot comes out all at once
- Allow minimum 30min to draw map and discuss

Pilot 2: KC

Karratha, 30.3.23; participant known to researcher (friend, colleague)

Phase 1 (map not completed, conversation only), phase 2 (main food purchaser and store checklist only), phase 3 (main food purchaser only)

Phase 1: KC

| Participant Information | |
|---------------------------------------------------------------|---------------|
| Date | 30.3.23 |
| Name | KC |
| Age | 28 |
| Gender | F |
| Number of people in household and relationship to participant | 1 |
| Main source of income | Redacted |
| Average annual income (household) | Redacted |
| Estimated hours spent in paid employment | 38 weekly |
| Estimated hours spent in unpaid employment | Not discussed |
| Highest level of education (self) | Masters |
| Postcode | Karratha |
| ^ | |

| | |
|----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ^ | |
| Mapping task (drawing) & Guided Conversation (researcher notes) | |
| What is fruit and veg to you? | <p>Jarred/canned NOT veg</p> <p>Most readily thinks of fresh veg</p> <p>If really thinking about it I guess frozen</p> <p>Dried fruit considered fruit</p> <p>Didn't discuss canned/frozen fruit specifically but does have frozen in house</p> |
| How do you feel about your current fruit and veg purchase and use | <p>Not much variety – very routine</p> <p>Inadequate intake overall but exceed fruit intake, especially dried. Enjoy fruit</p> <p>Veg less than 5 serves per day – could be doing better, not the healthiest. Trying to increase veg intake – ½ plate, usually uses frozen or pre-pack salad. Wants to be healthier bc veg is good for you (dietetics influence). Dislikes taste, has to add salt, therefore makes it unhealthy so not worth it</p> |
| Relevant fruit and vegetable purchase locations for phase 2 | Woolworths only – |
| Why do you choose to buy FV in these locations | <p>IGA is closer but woolworths cheaper</p> <p>Queries if spending fuel is worth it for cheaper food</p> <p>Coles right next to woolworths but chooses woolworths for everyday rewards/frequent flyer points – motive is desire to fly home (perth) to visit family. Also linked to fuel discount – saving money is good – very important</p> |
| What sort of FV do you buy in these locations | <p>All – as discussed earlier, mostly fresh fruit and veg, dried fruit, some frozen fruit. Salad packs (with dressing – only gets it because she likes the dressing), some salad veg (but rarely does this), occasionally steam pack veg but not currently doing this (too hot to eat cooked veg). Does buy canned/jarred (e.g. lentils, tomato) but doesn't consider these veg sources even when mostly veg (e.g. passata)</p> |
| Personal values and behaviours re FV purchase – any gaps/differences? | <p>Saving money is most important, influences FV through choosing cheapest variety (e.g. tomato), quality also very important – determines through visual appearance (no brown, no mould if in packet) but often buys imperfect lines (cheaper and larger packages); also aims for firm product (likes it to have no soft spots and feel hard – tomato)</p> <p>Feels that supply available influences ability to buy desired FV – if the store doesn't have what she wants she won't buy anything and won't find an alternative</p> |

| | |
|----------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Bad quality – as above, will go without intended FV if judged to be bad quality, won't find alternative |
| How do you think (location) influences your ability to buy the FV you want or feel you should buy? | <p>Price – fluctuates – specials, supply and season all influence ability to buy FV that aligns with price goals. Will troubleshoot or go without if these problems arise</p> <p>Location of store – cheaper so aligns with goals but further away so less convenient and worries about cost of fuel a little</p> <p>Frequent flyer/rewards card – incentive to buy due to booster points sales although doesn't feel that this really influences her much</p> |
| Other immediate environment influences on FV purchase (e.g. home, workplace) | Not discussed |

Phase 2: KC

| Observation & Guided Conversation | |
|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Date | 30.3.23 |
| Participant Name | KC |
| Location | Woolworths Karratha |
| Map/layout of retail location (drawn by researcher or supplied by store owner/manager) | Not completed |
| healthy stores checklist (separate document – appendix 5) | |
| Store owner questions (appendix 4) | Not completed |
| Observations about placement of fruit and vegetables / display | <p>Free fruit for kids at entrance – apples, bananas</p> <p>Specials at front and centre of FV section – see as soon as you walk into store</p> <p>Misters in fridges</p> <p>Signs/posters showing produce farmers (but KC doesn't notice)</p> |

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Observations about fruit and vegetable promotion</p> <ul style="list-style-type: none"> - Price - Signage - Recipes - Video/audio displayed in store - Taste testing | <p>Nectarines/plums on sale – wants these, always goes to the special display front and centre of store first</p> <p>Usually gets apples because they are hardy – pink lady preferred but settles for royal gala today as they are on sale and promoted front and centre of store</p> <p>doesn't use ripeness guides present in store</p> <p>will sometimes get pre-packaged fruits (further back in store) as they have more fruit in them but when questioned admits it's not really logical as could just get larger number from loose section (although lists specific number of fruits "10" to buy on shopping list). Admits she will eat more fruit if buying larger amount.</p> |
| <p>What is the participant doing?</p> | <p>Mostly checking firmness and price. Knows exactly where to go and where to look. Uses list as a strict guide. Interesting that on different shop she didn't have a list and reported feeling very lost/anxious/overwhelmed.</p> <p>Packaged salad – more expensive but likes the convenience. Feels better price for amount purchased – will sometimes try to select larger salad that costs same amount as smaller salad. Likes that they include a dressing but admits it would probably be quite easy and doable to add a dressing at home if she made a salad from scratch</p> |
| <p>What are they thinking about while selecting fruit or vegetables?</p> | <p>Sticks exactly to the list and is very specific about what she needs in the list (e.g. 10x fruit, bananas, tomato). Definitely is most concerned about cost and convenience, can see she is checking quality as she goes through, mostly by lightly squeezing the produce.</p> <p>Generally dislikes taste of veg hence preferring dressing. Will have to add salt if she uses single serve veg packs (frozen)</p> |
| <p>Are there any differences between what they spoke about wanting to or actually doing and what they are doing now?</p> | <p>Not really</p> |
| <p>What do they think about these (in)consistencies when raised?</p> | <p>N/A</p> |
| <p>What are the consequences of these (in)consistencies?</p> | <p>N/A</p> |

| | |
|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| What are the causes or drivers of these (in)consistencies? | n/a |
| What do they or wish they could do to address these (in)consistencies? | N/A |
| How does the participant seem in this space compared to how they seemed in phase 1? e.g. relaxed, stressed, frantic - | Pretty comfortable, no major change noticed |
| How are they feeling in this space? What emotions are they experiencing? | Enjoys food shopping so likes being here, very comfortable here Finds it exciting getting new foods but disgruntled if not done when planned i.e. only enjoys it if it's part of the routine (weds weekly shop) |

| Phase 3: KC Observation & Guided Conversation | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Date | 30.3.23 |
| Participant Name | KC |
| <p>What does the participant do with the FV when at home/other relevant location</p> <p>What happens when the participant prepares a meal?</p> <ul style="list-style-type: none"> - How is the purchased FV used? - Did they get all the ingredients they wanted (FV)? - What trade-offs do they make (if any) and why? - Are there any signs of frustration, satisfaction etc? | <p>Shopping list – checks fridge for what she has, specifies what and amount to buy</p> <p>Putting groceries away – stores all fresh in fridge. Doesn't perceive any issues with her home environment influencing her FV use beyond living alone. Got everything she intended to get. No disappointment noted with produce purchased. No trade-offs made. Seems normal, content with how the shop went.</p> |
| What are the participants thoughts/feelings while performing these activities? | Not explored. Very routine, didn't seem relevant |

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| How does the participant seem in this environment compared to how they seemed in the retail environment (e.g. more relaxed, more stressed) | Much the same. Comfortable, going about their business. Regular and routine in their behaviour |
| Do they feel any different now to how they did earlier? Why/why not? | Not specifically asked about |
| Are any other household members present? If so – who? Does the other household member(s) seem to influence FV purchase or use/ how? | No – friend visiting (me) – did buy more FV to account for my presence and preferences (e.g. bunch of bananas) but otherwise appeared completely normal and doing what she normally does for herself |
| How do they feel other household members influence their ability to purchase and use FV in ways they want or feel they should? | N/A lives alone - **Could have asked about when she shared previously? |
| Do they have any further ideas, thoughts or comments about | No |

| | |
|------------------------------------------------------------------------------|----|
| topics discussed in other phases? | |
| Anything else they would like to talk about relating to FV purchase and use? | No |
| Household Member semi-structured interview/guided conversation N/A | |

Reflexivity entry (Pilot, KC)

Participant: KC (PILOT)

Where: Phase 1) home, Phase 2) Woolworths Karratha, Phase 3) home

General reflection:

Are there any surprising, new, or stand-out findings from this participant/setting?

I didn't expect KC to be such a routinised shopper. I will have to consider purposefully selecting participants who represent diverse groups of people.

What do I think I 'know' from this participant

KC is a routine shopper. She likes to have a plan and follows it to a T

She does not deviate from her plan and she does this deliberately to ensure she saves money and buys healthy food

Her main priorities in the store are saving money and getting something that aligns with her idea of quality. This is usually done by visiting the sales display (front-centre of store), looking for the gold price promotions and lightly squeezing products to determine quality. She pays little attention to other things in the store including promotional materials and other people.

How do I think I 'know' it

I know these things from my observations and confirmation provided verbally by KC. I also know this because I know KC socially, though much of this could be based on assumptions due to my relationship with her.

At what point in the session did I arrive at this knowledge

I arrived at this knowledge when we were at the checkout at the end of the session, also during the shop I started to make this conclusion and recall commenting "you seem to be very routine and structured when shopping" to which she agreed.

Does this knowledge change or support my earlier assumptions or beliefs?

This knowledge challenges my earlier beliefs. I expected KC to be more influenced by the store environment. I was surprised by her use of plastic and statement that jarred and tinned vegetables are not counted as vegetables in her eyes. I was also surprised by how routine her behaviour was, I expected her to be more varied in her behaviour. I am unsure if this was a result of my being there.

Will this knowledge change the course of the research in terms of objectives methods line of inquiry? If so how?

This will not change the course of the research. I expect to find differences between different people. It has prompted me to add home observation of making a shopping list into my protocol. This could be done in phase 1, at the start of phase 2 or as an addit to phase 3. It best fits with phase three but the research phases may have to be non-sequential for this to make sense

How did I feel about the environment

I enjoyed seeing the differences in woolworths compared to my own regular store. I think I was more aware of promotional materials etc. than I normally am. I was feeling a bit awkward and flustered as it was difficult to write notes on everything that was happening while also actively shopping. People were watching us which made me a little bit concerned for how this will impact other participants. I think audio recording should help to alleviate

these issues as there will be less requirement for me to take notes as I talk with the participant. I might even take notes on my phone as this will seem more 'normal' and hopefully draw less attention from other shoppers.

What was my general mood

I generally felt a little bit anxious as this was the first pilot test. I was glad to be doing it with KC as she made me feel much more comfortable by assuring me that it was fine and she wasn't bothered by the inconvenience of the research. I was a little tired and stressed from having flown and driving to the airport that day however that will not be a regular occurrence for my data collection so I am not too worried about it.

How did this affect the questions asked/data collected

I definitely skipped over some questions and concepts – especially in phase 3. I think this was partly because I know KC so well but also because I was a bit flustered and stressed and didn't feel it was overly essential. I was also quite tired by this stage from a long day of travelling and then doing all three phases concurrently. I need to test the phases with someone I don't know so well to see how it really works in real-life. I think I should do this before submitting my ethics application if possible

What assumptions did I make about the participant(s)?

I assumed that KC would buy and use more vegetables than she does because she is a dietitian. When I spoke to her, I realised that she is more influenced by her living alone than her career. This is important and I need to make sure I don't make assumptions that affect my questioning too much when talking to participants. I also assumed that she would be more similar to myself when shopping which did not turn out to be the case.

What assumptions did I make about comments/responses to my questions?

I don't think I really made any assumptions about the comments/responses however I feel that if I reviewed an audio recording I might have more insight into this. I will ensure I do an audio-recording pilot.

What are my assumptions about the environment

I assumed the woolworths would have low quality produce being in Karratha. I was surprised to see such a nice display with misters for the fruit and vegetables. I was also surprised by the use of gold rather than yellow sale promotion labels. I found them much harder to read than the yellow usually used, though I did think it looked classier and more 'high-end'. I am curious to see how this plays out in other environments as KC still heavily relied on these labels even though they were harder to see and stood out less than others I have seen. I also assumed that the fruit and vegetable section would be larger than it was.

How did these assumptions affect or shape: the questions I asked, the interjections I made, my listening skills, and/or my behaviour?

I didn't ask any questions about the labels although I did comment that they were a different colour to what I was used to and KC didn't really react. I also didn't ask about the misters though I did comment on it and KC again didn't seem to phased. I don't want to guide participants too much because I want to understand what is truly relevant to them so commenting like this could be problematic. I think coming home after each activity and reflecting on the data will help me to identify relevant concepts to follow up on in the following phase.

How did my personal values, beliefs, life story, and/or social/economic status affect or shape: the questions I asked, the interjections I made, my listening skills, and/or my behaviour

I find this question hard to answer in this context because I think it was more my relationship with KC that influenced my behaviour than anything else. I did catch myself commenting on her use of plastic bags (she bagged 1 onion in a bag, which is something I believe to be wasteful). I did think about it at the time and would usually not comment in such a judgemental way but I figured because I know her it was different. I definitely should not do this with participants but I found it really interesting to explore how her values differed from my own. I know that for me reducing plastic waste is important but for her it is less of an issue. When I did comment she seemed to feel a bit guilty and responded with "oh yeah it's really bad, I shouldn't do this but I always do, it's such a habit". I would feel really

awful for making a participant feel guilty about what they are doing so I need to be aware of this and how it may affect my participants.

To what degree did my emotions or feelings for the participant(s) and the environment affect or shape: the questions I asked, the interjections I made, my listening skills, and/or my behaviour?

Hugely, my relationship with KC really affected the way I conducted my data collection. I need to explore how I operate in a setting where I do not know the participant so well.

How will my emotions or feelings for the participant(s) and environment affect the analytical process and my ability to draw valid interpretations from the data?

Hugely. I need to make sure I am being balanced in my interpretations and looking at the data with fresh eyes.

How did the physical setting/location of the research event alter how I related to the participant(s), and how the participant(s) related to me?

How did the physical setting/location impact data collection?

Talking to KC while at the checkout was difficult and awkward due to the layout of the self-service checkouts. The store attendant seemed uncomfortable that I was holding a device and taking notes while talking to KC

What were the logistical issues (e.g., in gaining access) that contributed to the “success” or weakness of the outcomes?

Key findings and changes to research design resulting from pilot (KC)

Phase 3:

- add observation and discussion around making a shopping list to phase 3 – was really helpful for getting insight into KC’s use of the store and management of FV purchase
- need to guide conversation with participant better (mostly influenced by doing all three phases in one session which fatigued me)
- separate phases if possible/suitable for participant

Phase 2:

- Draw less attention during shopping excursion. Attention from store attendants felt awkward although maybe more for me than the participant (need to check in second pilot)
- trial taking notes on phone instead of paper to seem more natural
- ask next participant if they felt awkward in store and if this influenced their reporting (KC said no but feel she is anomaly)
- reduce researcher burden during shopping activity –
- audio-recording shopping excursion will help here
- investigate environment prior to or after activity with participant
- multiple shopping excursions may be beneficial to see how behaviour changes with different events (e.g. not having shopping list, child present/not present)

General:

- determine influence of social relationship with participant. Pilot with someone I don't know so well to see how it works when I don't already have a social relationship with the participant
- guide questioning better.
- Having breaks between each activity/phase and reflecting on the data will help me to identify relevant concepts to follow up on in the next phase
- Expand prompts in data collection guide
- separate healthy stores checklist and questions for store owner – store owner questions are too general and not specific enough to fruit and vegetables. Have developed interview questions instead

APPENDIX 5: EQUIVALISED DISPOSABLE HOUSEHOLD INCOME (EDHI) CALCULATIONS

Calculating equivalised disposable household income (EDHI)

EDHI refers to the amount of disposable income households have left to spend after paying tax, according to the number of people living on that income. EDHI is adjusted by equivalence factors to standardise them for variations in household size and composition, while accounting for economies of scale that arise from sharing dwellings (Australian Bureau of Statistics, 2022). For example, 100K household income is required to stretch much further across a family of four than a single person household. The equivalising factors take this into account, providing an estimate of disposable income that can be realistically compared and considered for daily spending, such as fruit and vegetable purchase. The following steps detail how I calculated EDHI in this research project.

Step 1: Participants provide estimated gross (before tax) household income

Step 2: Gross household income entered into Australian Government income tax calculator (<https://moneysmart.gov.au/work-and-tax/income-tax-calculator#!focus=1>) to determine disposable income

Step 3: disposable income divided by equivalising factors (Australian Bureau of Statistics, 2022) to determine equivalised disposable household income (EDHI)

| Equivalising factors | |
|----------------------|-----|
| Lone person | 1 |
| Additional adult | 0.5 |
| Child under 15 years | 0.3 |

Step 4: EDHI compared to EDHI deciles and quintiles provided by Australian Bureau of Statistics (2019-2020: <https://www.abs.gov.au/statistics/economy/finance/household-income-and-wealth-australia/latest-release#data-downloads>)

| Income per week at top of selected percentiles (a) | 2019–20 | Simplified language used in this thesis |
|----------------------------------------------------|---------|-----------------------------------------|
| 10th (P10) | 475 | lowest |
| 20th (P20) | 583 | |
| 30th (P30) | 712 | second |
| 40th (P40) | 830 | |
| 50th (P50) | 959 | third |
| 60th (P60) | 1,118 | |
| 70th (P70) | 1,284 | fourth |
| 80th (P80) | 1,516 | |
| 90th (P90) | 1,903 | highest |

Example:

| Household | Household composition | Estimated Gross Income | Est disposable income (employment income only) | Equivalising factor | EDHI | EDHI weekly | EDHI decile 2019-2020 | EDHI Quintile |
|---------------|-----------------------|------------------------|------------------------------------------------|---------------------|----------|-------------|-----------------------|---------------|
| Leah & Connor | 2 adult, 2 children | \$130,000 | \$91,803 | 2.1 | \$43,715 | \$840 | 50th | 3rd |
| Ned & Eve | 2 adult | \$65,000 | \$51,028.00 | 1.5 | \$34,018 | \$ 654 | 30th | 2nd |

Australian Bureau of Statistics. (2022, 28/04/2022). *Household Income and Wealth, Australia*. Retrieved 15/11/23 from <https://www.abs.gov.au/statistics/economy/finance/household-income-and-wealth-australia/latest-release#low-middle-and-high-income-and-wealth-households>

APPENDIX 6: AI USE

Generative AI was used in editing stages of this thesis, to ensure that clear meaning was maintained throughout all chapters. Specifically I entered sections of text from Chapters 5-7 and asked Gemini AI what the key meaning of the chapter was. I then cross-checked this with my chapter summary to ensure that the meaning being extracted from my work by AI tools was consistent with the core concepts I was attempting to communicate. If the AI response was not consistent with my chapter summary, I revised my work independently to refine my key messages. I did not use generative AI in this secondary stage of revisions. All work presented in this thesis is my own original thinking and wording. An example of this process is provided below:

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prompt: “summarise the key messages in this chapter in less than 300 words.” *chapter 7 content copied and pasted into Gemini AI* | |
| Comparison | |
| Chapter summary: This chapter explored how participants’ fruit and vegetable practices were influenced by life course events and experiences. Childhood experiences were influential on preferences for fruit and vegetables, having both positive and negative influences on procurement and consumption into adulthood. Transitioning to adulthood initiated development of planning, preparation and procurement practices for many participants, despite initial challenges adapting to new demands of life such as full-time work and living independently. Early adulthood was particularly important for developing | Gemini response: This chapter, Chapter 7, explores how life course events and experiences influence fruit and vegetable use , building on previous chapters by integrating life course perspectives and social practice theory . The methodology involved inductive thematic analysis of participant data, followed by applying social practice theory and life-course concepts. This focused on how individuals developed skills and practices related to fruit and vegetable use throughout their lives. Key findings indicate that early childhood experiences are crucial for forming initial preferences. However, adult transitions |

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| <p>cooking skills and exploring different ways of incorporating fruit and vegetables into diets. Major life events such as having children, changing jobs, moving, and health concerns influenced the meanings participants attached to fruit and vegetable use, having both positive and negative influences on fruit and vegetable planning, procurement, preparation and eating. Becoming a parent led participants to value fruit and vegetables for health more highly, and often led to increased meal planning and preparation. Reduced time and income resulting from the addition of children, or alterations in employment often limited fruit and vegetable procurement and consumption and led participants to associate fruit and vegetable procurement with what 'should be done' rather than what they would 'like to do'. Adapting to a new environment reduced fruit and vegetable procurement and consumption in the short term, while participants attempted to 'familiarise' with new food retail and home spaces. Health concerns motivated participants to prioritise fruit and vegetable consumption, sometimes altering what and where they procured fruit and vegetables from. The findings from this chapter highlight the complex interplay of individual, social, and</p> | <p>significantly impact fruit and vegetable practices. These transitions include:</p> <ul style="list-style-type: none"> • Becoming a parent: This often shifts the meaning of fruit and vegetable intake, increasing focus on children's health and leading to more planning and shared household responsibilities. • Changes in employment: Increased income often leads to purchasing more enjoyable fruit and vegetables, while reduced income can lead to choosing cheaper options like frozen produce or sale items. • Relocation: Moving prompts adaptation to new food environments, affecting access to desired produce and requiring a "learning period" for new procurement methods. • Health and illness: Health concerns, either personal or within the family, often motivate increased fruit and vegetable consumption and can lead to changes in procurement sources (e.g., opting for delivery services or markets). Social media also plays a significant role in influencing choices based on health trends. |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| environmental factors that influence fruit and vegetable use over time. Findings suggest that there may be benefit in targeting specific practices of fruit and vegetable use, at specific life stages to increase fruit and vegetable use in Australia. | Overall, the chapter highlights the dynamic and adaptive nature of fruit and vegetable practices throughout an individual's life, shaped by a complex interplay of personal experiences, roles, resources, and environmental factors. |
| Changes made to this chapter based on AI output | None. |

Generative AI was also used to assist in developing subtitles for discussion sections 8.2.1-8.2.6. This involved copying the discussion content into Gemini AI, and asking it to suggest suitable titles. I then used these ideas to develop my own title and asked AI if my new proposed title would be a good fit. An example of this process is provided below:

| | |
|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Prompt: | suggest a good title for this text: *section 8.2.2 copied and pasted into Gemini AI* |
| Gemini response: | <p>Here are a few strong title suggestions for the text, playing on different aspects:</p> <p>Emphasizing Childhood and Lasting Impact:</p> <ul style="list-style-type: none"> • The Enduring Influence of Childhood: Shaping Adult Fruit and Vegetable Habits • Beyond Knowledge: How Early Experiences Dictate Fruit and Vegetable Consumption • Cultivating Lifelong Habits: The Foundational Role of Childhood in Fruit and Vegetable Use <p>Highlighting the Gap Between Knowledge and Behavior:</p> <ul style="list-style-type: none"> • Mind the Gap: Why Knowing Isn't Doing in Fruit and Vegetable Consumption • Bridging the Divide: From Dietary Guidelines to Real-World Fruit and Vegetable Practices <p>Focusing on Intervention Strategies:</p> <ul style="list-style-type: none"> • Home Grown Habits: Rethinking Fruit and Vegetable Interventions Beyond Schools |

| | |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ul style="list-style-type: none"> • Beyond the Classroom: Prioritizing Household Influences in Fruit and Vegetable Promotion • Family Matters: A Holistic Approach to Fostering Fruit and Vegetable Use <p>Short and Punchy:</p> <ul style="list-style-type: none"> • The Roots of Our Plates: Early Experiences and Fruit/Vegetable Use • Habits Over Guidelines: The Power of Early Food Experiences <p>I think "Beyond Knowledge: How Early Experiences Dictate Fruit and Vegetable Consumption" or "The Enduring Influence of Childhood: Shaping Adult Fruit and Vegetable Habits" best capture the core message that early experiences are more influential than later acquired knowledge about dietary guidelines.</p> |
| Prompt: | what about: "Constructing value: household influences on fruit and vegetable understandings across the life course"? |
| Gemini response: | <p>Yes, "Constructing value: household influences on fruit and vegetable understandings across the life course" is an excellent title!</p> <p>Here's why it works well:</p> <ul style="list-style-type: none"> • "Constructing value": This perfectly captures the essence of how participants <i>attribute meaning and worth</i> to fruit and vegetables, rather than just consuming them. It suggests an active, interpretive process. • "Household influences": This directly addresses a core finding – that the home environment and family dynamics are paramount in shaping these understandings. • "Fruit and vegetable understandings": This is more nuanced than just "use" or "consumption," reflecting the deeper beliefs, perceptions, and practices that the text discusses. • "Across the life course": This ties back to the broader thesis context and acknowledges that these understandings evolve, or are reinforced, over time, starting from childhood. <p>It's comprehensive, accurately reflects the content, and is academically sound. Great choice!</p> |
| Changes made to thesis based on AI response | Title proposed in my second prompt included in thesis. |

APPENDIX 7: RECRUITMENT MATERIALS

PARTICIPANT INFORMATION SHEET AND CONSENT FORM | Phase 1: Main Food Purchaser

Title: Everyday experiences of fruit and vegetable buying: Phase 1

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Description of the study

This information sheet refers to phase 1 of the larger project: Everyday experiences of fruit and vegetable buying. There are 3 separate phases in this project.

Phase 1 of the project will look at where, how and why people buy fruit and vegetables and, how people think and feel about the places they buy fruit and vegetables from.

Findings from phase 1 will inform how and where phase 2 and 3 will be conducted. Together, the three phases will provide important insight into how Australian people buy and use fruit and vegetables in everyday situations, what they think about different fruit and vegetable environments, and how these environments influence their purchase and use of fruit and vegetables. This project will also provide Australian people with an opportunity to suggest solutions that they feel will be helpful for increasing fruit and vegetable buying and use in their community.

You must be over 18 years of age, the main food purchaser for yourself/your household and, able to speak English to participate in this study.

This project is supported by Flinders University, College of Medicine & Public Health

Purpose of the study

The aims of phase 1 are to:

1. Determine how, where and why Australian people shop for fruit and vegetables.
2. Explore Australian people's perceived desires, obligations and behaviours relating to fruit and vegetable purchase and how they do or do not fulfill these in everyday situations
3. Understand how Australian people think and feel about buying fruit and vegetables, and the locations they buy these from

Benefits of the study

Participating in this study will help researchers to understand your personal experiences of buying fruit and vegetables and how these experiences are shaped by the places you shop for and use fruit and vegetables. This is important for public health research as it will help researchers to understand how important factors influence your ability to buy, use and eat fruit and vegetables. This can help researchers and policy makers to design fruit and vegetable campaigns and programs that are more relevant to you and your community than what has been done before.

Participant involvement and potential risks

You are eligible to participate in this study if you are the main grocery buyer for yourself or your household. If you agree to participate in the research study, you will be asked to:

- Draw a map of the areas that you normally buy and use fruit and vegetables in
- Talk to a researcher about different things related to fruit and vegetables such as:
 - how and why you buy fruit and vegetables in these places
 - How you think and feel about buying fruit and vegetables
 - How you think and feel about the places you buy fruit and vegetables from
 - How you think these locations influence your ability to buy and use fruit and vegetables
- Consent to having your discussion with the researcher audio-recorded

The session will take about 30-60 minutes and participation is entirely voluntary.

The researchers do not expect the questions to cause any harm or discomfort to you. However, if you experience feelings of distress as a result of participation in this study, please let the research team know immediately. You can also contact the following services for support:

- Lifeline – 13 11 14, <http://www.lifeline.org.au/>
- Beyond Blue – 1300 22 4636, <http://www.beyondblue.org.au>

Withdrawal Rights

You may decline to take part in this research study. If you decide to take part and later change your mind, you may withdraw at any time without providing an explanation. To withdraw, please contact the Chief Investigator or you may just refuse to answer any questions / not participate in exercises at any time. Any data collected up to the point of your withdrawal will be securely destroyed unless you consent to this data being used.

Confidentiality and Privacy

Only researchers listed on this form have access to the individual information provided by you. Privacy and confidentiality will be assured at all times. The research outcomes may be presented at conferences, written up for publication or used for other research purposes as described in this information form. However, the privacy and confidentiality of individuals will be protected at all times. You will not be named, and your individual information will not be identifiable in any research products without your explicit consent.

No data, including identifiable, non-identifiable and de-identified datasets, will be shared or used in future research projects without your explicit consent. Please provide your consent to this by ticking the appropriate box on the Consent Form at the end of this form.

Data Storage

The information collected will be stored securely on a password protected computer and/or Flinders University server throughout the study. Any identifiable data will be de-identified for data storage purpose. Only the researchers listed on this information sheet will be able to re-identify your data and this will never be shared or published without your explicit consent. All data will be securely transferred to and stored at Flinders University for five years after publication of the results. Following the required data storage period, all data will be securely destroyed according to university protocols.

Recognition of Contribution / Time / Travel costs

In recognition of your contribution and participation time, you will be provided with a cumulative amount of cash for your participation in each phase. If you participate in phase 1 you will receive \$30.00, if you participate in phase 1 and 2 you will receive \$80.00 and if you participate in all three phases you will receive \$110.00. If the researcher feels it is required, phase 2 and 3 can be conducted multiple times. In this event, if you participate in each phase multiple times, you will also be compensated for the additional sessions at a rate of \$30 per hour of participation time. The total amount of compensation provided for all three phases will not exceed \$200. Participation in all three phases is greatly appreciated however you are free to withdraw from the study at any time. If you choose to withdraw you will receive compensation for your participation up until the time of withdrawal from the study. Otherwise, the researcher will provide you with cash either at the end of each phase, or at the end of phase 3, dependant on which option you prefer.

How will I receive feedback?

The researcher will provide you with a copy of your (written copy of your conversations with the researcher) to check for correctness and provide comments on. This will be given to you in person or via email, whichever you prefer. On project completion, a short summary of the outcomes will be provided via email.

Ethics Committee Approval

The project has been approved by Flinders University's Human Research Ethics Committee (Project ID 5618).

Queries and Concerns

Queries or concerns regarding the research can be directed to the research team. If you have any complaints or reservations about the ethical conduct of this study, you may contact the Flinders University's Research Ethics and Compliance Office team either via telephone (08) 8201 2543 or via email human.researchethics@flinders.edu.au.

Thank you for taking the time to read this information sheet which is yours to keep.

If you accept our invitation to be involved, please sign the enclosed Consent Form.

CONSENT FORM

Consent Statement

- ☐ I have read and understood the information about the research, and I understand I am being asked to provide informed consent to participate in this research study. I understand that I can contact the research team if I have further questions about this research study.
- ☐ I am not aware of any condition that would prevent my participation, and I agree to participate in this project.
- ☐ I understand that I am free to withdraw at any time during the study.
- ☐ I understand that I can contact Flinders University's Research Ethics and Compliance Office if I have any complaints or reservations about the ethical conduct of this study.
- ☐ I understand that my involvement is confidential, and that the information collected may be published. I understand that I will not be identified in any research products without my explicit consent.

I further consent to:

- ☐ participating in the mapping task
- ☐ having a conversation with the researcher
- ☐ having my conversation with the researcher audio recorded
- ☐ allowing the research team to keep the original copy of my fruit and vegetable map for the duration of the project
- ☐ checking my information for accuracy after the session has ended
- ☐ my data and information being used in this project and other related projects for an extended period of time (no more than 5 years after publication of the data)
- ☐ being contacted about other research projects

Signed:

Name:

Date:

Email:

PARTICIPANT INFORMATION SHEET AND CONSENT FORM | Phase 2: Main Food Purchaser

Title: Everyday experiences of fruit and vegetable buying: Phase 2

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Description of the study

This information sheet refers to phase 2 of the larger project: Everyday experiences of fruit and vegetable buying. There are 3 separate phases in this project.

Phase 2 of the project will build on findings from phase 1 and will look at how fruit and vegetable retail environments influence fruit and vegetable buying.

Together, the three phases will provide important insight into how Australian people buy and use fruit and vegetables in everyday situations, what they think about different fruit and vegetable environments, and how these environments influence their purchase and use of fruit and vegetables. This project will also provide Australian people with an opportunity to suggest solutions that they feel will be helpful for increasing fruit and vegetable buying and use in their community.

You must be over 18 years of age, the main food purchaser for yourself/your household and, able to speak English to participate in this study.

This project is supported by Flinders University, College of Medicine & Public Health

Purpose of the study

This phase of the project aims to investigate fruit and vegetable retail environments and how they influence fruit and vegetable purchasing and use.

Benefits of the study

Participating in this study will help researchers to understand your personal experiences of buying fruit and vegetables and how these experiences are shaped by the places you shop for and use fruit and vegetables. This is important for public health research as it will help researchers to understand how important factors influence your ability to buy, use and eat fruit and vegetables. This can help researchers and policy makers to design fruit and vegetable campaigns and programs that are more relevant to you and your community than what has been done before.

Participant involvement and potential risks

If you agree to participate in the research study, you will be asked to:

- Have a researcher go grocery shopping with you one or more times.
- Talk to the researcher about how you are choosing fruit and vegetables, your thoughts about the place you are in and how you are feeling.
- Consent to having the researcher observe you shopping and taking notes.
- Consent to having photos taken of you doing your shopping. We will seek explicit consent, from you if we wish to use your photo in research publications.
- Consent to having your discussions with the researcher audio-recorded.

The shopping activity will take a similar amount of time as your usual grocery shopping takes plus an extra 15-30 minutes. Participation is entirely voluntary.

The researchers do not expect the questions to cause any harm or discomfort to you. However, if you experience feelings of distress as a result of participation in this study, please let the research team know immediately. You can also contact the following services for support:

- Lifeline – 13 11 14, <http://www.lifeline.org.au/>
- Beyond Blue – 1300 22 4636, www.beyondblue.org.au

Withdrawal Rights

You may decline to take part in this research study. If you decide to take part and later change your mind, you may, withdraw at any time without providing an explanation. To withdraw, please contact the Chief Investigator or you may just refuse to answer any questions/ not participate in exercises at any time. Any data collected up to the point of your withdrawal will be securely destroyed unless you consent to this data being used.

Confidentiality and Privacy

Only researchers listed on this form have access to the individual information provided by you. Privacy and confidentiality will be assured at all times. The research outcomes may be presented at conferences, written up for publication or used for other research purposes as described in this information form. However, the privacy and confidentiality of individuals will be protected at all times. You will not be named, and your individual information will not be identifiable in any research products without your explicit consent.

No data, including identifiable, non-identifiable and de-identified datasets, will be shared or used in future research projects without your explicit consent. Please provide your consent to this by ticking the appropriate box on the Consent Form at the end of this form.

Data Storage

The information collected will be stored securely on a password protected computer and/or Flinders University server throughout the study. Any identifiable data will be de-identified for data storage purpose. Only the researchers listed on this information sheet will be able to re-identify your data and this will never be shared or published without your explicit consent. All data will be securely transferred to and stored at Flinders University for five years after publication of the results. Following the required data storage period, all data will be securely destroyed according to university protocols.

Recognition of Contribution / Time / Travel costs

In recognition of your contribution and participation time, you will be provided with a cumulative amount of cash for your participation in each phase. If you participate in phase 1 you will receive \$30.00, if you participate in phase 1 and 2 you will receive \$80.00 and if you participate in all three phases you will receive \$110.00. If the researcher feels it is required, phase 2 and 3 can be conducted multiple times. In this event, if you participate in each phase multiple times, you will also be compensated for the additional sessions at a rate of \$30 per hour of participation time. The total amount of compensation provided for all three phases will not exceed \$200. Participation in all three phases is greatly appreciated however you are free to withdraw from the study at any time. If you choose to withdraw you will receive compensation for your participation up until the time of withdrawal from the study. Otherwise, the researcher will provide you with cash either at the end of each phase, or at the end of phase 3, dependant on which option you prefer.

How will I receive feedback?

The researcher will provide you with a copy of your transcripts (written copy of your conversations with the researcher) to check for correctness and provide comments on. This will be given to you in person or via email, whichever you prefer. On project completion, a short summary of the outcomes will be provided via email.

Ethics Committee Approval

The project has been approved by Flinders University's Human Research Ethics Committee (Project ID 5618).

Queries and Concerns

Queries or concerns regarding the research can be directed to the research team. If you have any complaints or reservations about the ethical conduct of this study, you may contact the Flinders University's Research Ethics and Compliance Office team either via telephone (08) 8201 2543 or via email human.researchethics@flinders.edu.au.

Thank you for taking the time to read this information sheet which is yours to keep.

If you accept our invitation to be involved, please sign the enclosed Consent Form.

CONSENT FORM

Consent Statement

- ☐ I have read and understood the information about the research, and I understand I am being asked to provide informed consent to participate in this research study. I understand that I can contact the research team if I have further questions about this research study.
- ☐ I am not aware of any condition that would prevent my participation, and I agree to participate in this project.
- ☐ I understand that I am free to withdraw at any time during the study.
- ☐ I understand that I can contact Flinders University's Research Ethics and Compliance Office if I have any complaints or reservations about the ethical conduct of this study.
- ☐ I understand that my involvement is confidential, and that the information collected may be published. I understand that I will not be identified in any research products.

I further consent to:

- ☐ having the researcher observe me shopping
- ☐ having conversations with the researcher while I am shopping
- ☐ having my conversations with the researcher audio recorded
- ☐ having my photo taken
- ☐ having the researcher take notes on my shopping behaviour
- ☐ checking my information for accuracy after the session has ended
- ☐ my data and information being used in this project and other related projects for an extended period of time (no more than 5 years after publication of the data)
- ☐ being contacted about other research projects

Signed:

Name:

Date:

Email:

PARTICIPANT INFORMATION SHEET AND CONSENT FORM | Phase 3: Main Food Purchaser

Title: Everyday experiences of fruit and vegetable buying: Phase 3

Chief Investigator

Ms Ellen Wynn
PhD Candidate
College of Medicine & Public Health
Flinders University
Tel:

Co-Investigators

A/Prof Annabelle Wilson
College of Medicine & Public Health
Flinders University
Tel: 08 7221 8462

Dr. Emma Tonkin
College of Medicine & Public Health
Flinders University
Email: emma.tonkin@flinders.edu.au

A/Prof Trevor Webb
College of Nursing and Health Sciences
Flinders University
Email: trevor.webb@flinders.edu.au

Description of the study

This project forms phase 3 of the larger project: Everyday experiences of fruit and vegetable purchase. There are 3 separate phases in this project.

Phase 3 of the project will build on findings from phase 1 and 2 and will look at:

1. How Australian people's homes and other household members influence fruit and vegetable buying and use
2. How fruit and vegetable buying influences use of fruit and vegetables in the home
3. What Australian people think can be done to increase fruit and vegetable purchase and use

Together, the three phases will provide important insight into how Australian people buy and use fruit and vegetables in everyday situations, what they think about different fruit and vegetable environments, and how these environments influence their purchase and use of fruit and vegetables. This project will also provide Australian people with an opportunity to suggest solutions that they feel will be helpful for increasing fruit and vegetable buying and use in their community.

If you share your house with other people over the age of 18 and you also buy fruit and vegetables for them, they will also be invited to participate in the study. If they choose to participate in this phase of the study, they will be asked questions about their own fruit and vegetable experiences and, what they think about your fruit and vegetable purchasing. Please notify the chief investigator if any of your household members over 18 years of age wish to participate in the study.

You must be over 18 years of age, the main food purchaser for yourself/your household and, able to speak English to participate in this study.

This project is supported by Flinders University, College of Medicine & Public Health

Purpose of the study

Phase 3 of the project aims to understand how Australian people's homes and household members influence and are influenced by fruit and vegetable buying and use.

Benefits of the study

Participating in this study will help researchers to understand your personal experiences of buying fruit and vegetables and how these experiences are shaped by the places you shop for and use fruit and vegetables. This is important for public health research as it will help researchers to understand how important factors influence your ability to buy, use and eat fruit and vegetables. This can help researchers and policy makers to design fruit and vegetable campaigns and programs that are more relevant to you and your community than what has been done before.

Participant involvement and potential risks

If you agree to participate in phase 3 you will be asked to:

- Have a researcher observe you using fruit and vegetables at home. This may include making a shopping list or meal plan, putting your shopping away and/or preparing a meal.
- Consent to the researcher taking photos and notes of what you are doing. We will seek explicit consent, from you if we wish to use your photo in research publications.
- Have a conversation with the researcher about how you think other people and things in your house influence your fruit and vegetable buying and use
- Consent to having your conversation with the researcher audio-recorded
- Invite other adults (>18 years old) in your house to participate in the research and provide them with the relevant consent forms (provided by researcher)

The session(s) will take about 30-60 minutes and participation is entirely voluntary.

The researchers do not expect the questions to cause any harm or discomfort to you. However, if experience feelings of distress as a result of participation in this study, please let the research team know immediately. You can also contact the following services for support:

- Lifeline – 13 11 14, www.lifeline.org.au
- Beyond Blue – 1300 22 4636, www.beyondblue.org.au

Withdrawal Rights

You may decline to take part in this research study. If you decide to take part and later change your mind, you may, withdraw at any time without providing an explanation. To withdraw, please contact the Chief Investigator or you may just refuse to answer any questions/ not participate in exercises at any time. Any data collected up to the point of your withdrawal will be securely destroyed unless you consent to this data being used.

Confidentiality and Privacy

Only researchers listed on this form have access to the individual information provided by you. Privacy and confidentiality will be assured at all times. The research outcomes may be presented at conferences, written up for publication or used for other research purposes as described in this

information form. However, the privacy and confidentiality of individuals will be protected at all times. You will not be named, and your individual information will not be identifiable in any research products without your explicit consent.

No data, including identifiable, non-identifiable and de-identified datasets, will be shared or used in future research projects without your explicit consent. Please provide your consent to this by ticking the appropriate box on the Consent Form at the end of this form.

Data Storage

The information collected will be stored securely on a password protected computer and/or Flinders University server throughout the study. Any identifiable data will be de-identified for data storage purposes unless indicated otherwise. All data will be securely transferred to and stored at Flinders University for five years after publication of the results. Following the required data storage period, all data will be securely destroyed according to university protocols.

Recognition of Contribution / Time / Travel costs

In recognition of your contribution and participation time, you will be provided with a cumulative amount of cash for your participation in each phase. If you participate in phase 1 you will receive \$30.00, if you participate in phase 1 and 2 you will receive \$80.00 and if you participate in all three phases you will receive \$110.00. If the researcher feels it is required, phase 2 and 3 can be conducted multiple times. In this event, if you participate in each phase multiple times, you will also be compensated for the additional sessions at a rate of \$30 per hour of participation time. The total amount of compensation provided for all three phases will not exceed \$200. Participation in all three phases is greatly appreciated however you are free to withdraw from the study at any time. If you choose to withdraw you will receive compensation for your participation up until the time of withdrawal from the study. Otherwise, the researcher will provide you with cash either at the end of each phase, or at the end of phase 3, dependant on which option you prefer.

How will I receive feedback?

The researcher will provide you with a copy of your transcript to check for correctness and provide comments on. This will be given to you in person or via email, whichever you prefer. On project completion, a short summary of the outcomes will be provided to participants via email.

Ethics Committee Approval

The project has been approved by Flinders University's Human Research Ethics Committee (Project ID 5618).

Queries and Concerns

Queries or concerns regarding the research can be directed to the research team. If you have any complaints or reservations about the ethical conduct of this study, you may contact the Flinders University's Research Ethics and Compliance Office team either via telephone (08) 8201 2543 or via email human.researchethics@flinders.edu.au.

Thank you for taking the time to read this information sheet which is yours to keep.

If you accept our invitation to be involved, please sign the enclosed Consent Form.

CONSENT FORM

Consent Statement

- ☐ I have read and understood the information about the research, and I understand I am being asked to provide informed consent to participate in this research study. I understand that I can contact the research team if I have further questions about this research study.
- ☐ I am not aware of any condition that would prevent my participation, and I agree to participate in this project.
- ☐ I understand that I am free to withdraw at any time during the study.
- ☐ I understand that I can contact Flinders University's Research Ethics and Compliance Office if I have any complaints or reservations about the ethical conduct of this study.
- ☐ I understand that my involvement is confidential, and that the information collected may be published. I understand that I will not be identified in any research products.

I further consent to:

- ☐ having the researcher observe me doing activities related to fruit and vegetables in my home
- ☐ have a conversation with the researcher while they are observing me in my home
- ☐ having my conversations with the researcher audio recorded
- ☐ having photos taken of me and, in my home
- ☐ Providing consent forms and information sheets to any adult household members who want to participate on behalf of the research team.
- ☐ checking my information for accuracy after the session has ended
- ☐ my data and information being used in this project and other related projects for an extended period of time (no more than 5 years after publication of the data)
- ☐ being contacted about other research projects

Signed:

Name:

Date:

Email:

PARTICIPANT INFORMATION SHEET AND CONSENT FORM | Phase 3: Household Member

Title: Everyday experiences of fruit and vegetable buying: Phase 3 (household member)

Chief Investigator

Ms Ellen Wynn
PhD Candidate
College of Medicine & Public Health
Flinders University
Tel:

Co-Investigators

A/Prof Annabelle Wilson
College of Medicine & Public Health
Flinders University
Tel: 08 7221 8462

Dr. Emma Tonkin
College of Medicine & Public Health
Flinders University
Email: emma.tonkin@flinders.edu.au

A/Prof Trevor Webb
College of Nursing and Health Sciences
Flinders University
Email: trevor.webb@flinders.edu.au

Description of the study

This project forms phase 3 of the larger project: Everyday experiences of fruit and vegetable buying. There are 3 separate phases in this project.

Phase 3 of the project (household member participation) looks at:

4. How household members of main food purchasers influence fruit and vegetable buying and use
5. How fruit and vegetable buying influences household member use of fruit and vegetables
6. What Australian people think could be done to increase fruit and vegetable purchase and use

Together, the three phases will provide important insight into how Australian people buy and use fruit and vegetables in everyday situations, what they think about different fruit and vegetable environments, and how these environments influence their purchase and use of fruit and vegetables. This project will also provide Australian people with an opportunity to suggest solutions that they feel will be helpful for increasing fruit and vegetable buying and use in their community.

You must be over 18 years of age, a household member (temporary or permanent) of a main food purchaser who is also participating in phase 3, and able to speak English to participate in this study.

This project is supported by Flinders University, College of Medicine & Public Health

Purpose of the study

Phase 3 of the project aims to understand how Australian people's homes and household members influence and are influenced by fruit and vegetable buying and use.

Benefits of the study

Sharing your experiences will allow the researcher to better understand how your household's dynamics influence fruit and vegetable purchase and use. This is important for public health research as it will help researchers to understand how important factors influence your household's ability to buy, use and eat fruit and vegetables. This can help researchers and policy makers to design fruit and vegetable campaigns and programs that are more relevant to you and your community than what has been done before.

Participant involvement and potential risks

If you agree to participate in the research study, you will be asked to:

- talk to the researcher about:
 - your experiences using fruit and vegetables.
 - how you think you influence fruit and vegetable purchasing for your household
 - what you think can be done to increase fruit and vegetable purchasing and use in Australia.
- consent to having your conversation with the researcher audio-recorded.
- Consent to having photos taken of you at home. We will seek explicit consent, from you if we wish to use your photo in research publications.

The interview will take about 15-20 minutes and participation is entirely voluntary.

The researchers do not expect the questions to cause any harm or discomfort to you. However, if you experience feelings of distress as a result of participation in this study, please let the research team know immediately. You can also contact the following services for support:

- Lifeline – 13 11 14, www.lifeline.org.au
- Beyond Blue – 1300 22 4636, www.beyondblue.org.au

Withdrawal Rights

You may decline to take part in this research study. If you decide to take part and later change your mind, you may, withdraw at any time without providing an explanation. To withdraw, please contact the Chief Investigator or you may just refuse to answer any questions/ not participate in exercises at any time. Any data collected up to the point of your withdrawal will be securely destroyed unless you consent to this data being used.

Confidentiality and Privacy

Only researchers listed on this form have access to the individual information provided by you. Privacy and confidentiality will be assured at all times. The research outcomes may be presented at conferences, written up for publication or used for other research purposes as described in this information form. However, the privacy and confidentiality of individuals will be protected at all times. You will not be named, and your individual information will not be identifiable in any research products without your explicit consent.

No data, including identifiable, non-identifiable and de-identified datasets, will be shared or used in future research projects without your explicit consent. Please provide your consent to this by ticking the appropriate box on the Consent Form at the end of this form.

Data Storage

The information collected will be stored securely on a password protected computer and/or Flinders University server throughout the study. Any identifiable data will be de-identified for data storage purposes unless indicated otherwise. All data will be securely transferred to and stored at Flinders University for five years after publication of the results. Following the required data storage period, all data will be securely destroyed according to university protocols.

Recognition of Contribution / Time / Travel costs

If you would like to participate, in recognition of your contribution and participation time, you will be provided with \$10 cash. This voucher will be provided to you face-to-face on completion of the interview.

How will I receive feedback?

On project completion, a short summary of the outcomes will be provided to all participants via email

Ethics Committee Approval

The project has been approved by Flinders University's Human Research Ethics Committee (Project ID 5618).

Queries and Concerns

Queries or concerns regarding the research can be directed to the research team. If you have any complaints or reservations about the ethical conduct of this study, you may contact the Flinders University's Research Ethics and Compliance Office team either via telephone (08) 8201 2543 or via email human.researchethics@flinders.edu.au.

Thank you for taking the time to read this information sheet which is yours to keep.

If you accept our invitation to be involved, please sign the enclosed Consent Form.

CONSENT FORM

Consent Statement

- ☐ I have read and understood the information about the research, and I understand I am being asked to provide informed consent to participate in this research study. I understand that I can contact the research team if I have further questions about this research study.
- ☐ I am not aware of any condition that would prevent my participation, and I agree to participate in this project.
- ☐ I understand that I am free to withdraw at any time during the study.
- ☐ I understand that I can contact Flinders University's Research Ethics and Compliance Office if I have any complaints or reservations about the ethical conduct of this study.
- ☐ I understand that my involvement is confidential, and that the information collected may be published. I understand that I will not be identified in any research products.

I further consent to:

- ☐ participating in an interview
- ☐ having my information audio recorded
- ☐ having my photo taken
- ☐ my data and information being used in this project and other related projects for an extended period of time (no more than 5 years after publication of the data)
- ☐ being contacted about other research projects

Signed:

Name:

Date:

Email:

PARTICIPANT INFORMATION SHEET AND CONSENT FORM | Phase 4

Title: Everyday experiences of fruit and vegetable buying

Chief Investigator

Ms Ellen Wynn
PhD Candidate
College of Medicine & Public Health
Flinders University
Tel:

Co-Investigators

A/Prof Annabelle Wilson
College of Medicine & Public Health
Flinders University
Tel: 08 7221 8462

Dr. Emma Tonkin
College of Medicine & Public Health
Flinders University
Email: emma.tonkin@flinders.edu.au

A/Prof Trevor Webb
College of Nursing and Health Sciences
Flinders University
Email: trevor.webb@flinders.edu.au

Description of the study

This project forms part of the larger project: Everyday experiences of fruit and vegetable buying. There are 3 separate phases in this project. This phase of the research aims to provide insight into how fruit and vegetable purchase influences fruit and vegetable use. If you choose to participate in this part of the project you will complete a series of weekly activities which will include recording your weekly fruit and vegetable use, and submitting your grocery receipts for the same week. You may also be asked to participate in a brief interview to provide additional insight into the findings from the activities.

You must be over 18 years of age, a household or family member of a main food purchaser who is also participating in the project and able to speak English to participate in this study.

This project is supported by Flinders University, College of Medicine & Public Health

Purpose of the study

To understand how household and family members influence and are influenced by fruit and vegetable buying and use, and how this differs between generations

Benefits of the study

Sharing your experiences will allow the researcher to better understand how your fruit and vegetable purchase and use differs between households, families and generations. This is important for public

health research as it will help researchers to understand how important factors influence your household's or family's ability to buy, use and eat fruit and vegetables. This can help researchers and policy makers to design fruit and vegetable campaigns and programs that are more relevant to you and your community than what has been done before.

Participant involvement and potential risks

If you agree to participate in the research study, you will be asked to:

- Complete a weekly fruit and vegetable intake activity for 1 to 4 weeks
- Send the researcher all of your grocery receipts for the same week(s) that you complete the fruit and vegetable activity
- Participate in a 20-30 minute interview to provide further insight into your experiences with fruit and vegetables during the study period.

Participation is entirely voluntary. Participation time is estimated to be 10-20 minutes per week to complete the fruit and vegetable activity and receipt submission and 20-30 minutes for any related interviews. Maximum participation time is estimated to be no more than 1 hour per week.

The researchers do not expect the questions to cause any harm or discomfort to you. However, if you experience feelings of distress as a result of participation in this study, please let the research team know immediately. You can also contact the following services for support:

- Lifeline – 13 11 14, www.lifeline.org.au
- Beyond Blue – 1300 22 4636, www.beyondblue.org.au

Withdrawal Rights

You may decline to take part in this research study. If you decide to take part and later change your mind, you may, withdraw at any time without providing an explanation. To withdraw, please contact the Chief Investigator or you may just refuse to answer any questions/ not participate in exercises at any time. Any data collected up to the point of your withdrawal will be securely destroyed unless you consent to this data being used.

Confidentiality and Privacy

Only researchers listed on this form have access to the individual information provided by you. Privacy and confidentiality will be assured at all times. The research outcomes may be presented at conferences, written up for publication or used for other research purposes as described in this information form. However, the privacy and confidentiality of individuals will be protected at all times. You will not be named, and your individual information will not be identifiable in any research products without your explicit consent.

No data, including identifiable, non-identifiable and de-identified datasets, will be shared or used in future research projects without your explicit consent. Please provide your consent to this by ticking the appropriate box on the Consent Form at the end of this form.

Data Storage

The information collected will be stored securely on a password protected computer and/or Flinders University server throughout the study. Any identifiable data will be de-identified for data storage purposes unless indicated otherwise. All data will be securely transferred to and stored at Flinders University for five years after publication of the results. Following the required data storage period, all data will be securely destroyed according to university protocols.

Recognition of Contribution / Time / Travel costs

If you would like to participate, in recognition of your contribution and participation time, you will be provided with \$10 cash per week for the fruit and vegetable and receipt activity (minimum 1 week, maximum 4 weeks), and \$30 cash per hour of participation in related interview(s). This will be provided to you face-to-face on completion of the research session(s).

How will I receive feedback?

On project completion, a short summary of the outcomes will be provided to all participants via email

Ethics Committee Approval

The project has been approved by Flinders University's Human Research Ethics Committee (Project ID 5618).

Queries and Concerns

Queries or concerns regarding the research can be directed to the research team. If you have any complaints or reservations about the ethical conduct of this study, you may contact the Flinders University's Research Ethics and Compliance Office team either via telephone (08) 8201 2543 or via email human.researchethics@flinders.edu.au.

Thank you for taking the time to read this information sheet which is yours to keep.

If you accept our invitation to be involved, please sign the enclosed Consent Form.

CONSENT FORM

Consent Statement

- ☐ I have read and understood the information about the research, and I understand I am being asked to provide informed consent to participate in this research study. I understand that I can contact the research team if I have further questions about this research study.
- ☐ I am not aware of any condition that would prevent my participation, and I agree to participate in this project.
- ☐ I understand that I am free to withdraw at any time during the study.
- ☐ I understand that I can contact Flinders University's Research Ethics and Compliance Office if I have any complaints or reservations about the ethical conduct of this study.
- ☐ I understand that my involvement is confidential, and that the information collected may be published. I understand that I will not be identified in any research products.

I further consent to:

- ☐ completing the weekly fruit and vegetable intake activity
- ☐ sending my grocery receipts to the research team for review
- ☐ participating in an interview and having my information audio recorded
- ☐ my data and information being used in this project and other related projects for an extended period of time (no more than 5 years after publication of the data)
- ☐ being contacted about other research projects

Signed:

Name:

Date:

Email:

Recruitment scripts

Introductory email to be sent to **third party recruiters** (e.g. community newsletter editor, local library, food box delivery company, admin of social media page):

Dear (name),

My name is Ellen Wynn, I am a Public Health researcher at Flinders University.

I am recruiting participants for a study about fruit and vegetable buying in Australia. I would be very grateful if you could share this invitation with your customers/clients through your [usual means of communication].

Subject/title: Invitation to participate in fruit and vegetable research

Flinders University researchers are currently seeking people who buy most of the groceries for their household to participate in research about fruit and vegetable buying. Please see the flyer attached/below if you would like more information.

Participation is entirely voluntary. Please contact Ellen Wynn if you would like further information, or if you would like to participate in this study.

Ellen Wynn

Email: ellen.wynn@flinders.edu.au

Phone: xxxx xxx xxx

****INSERT FLYER HERE****

Thank you for your assistance with this research project.

Ellen Wynn

College of Medicine & Public Health

Flinders University

Email: ellen.wynn@flinders.edu.au

Phone: xxxx xxx xxx

*** the researcher may provide physical copies of flyers to relevant third-party organisations (e.g. workplaces, library, supermarket, farmers market) to display in their open spaces, or distribute to prospective participants. The researcher will use the above script as a guide for conversations with relevant representatives of third-party organisations. If recruitment through these methods is not successful, the researcher will pass flyers out in person. Permission will be sought from relevant entities (e.g. store owner, university dean, library manager) and prospective participants will not be coerced to participate in any way.

Introductory email to store owners/managers:

Dear (name),

My name is Ellen Wynn, I am a Public Health researcher at Flinders University currently conducting a study regarding fruit and vegetable buying in Australia. Some of my participants have identified your store as their regular fruit and vegetable purchasing location.

I am writing to inform you that I will be conducting part of my study in your store, unless you explicitly advise me that you are not willing for this to happen. This will involve me observing my participant doing their usual shopping in your store. I will talk to the participant about what they are doing and take photos and written notes while they shop. I will actively avoid taking photos of other customers, store staff and identifiable promotion materials as much as possible. Data collected will not be accessed by anyone outside of the research team and photos containing identifiable material will not be published without your review and permission. Your store will not be named or identified in any publications.

If you are not willing for the study to be conducted in your store, please reply to this email confirming that you **DO NOT** consent to this research being conducted in your store. If I have not received a response after 5 days, I will call your store to follow up.

Thank you for considering my request. Please do not hesitate to contact me if you have any questions or concerns.

Kind Regards,

Ellen Wynn

College of Medicine & Public Health

Flinders University

Email: ellen.wynn@flinders.edu.au

Phone: xxxx xxx xxx

Sample script: social media recruitment

Flinders university researchers are looking for adults who buy most of the groceries for themselves or their households to participate in fruit and vegetable research. Please see the attached flyer if you would like more information on the study.

ATTACH FLYER HERE

Verbal script: face-to face recruitment:

Hi, my name is Ellen, I am a Public Health researcher at Flinders University. I am recruiting participants for a study which aims to understand people's every-day experiences buying and using fruit and vegetables. Participation is voluntary and I can provide you with more information if you are interested. (yes/no)

(if no – ok, thank you for your time) **END**

(if yes):

The first part of the study looks at where, how and why you buy fruit and vegetables. You will be asked to draw a rough map of the areas you buy and use fruit and vegetables in and to talk to me about your experiences in these locations. In phase 2 we will go shopping for fruit and vegetables and I will talk to you about what you are doing. In phase 3 I will come to your home and observe you using fruit and vegetables while I ask you and your household members questions about how you use fruit and vegetables.

Here is a flyer about the project and an information sheet and consent form for phase 1 (provide participant with info pack). If you would like to participate, you can phone, text or email me (show contact details on form).

Thank you for your time **END**

Recruitment flyer

Seeking adults who buy groceries for themselves or their households to participate in fruit and vegetable research.

This project looks at how different environments influence fruit and vegetable buying and use in Australia. There are three separate activities related to this project. By participating in this study, you will help researchers understand important factors that influence fruit and vegetable use in Australia.

Phase 1 – Talk to the researcher about the places you buy fruit and vegetables from (\$30)

Phase 2 – Go shopping with the researcher for fruit and vegetables (\$50)

Phase 3 – Talk to the researcher about how you use fruit and vegetables at home (\$30)

Participation is entirely voluntary. You can withdraw from the study at any time however participation in all three phases is greatly appreciated. You will be given cash for participation in each phase.

This project has been approved by Flinders University's Human Research Ethics Committee (Project ID 5618).

If you would like more information, or are interested in participating in this project please contact:

Ellen Wynn

Email: ellen.wynn@flinders.edu.au

College of Medicine & Public Health

Phone: xxxx xxx xxx

Flinders University

Email



Text



Phone



APPENDIX 8: ETHICS APPROVAL

25 May 2023



HUMAN ETHICS LOW RISK PANEL APPROVAL NOTICE

Dear Ms Ellen Wynn,

The below proposed project has been **approved** on the basis of the information contained in the application and its attachments.

Project No: 5618

Project Title: Everyday experiences of fruit and vegetable buying

Chief Investigator: Ms Ellen Wynn

Approval Date: 25/05/2023

Expiry Date: 01/02/2025

Approved Co-Investigator/s: A/Prof Annabelle Wilson, Dr Emma Tonkin, A/Prof Trevor Webb

Supervisory Panel: Associate Professor Annabelle Wilson, Doctor Emma Tonkin, Associate Professor Trevor Webb

Conditions of Approval: -

Please note: Due to COVID-19, researchers should try to avoid face-to-face testing where possible and consider undertaking alternative distance/online data or interview collection means. For further information, please go to <https://staff.flinders.edu.au/coronavirus-information/>.

Please note: For all research projects wishing to recruit Flinders University students as participants, approval needs to be sought from the Pro Vice-Chancellor (Learning and Teaching Innovation), Professor Michelle Picard. To seek approval, please provide a copy of the Ethics approval for the project and a copy of the project application (including Participant Information and Consent Forms, advertising materials and questionnaires etc.) to the Pro Vice-Chancellor (Learning and Teaching Innovation) via michelle.picard@flinders.edu.au.

RESPONSIBILITIES OF RESEARCHERS AND SUPERVISORS

1. Participant Documentation

Please note that it is the responsibility of researchers and supervisors, in the case of student projects, to ensure that:

- all participant documents are checked for spelling, grammatical, numbering and formatting errors. The Committee does not accept any responsibility for the above mentioned errors.
- the Flinders University logo is included on all participant documentation (e.g., letters of Introduction, information Sheets, consent forms, debriefing information and questionnaires – with the exception of purchased research tools) and the current Flinders University letterhead is included in the header of all letters of introduction. The Flinders University international logo/letterhead should be used and documentation should contain international dialing codes for all telephone and fax numbers listed for all research to be conducted overseas.

2. Annual Progress / Final Reports

In order to comply with the monitoring requirements of the *National Statement on Ethical Conduct in Human Research 2007* (updated 2018) an annual progress report must be submitted each year on the approval anniversary date for the duration of the ethics approval

using the HREC Annual/Final Report Form available online via the ResearchNow Ethics & Biosafety system.

Please note that no data collection can be undertaken after the ethics approval expiry date listed at the top of this notice. If data is collected after expiry, it will not be covered in terms of ethics. It is the responsibility of the researcher to ensure that annual progress reports are submitted on time; and that no data is collected after ethics has expired.

If the project is completed *before* ethics approval has expired please ensure a final report is submitted immediately. If ethics approval for your project expires please either submit (1) a final report; or (2) an extension of time request (using the HREC Modification Form).

For student projects, the Low Risk Panel recommends that current ethics approval is maintained until a student's thesis has been submitted, assessed and finalised. This is to protect the student in the event that reviewers recommend that additional data be collected from participants.

3. Modifications to Project

Modifications to the project must not proceed until approval has been obtained from the Ethics Committee. Such proposed changes / modifications include:

- change of project title;
- change to research team (e.g., additions, removals, researchers and supervisors)
- changes to research objectives;
- changes to research protocol;
- changes to participant recruitment methods;
- changes / additions to source(s) of participants;
- changes of procedures used to seek informed consent;
- changes to reimbursements provided to participants;
- changes to information / documents to be given to potential participants;
- changes to research tools (e.g., survey, interview questions, focus group questions etc);
- extensions of time (i.e. to extend the period of ethics approval past current expiry date).

To notify the Committee of any proposed modifications to the project please submit a Modification Request Form available online via the ResearchNow Ethics & Biosafety system. Please note that extension of time requests should be submitted prior to the Ethics Approval Expiry Date listed on this notice.

4. Adverse Events and/or Complaints

Researchers should advise the Executive Officer of the Human Research Ethics Committee on at human.researchethics@flinders.edu.au immediately if:

- any complaints regarding the research are received;
- a serious or unexpected adverse event occurs that affects participants;
- an unforeseen event occurs that may affect the ethical acceptability of the project.

Yours sincerely,

Camilla Dorian

on behalf of

Human Ethics Low Risk Panel
Research Development and Support
human.researchethics@flinders.edu.au

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GPO Box 2100, Adelaide, South Australia, 5001

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