The role of parental self-efficacy, parental feeding practices and home food environment in influencing preschool aged children's diet.

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Statement of Originality and Declarations

*This dissertation contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. I give consent to this copy of my dissertation, when deposited in the University Library***, *being made available for loan and photocopying subject to the provisions of the Copyright Act 1968.*

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Abstract

Background: Significant health consequences in adulthood and childhood are related to poor diet quality (National Health and Medical Research Centre, 2003a). Dietary patterns developed in childhood often persist into adulthood (Lau, Quadrel & Hartman, 1990) and parents are among the most important influences on the development of dietary patterns in childhood (Birch & Fisher, 1998). This study aimed to explore relationships between parental factors that impact upon child dietary intakes. *Method:* Cross-sectional data was collected by telephone interview for 202 parents of children aged 3-5 attending preschools in the Greater Newcastle Area, New South Wales, Australia. Multiple mediation analyses (Preacher & Hayes, 2008) were conducted to examine for indirect and direct effects of parental self-efficacy for managing child diet, through availability and accessibility of fruits vegetables and other foods and use of parental control strategies on four child dietary intakes (fruit and vegetables, fat from dairy, sweetened beverages and non-core foods). In addition, parent socio-economic status and child gender were examined as potential moderators. *Results:* This study found significant mediation effects of fruit and vegetable availability and parental control strategies on the relationships between parental self-efficacy for managing child diet and child fruit and vegetable intake and non-core food intakes. Moderation effects were found for the relationships between child non-core food intake with parental use of restriction and parental self-efficacy respectively. Surprisingly, fruit and vegetable availability were significant moderators rather than the expected parent and child demographic factors of socio-economic status or child gender. *Conclusions:* This study provides support for significant direct and indirect effects of parental self-efficacy on child intakes of fruit and vegetables and non-core foods. Furthermore, moderation effects found for child non-core food intake are supportive of a displacement effect of child fruit and vegetable intake on non-core food consumption. Parental self-efficacy is an important target for family based interventions to improve child diet and prevent poor dietary outcomes.

Introduction

1-Diet and Health

A healthy diet is important to maintain good health. There is a wealth of evidence demonstrating that poor diet quality increases an individual's risk of developing chronic diseases and health conditions (National Health and Medical Research Centre [NHRMC], 2003a; Australian Institute of Health & Welfare [AIHW], 2008). This includes but is not limited to an increased risk of: Cardiovascular Disease (CVD), cancer, type II diabetes, gestational diabetes, hypertension, obesity, anaemia, atherosclerosis, dental caries and osteoporosis across a number of different cultures and ethnicities (World Health Organization [WHO], 2004; Mai et al., 2005; McCrory et al., 1999; Moore et al., 1999; Zhang, Schulze, Solomon & Hu, 2006). Evidence also suggests that dietary factors are important for the management and quality of life of individuals with communicable diseases and in mental health and mental health disorders for adults and children (WHO, 2003a; WHO, 2010; Casper, 2005, Peet, 2005, Tomlinson, Wilkinson & Wilkinson, 2009; Jacka et al., 2010a; Irving, Mumby-Croft & Joy, 2006). Finally, diet quality and variety has been shown to have an inverse relationship with all-cause mortality in men and women and from some specific causes such as cardiovascular disease (Kant, Schatzkin, Harris, Ziegler & Block, 1993; Kant, Schatzkin, Graubard & Schairer, 2000; Michels & Wolk, 2002).

Recognising the important link between nutritional intake and health, the National Health and Medical Research Council has developed dietary guidelines for maintaining good health for Australian adults and Australian children and adolescents (NHMRC, 2003a; NHMRC, 2003b). The NHMRC guidelines were developed based on the assessment of evidence and consultation with the community and relevant experts in the field. Currently most Australian adults and children fail to meet recommendations outline in the guidelines

regarding nutrition intakes. For example, over 80% of adults and children do not meet dietary guidelines regarding the recommended serves of both fruit and vegetables (Magarey, Daniels & Smith, 2001; Magarey, McKeen & Daniels, 2006). Furthermore, Australian adults and children have been shown to consumer higher than recommended amounts of fats, sugars and salts, particularly from high energy foods of little nutritional values such as soft drinks and fried potatoes (i.e. junk foods; Rangan, Randall, Hector, Gill & Webb, 2008; Rangan, Schindeler, Hector, Gill & Webb, 2009).

1.1-The impact of fruit and vegetable consumption on health.

Research examining the specific relationship between fruit and vegetable consumption and health has demonstrated a negative relationship of fruit and vegetable consumption with morbidity and mortality from chronic diseases including: cardiovascular disease (stroke, coronary heart disease), obesity, cataracts, type II diabetes, hypertension, cancer, diverticulitis, chronic obstructive pulmonary disease and macular degeneration (Bazzano, 2006; Centre for Public Health Nutrition, 2003). Bazzano (2006) notes that a single dietary change to increase the consumption of fruits and vegetables has the potential to assist in reversing the worldwide increasing rates of cardiovascular disease, hypertension, obesity and type II diabetes. A study by Lock, Pomerleau, Causer, Altmann & McKee (2005) on the global burden of disease attributable to low consumption of fruit and vegetables found that approximately 2.635 million deaths per year could be attributed to insufficient fruit and vegetable consumption. Increasing consumption of fruits and vegetables by 600g per day could reduce the global impact and individual impact of chronic diseases substantially (e.g. reduce the impact of ischemic heart disease by 31%, reduce worldwide burden of disease by 1.8%; Lock et al, 2005). In 2003, low consumption of

fruits and vegetables contributed 2.1% of the total burden of disease and injury in Australia and was responsible for 4,568 deaths and 55, 259 disability-adjusted life years (DALYs; Begg et al., 2007). Furthermore, Australia could save up to $180 million per year by increasing the amount of fruit and vegetables consumed by 1 serve per person per day (Australian Chronic Disease Prevention Alliance [ACDPA], 2004).

Fruit and vegetable consumption can be considered to be both a protective factor against chronic illnesses where consumption is high, and a risk factor for chronic illnesses where consumption is low (Centre for Public Health Nutrition, 2003; NHMRC; 2003a). The way the consumption of fruit and vegetables works to reduce the impact of chronic diseases has been reported to be through a range of the components (e.g. vitamins, antioxidants etc) working together rather than individual components or nutritional supplements (Centre for Public Health Nutrition, 2003; NHMRC, 2003a). Furthermore, increased consumption of fruit and vegetables may displace (i.e. reduce) the consumption of high energy density, low nutrition "extras" (i.e. junk foods) in which dietary guidelines suggest intakes should be minimised to reduce poor health outcomes (Centre for Public Health Nutrition, 2003; Dietz & Gortmaker, 2001; NHMRC, 2003a).

Due to the varying range of beneficial components found in different fruits and vegetables, it has been noted that consuming a variety of fruits and vegetables is a particularly important factor in achieving optimal health benefits from fruit and vegetable intake (Centre for Public Health Nutrition, 2003; NHMRC, 2003a). Furthermore the nature of the dose-response relationship between fruit and vegetable consumption and health benefits has found that even small increases in fruit and vegetable consumption can lead to significant health benefits. As such the main messages from research and the NHMRC guidelines with regards to fruit and vegetable consumption are: eat a variety of fruit and

vegetables, and while the more a person eats the better protection/outcomes they will receive, even small increases may provide a significant health benefit (Centre for Public Health Nutrition, 2003; NHMRC, 2003a; 2003b).

Australian guidelines recommend that a minimum of two serves of fruit and five serves of vegetables per day for adults and 1-2 serves of fruit and 2-4 serves of vegetables per day for children aged 4-7 years of age (NHMRC, 2003a, 2003b). Despite the importance of fruit and vegetable intake, population studies examining the levels of fruit and vegetable consumption in Australia have demonstrated that most Australian adults and children do not eat the recommended quantities of fruits and vegetables (Booth et al., 2006; Hardy, King, Espinel, Cosgrove & Bauman, 2011; Centre for Epidemiology and Research, 2008; NHMRC, 2003a). For example, the 2007 Australian National Children's Nutrition and Physical Activity Survey which examined 2-16 year old children's diet and physical activity patterns in a random national sample of 4,487 children and/or caregivers found that only 22% of 4-8 year old children, 14% of 2-3 and 9-13 year old children and 5% of 14-16 year old children meet national guidelines for vegetable intake (Commonwealth Scientific Industrial Research Organisation (CSIRO), University of South Australia, 2008). Given the potential benefits of increasing fruit and vegetable consumption, and that most Australians do not currently meet dietary recommendations for number of serves of fruits and vegetables per day; this is an important area for intervention.

1.2- The impact of diets high in fat, sugar and salt on health.

Overconsumption of foods high in sugar, fat and salt tend to be associated with poorer health outcomes including, for example, obesity, type II diabetes, coronary heart disease, some types of cancer, hypertension, high cholesterol, and dental caries (Lobstein,,

Baur, & Uauy. for the IASO International Obesity Taskforce, 2004; NHMRC, 2003a; Sharma & Ickes, 2008; Burt et al., 1988; Frantz et al., 1989; Graudal, Galloe & Garred, 1998; Moore et al., 1999; Nestel et al., 2005; Bingham & Wilcock for the Health Education Authority, 1999). Reducing consumption of saturated fat, sugar and salt has the potential to reduce these health risks and reduce the public health burden of diet (e.g. Flood et al, 2009; Moore et al., 2009).

Foods high in fats and some sugars (complex carbohydrates) are generally of higher energy density compared to fruits and vegetables which tend to be high in water content and fibre content but low in fat content (NHMRC, 2003c; Tohill, Seymour, Serdula, Kettel-Khan & Rolls, 2004; NSW Childhood Obesity Secretariat,2002). Energy density itself refers to the ratio between the energy a food provides versus the volume of the food item. High energy dense foods provide a high level of energy for smaller volumes of food (NHMRC, 2003c; Rolls, Drewnowski & Ledikwe, 2005; Lobstein et al., 2004). Fats, while an important dietary component, may differ in terms of the impact they have on health. Saturated fats, in particular, are considered to be “low quality” or unhealthy compared to unsaturated fats (Lecerf, 2009; Zevenbergen, de Bree, Zeelenberg, Laitinen, van Duijn & Floter, 2009). Particular foods associated with high levels of saturated fat, sugar and salt include: Takeaway foods, processed meat products, fried potatoes and potato crisps and salty snacks, and soft drinks or cordials (Centre for Epidemiology and Research, 2008). These types of food are sometimes referred to as 'extras', 'junk foods' or 'non-core foods' by guidelines and researchers, meaning that they are not representative of the major food groups which are considered to be important for maintaining good health (e.g. Kellett, Smith & Schmerlaib, 1998; Magarey, Golley, Spurrier, Goodwin & Ong, 2009). Australian

research has shown that Australian adults and children consume excess amounts of these non-core foods (Rangan, Randall et al., 2008; Rangan et al., 2009).

Some research has separately examined different types/categories of these types of non-core/extra foods as important individual factors related to risk of chronic disease and poor health (e.g. Magarey et al., 2009; van der Horst, Oenema et al., 2007). Such types/categories of foods high in fat, sugar and salt include take away foods and other junk or "non-core" foods as one category and soft drinks and sweetened beverages as another category (e.g. Magarey et al., 2009). Indeed Lobsetin et al. (2004), for example, argue that the energy we consume from drinking fluids should be considered as a separate factor compared to solid foods as the mechanism through which fluids versus solid intakes impacts appetite significantly differ. Furthermore, these categories reflect Australian dietary guidelines in relation to recommendations to: limit consumption of saturated fat and reduce overall fat intake; eat only moderate amounts of sugar and foods containing added sugar, and drink plenty of water as opposed to high sugar drinks (soft drinks, fruit juice etc; NHMRC, 2003a; NHMRC, 2003b).

Research has suggested that there exists a positive relationship between sweetened beverages/soft drink consumption and overweight and obesity in children and adults (Chang & Nayga, 2010; Newby, 2007; Swinburn, Caterson, Seidell & James, 2004) and as such dietary recommendations state that drinking water should be preferred compared to other more energy dense drinks (NHMRC, 2003a; NHMRC, 2003b). Furthermore, sweetened beverages and soft drink consumption has been linked to metabolic syndrome, type II diabetes, non-alcoholic fatty liver disease, risk of pancreatic cancer and other health conditions (Nseir, Nassar & Assy, 2010; Odegaard, Koh, Arakawa, Yu & Pereira; 2010; Abid, Taha, Nseir, Farah, Grosovski & Assy, 2009; Mueller et al., 2010). Increasing

availability of soft drinks has been linked to decreased availability of fruit, vegetables and milk and higher availability of unhealthy meats, French fries, desserts and high sugar foods (Naska, Bountziouka, Trichopoulou & the DAFNE participants, 2010; Ranjit, Evans, Byrd-Williams, Evans & Hoelscher, 2010), further suggesting that sweetened beverages are an important target for improving dietary and health outcomes.

A positive association has been found between consumption of fast foods and takeaway and childhood and adult overweight and obesity, cardiovascular disease, stroke, hypertension and heart failure and school achievement (Chang & Nayga, 2010; Cohen, Strum, Lara, Gilbert & Gee, 2010; Capewell & McPherson, 2010; Stanley, Shah & Essop, 2009; Feinstein, et al., 2008). The societal harm of junk foods has been equated to the harms of tobacco use and excessive alcohol use, and it has been suggested that similar health policies, such as taxation, should be implemented for non-core (junk) foods as they are for tobacco and alcohol in Australia (Bond, Williams, Crammond & Loff, 2010). Furthermore, NICE guidelines from the United Kingdom recommend that the food industry moves towards reducing salt and saturated fat in food production as well as other structural changes in society such as making healthy choices cheaper and banning the use of trans-fats in processed foods and takeaway (Capewell & McPherson, 2010). Cohen et al. (2010), particularly note that targeting interventions to reduce non-core foods such as salty snacks and candy cookies, is important and may be more salient than targeting other factors such as physical activity and fruit and vegetable intake with regards to obesity.

Despite the benefits of reduced consumption of these sorts of food and beverages, Australians eat and drink much more than the recommended intake of foods containing fats, sugars and salt (CSIRO, University of South Australia, 2008; Booth et al., 2006; Hardy et al., 2011; Centre for Epidemiology and Research, 2008; NHMRC, 2003a). For example, in

the 2007 Australian National Children's Nutrition and Physical Activity Survey only 16-22% of children aged 2-16 years of age met guidelines for saturated fat intake (i.e. should be less than 10% of total energy intake; NHMRC, 2003b) and only 21-39% of children aged 2-16 met guidelines for sugar intake (i.e. should be less than 20% of total energy intake; NHMRC, 2003b; CSIRO, University of South Australia, 2008). The benefits associated with reducing consumption of foods high in fat, sugar and salt, coupled with current poor dietary compliance with Australian guidelines and recommendations, makes this an important area for intervention.

1.3- The impact of full fat dairy intakes on health

Dairy products are a common source of saturated fats in Australian diets, yet, research also suggests a very important role of dairy consumption in positive health outcomes (German et al., 2009; Wise, Radin, palmer, Kumanyika & Rosenberg, 2009; van der Pols, Gunnell, Williams, Holly, Bain & Martin, 2009) including being a potentially positive factor in weight loss through providing essential nutrients such as calcium (Christensen et al., 2009; Shahar et al., 2010). NHMRC dietary recommendations suggest reduced or low fat dairy products over full-fat products be the preference for children and adults over the age of 2 years of age as a means of reducing saturated fat intake (NHMRC, 2003a; NHMRC, 2003b; WHO, 2003b). Research supporting this recommendation includes a recent study finding that that full-fat dairy products are associated with increased weight gain in normotensive adults, whereas reduced-fat products were not associated with weight gain in normotensive adults (Alonso, Zozaya, Vazquez, Martinez & Martinez-Gonzalez, 2009); and another finding that full-fat milk intake was associated with risk of intracerebral haemorrhage (Larsson, Mannisto, Virtanen, Kontto, Albanes & Virtamo,

2009. Despite NHMRC recommendations, the majority of Australians consume full-fat dairy products which contribute to up to 27% of total saturated fat intakes (Booth et al., 2006; Hardy et al., 2011; NHMRC, 2003).

2- The development of dietary patterns and eating behaviours.

Evidence that the dietary patterns and habits of children persist into adulthood has fostered an increased research interest in the development of dietary patterns and eating behaviours (Kelder, Perry, Klepp & Lytle, 1994; Lau, Quadrel & Hartman, 1990). The development of dietary patterns in children has short, medium and long-term implications for health across the human lifespan. For example, poor child diet impacts in the short to medium term on child health and development with respect to malnutrition and stunted growth, obesity and dental caries (NHMRC, 2003b). If poor dietary habits persist into adulthood, then child dietary patterns may also impact on adult health including obesity, cardiovascular disease, stroke, hypertension, type II diabetes, some types of cancer, chronic obstructive pulmonary disease and so on (NHMRC, 2003a; AIHW, 2008; Dietz, 1998a, 1998b). The increasing prevalence of obesity and poor dietary habits of children is resulting in many chronic illnesses that were once considered "adult only diseases and health problems" such as type II diabetes, hypertension, atherosclerosis and dyslipidaemia (high cholesterol & triglycerides) now being seen in children and adolescents. Children from Aboriginal and Torres Strait Islander background are particularly vulnerable to the development of such chronic diseases as compared to Caucasian Australians (Craig & Huang, 2009; Maple-Brown, Sinha & Davis, 2010; Halpern et al., 2010).

The development of dietary patterns is influenced by a combination of genetic/innate and environmentally determined factors (Birch & Ventura, 2009). For

instance, genetically, humans are predisposed to prefer foods which are sweet and salty rather than bitter or sour and child preferences for sugary and fatty foods has been previously documented as a predisposition to learn to prefer these sorts of foods with high energy density (Birch & Fisher, 1998; Scaglioni, Salvioni & Galimberti, 2008; Birch & Ventura, 2009). Young children also are predisposed towards disliking and avoiding trying novel foods, especially around the age of two, and to learn to associate food flavours with digestive consequences of different foods (Birch & Fisher, 1998; Scaglioni, et al., 2008). Nevertheless, it has been noted that environmental influences interact with genetic and innate predispositions in the development of child diet (Savage, Fisher & Birch, 2007; Birch & Ventura, 2009). For example, with repeated food exposure, a young child with neophobic tendencies may learn to accept a new food (Birch, 1998).

The importance of environmental factors in the development of dietary habits and eating behaviours has been highlighted in a recent review conducted by Birch and Ventura (2009); examining environmental factors contributing to dietary habits and eating behaviours in evolutionary and historical contexts. From the evolutionary perspective, survival of one's children is a primary goal for parents (i.e. to bring up children who are healthy and growing well; Birch and Ventura, 2009). In the context of food scarcity, lack of food variety and palatability and poor food security, all which were common in Australia even up until the end of World War II (Erklund, 2009), perceptions that larger children (for their age) are healthier became the dominant view of many parents and society. It has been suggested that parents developed parental feeding practices to encourage growth including: eating regularly and frequently, providing large portions at meals, providing foods which children like, using food as a comforter to distress and providing pressure to eat regardless of hunger state (Birch & Ventura, 2009). However, in current times the same

environmental factors do not necessarily hold true in developed countries, where food is not scarce, a wide range of foods and a large number of high-density foods are readily available and environmental conditions are much more sanitary in terms of food security. Nevertheless, Birch and Ventura suggest that despite these environmental differences, parents are using the same practices their parents used when food scarcity, security and low variety were common problems.

Egger and Swinburn (1997) identified societal, physical, economic and socio-cultural environmental factors which influence diet including but not limited to: Food laws and regulation, labour saving devices, food taxes and subsidies, traditional cuisine, food in the home, family income, and family eating patterns. See Appendix A for the full table of factors identified by Egger and Swinburn. Furthermore, family and social factors such as food preferences, availability of specific types and varieties of food, portion size, cultural values and attitudes, parenting style, beliefs and knowledge, mealtime structure and rules, and, parent modelling and feeding strategies directly impact on the development of eating behaviours and habits in children (Patrick & Nicklas, 2005; Birch & Fisher, 1998; Golan, 2006; Birch & Fisher, 2000; Arredondo, et al., 2006). Such environmental factors are important to consider for intervention as these tend to be more modifiable compared to biological/genetic factors at the current time (Egger & Swinburn, 1997).

2.1- Parental influences on the development of dietary patterns: targeting parents as a mechanism for improving child diet.

Parents have a strong influence on the development of dietary behaviours in children through the of provision of genes and social learning, and through having significant environmental control, particularly in the home (Birch & Fisher, 1998; Golan,

2006; Young, Fors & Hayes, 2004; Scaglioni, Salvioni & Galimberti, 2008; Birch & Fisher, 2000). Such influences are particularly strong prior to children starting school, when their exposure to a larger variety of people, attitudes and food cultures increases. Parental influences on the development of child dietary habits have been shown to have long-term impact with behaviours learnt from parents persisting into adulthood (Lau, et al., 1990). In fact, parents have been identified as “the most important target” for obesity prevention efforts with regards to children, through acting as mediators of change (Golan, 2006).

Parental influence on child dietary intake through the home and family environment range from determining what foods are available and accessible to children at home (home food environment) through to family rules and the use of specific strategies surrounding eating (parental feeding practices; Stang, Rehorst & Golicic, 2004; Arredondo, et al., 2006; Birch & Fisher, 1998; Scaglioni et al., 2008; Birch & Fisher, 2000). Parents are pivotal in terms of deciding what foods are in the home and what they provide their children to eat, particularly for preschool aged-children (Rosenkranz & Dzewaltowski, 2008). Parents do the food shopping, food preparation and present food to the child. Furthermore, parents decide what "rules" there are if any around mealtimes, such as whether the family eats together, watching television at meal times and rewards for meal consumption (Tiggeman & Lowes, 2002; Rosenkranz & Dzewaltowski, 2008). Finally, the strategies that parents use to encourage or restrict eating, particular dietary habits or behaviours do impact on child eating behaviour and diet (Arredondo et al., 2006; Birch & Fisher, 1998; Scaglioni et al., 2008; Birch & Fisher, 2000). The potential modifiability of the home food environment or strategies used to manage child diet strengthens the importance of parents as intervention targets for promoting healthy child diet. The next two sections consider research on home

food environment and parental feeding strategies and their impact on child dietary patterns in more depth.

2.2- The impact of home food environment on the development of dietary patterns in children.

Home food environment takes into account a number of variables including availability of specific foods in the house, accessibility of foods in the house to children if available, meal structure (families eating together, T.V. viewing during meal times, frequency of eating out) and parental feeding practices (Nicklas et al., 2001). Home and family environment has been shown to be among the strongest influences on the development of healthy eating habits in children (Patrick & Nicklas, 2005; Golan, 2006; Nicklas et al, 2001; Rasmussen et al., 2006). This section reviews literature particularly on the impact of availability and accessibility of food at home, as these factors have been shown to be the most consistent predictors of child dietary intakes (Rasmussen et al., 2006; Nicklas et al., 2001; Patrick & Nicklas, 2005).

What children eat is dependent on what foods are available and/or accessible to them. Rasmussen et al. (2006) conducted a systemic review examining studies on potential determinants of fruit and vegetable intake in children and adolescents aged 6 to 18 years of age. Ninety-eight papers met the inclusion criteria of population, community or school based human research with children aged 6-18 investigating determinants of fruit and/or vegetable intake specifically as a primary focus or as an outcome. Papers were limited to quantitative research published in English, excluding reviews, intervention evaluations, methodological papers, prevalence papers and papers where fruit and vegetable intake are considered to be a determinant or correlate of other health issues than an outcome in its own right. The results of the review identified that the availability and accessibility of foods

in the home was consistently predicting fruit and vegetable intake in children and adolescents. All nine studies that included a measure of availability or accessibility demonstrated some positive association with fruit and/or vegetable consumption of children/adolescents, though gender differences were observed for some studies. While availability and accessibility of foods in the home has been linked to child food preferences and consumption, particularly for fruit and vegetables (Cullen et al., 2003; Reinaerts, de Nooijer, Candel & de Vries, 2007; Hearn et al.,1998), a study by Ezendam, Evans, Stigler, Brug and Oenema (2010) demonstrated that lower availability at home was also an important predictor of reduced consumption of sweetened beverages. Furthermore, child perceived availability (Young et al., 2004; Wind, Bobelijn, de Bourdeaudhuij, Klepp & Brug, 2005), set family meal times (Videon & Manning, 2003) and eating meals away from the television (Coon, Goldberg, Rogers & Tuker, 2001) has also been found to be associated with child healthy eating (i.e. increased fruit and vegetables &/or decreased junk food).

Understanding what barriers exist for parents in providing a home food environment supportive of healthy eating is important as a way of developing interventions to improve child diet (Rosenkranz & Dzewaltowki, 2008). A number of factors have been identified that limit the capacity of parents to create supportive home environments for healthy eating for their children. These include lack of nutrition knowledge or skills in food preparation, the cost of healthy foods, and, the perishability, accessibility and preparation requirements of fresh foods and parent psychological factors, such as self-efficacy (Ward-Begnoche & Speaker, 2006; Blanchette & Brug, 2005; Centre for Public Health Nutrition, 2003; Omar, Coleman & Hoerr, 2001; Hesketh, Waters, Green, Salmon & Williams, 2005; Cullen et al., 2009). Furthermore, research suggests that when parents do take steps to encourage their

children to eat healthily they often employ inappropriate strategies such as pressuring feeding practices or the use of food rewards (Stanek et al, 1990; Coon et al., 2001). These types of practices have been found to be counterproductive and hinder the normalisation of healthy dietary behaviours (Casey & Rozin, 1989).

2.3- The impact of parental feeding practices on the development of dietary patterns in children.

Parental feeding practices include behavioural strategies used to direct or mould child eating patterns, such as: pressure to eat, restriction of foods, using food rewards, modelling of eating and monitoring of eating (Campbell et al., 2006; Ventura & Birch, 2008). Parental feeding 'practices' should be distinguished from more general parenting feeding 'style' (e.g. permissive, authoritarian & authoritative parenting styles) which have also been explored in relation to child diet (e.g. Nicklas et al., 2001; Ventura & Birch, 2008). While some inconsistencies in definitions in past research has been observed, Ventura and Birch (2008) distinguish parenting styles from parenting practices with the former referring to overall parental attitudes and interaction styles, while parenting practices are specific behavioural strategies employed by parents. Research has demonstrated some link between these two constructs, where particular parenting styles have been related to the use of specific parental strategies in keeping with that style (e.g. authoritarian parents being more likely to pressure their child to eat; Darling & Steinberg, 1993; Vereecken, Rovner & Maes, 2010; Hughes, Power, Fisher, Mueller & Nicklas, 2005), nevertheless, parenting strategies are argued to have a more "direct" impact on diet outcomes compared to overall parenting style (Darling & Steinberg, 1993).

Parent behaviours including: parental healthy eating, use of feeding strategies (e.g. pressure to eat); parent modelling and parent support, repeated food exposure, use of

rewards, positive reinforcement and monitoring food consumption have all been found to be associated with healthy child eating behaviours (O'Connor et al., 2009; Stanek, Abbott & Cramer, 1990; Orlet-Fisher, Mitchell, Smiciklas-Wright & Birch, 2002; Arredondo et al., 2006; Young et al., 2004; Wardle, Herrera, Cooke & Gibson; 2003). Ventura and Birch (2008) recently conducted a systematic review of research literature published prior to January 2007 which examined relationships between parenting, child eating and child overweight. They proposed a model of a mediating relationship of child eating on the relationship of parenting and child weight with bi-directional influences of each variable upon one another (i.e. parenting impacts child weight, which also in turn impacts on parenting; see Figure 1). Articles were excluded if they: were not written in English; were not empirically based and published in peer reviewed journals or books; did not examine the relationships between parenting and child outcomes; did not measure parenting and child eating/weight; used non-human participants; examined parenting influence on weight loss, child dieting, or clinical eating/weight problems; or, examined children less than 12 months old or with a mean age of 12 years or older (i.e. adolescents). From the 67 studies included in the review, Ventura and Birch found strong evidence that parental feeding practices; such as pressure to eat and restriction, in addition to other parental influences of availability and modelling, impact upon child diet. Furthermore, they concluded that cross-sectional research suggested a relationship between parenting strategies and child weight albeit an indirect relationship mediated through the impact of parenting on child diet. Acknowledging a dearth of research in the field, the review also advocated for further research to be conducted (Ventura & Birch, 2008).

Figure 1: Model of parenting including practices and styles and their influence of child eating (behaviour, preferences, intake) and child weight taken from Ventura and Birch (2008).

A significant body of research has examined parental use of external strategies to control child diet and eating behaviour (which minimise the amount of child autonomy in feeding), and found them to be generally associated with poorer child diet outcomes (Birch et al., 2001; Hughes, et al., 2005; Savage et al., 2007). Such control strategies include exerting pressure on a child to eat certain foods or increased quantities of foods, restricting child access to palatable foods that their child likes to eat and which are often considered unhealthy, and the excessive use of monitoring to enable such restrictive practices (Birch et al., 2001).

Relationships have been found between parental use of pressure to eat and increased overall energy consumption, savoury snack and sweet snack consumption, lower levels of fruit and vegetable intake, child weight, and, girls use of dietary restraint (restricting their own eating), emotional eating and use of external eating cues (e.g. availability, portion size) as opposed to internal cues (hunger & satiety; Campbell et al., 2006; Carper, Fisher & Birch, 2000; Fisher, Mitchell, Smicklas-Wright & Birch, 2002; Galloway, Fiorito, Francis & Birch, 2006; Spruijt-Metz, Lindquist, Birch, Fisher & Goran, 2002). It has been argued that pressuring children to finish what is on their plate may lead children to use visual cues

of what is left on their plate rather than internal satiety of hunger cues when determining whether they have eaten enough (Birch, 1998). Furthermore, evidence suggests that exerting pressure to eat more healthy foods may actually influence children to react negatively and result in them having negative thoughts/feelings about such foods (Galloway et al., 2006).

Use of parental restriction of certain foods has been demonstrated to promote overeating and eating when not hungry, increased consumption of unhealthy but palatable foods (e.g. snack foods) and, in girls, negative self-evaluation around eating (Birch, Fisher & Davison, 2003; Carper et al., 2000; Fisher & Birch, 1999a; Fisher & Birch, 1999b; Fisher & Birch, 2000). It has been proposed that by restricting unhealthy palatable foods (foods high in sugar & fat), that children focus more attention on these foods, and that such restriction increases their desirability (Fisher & Birch, 1999a). When children gain access to such foods, they will then eat them regardless of whether they are hungry or not, and also will eat a larger quantity of the restricted food, as they may not be able to access it again for some time. Some recent research suggests that it may not be the use of restriction itself, but how restriction is used that brings about more negative outcomes (Ogden, Reynolds & Sith, 2006; Brown, Ogden, Vogele & Gibson, 2008).Ogden et al., (2006) coined the concepts of 'overt' and 'covert' control, where overt control refers to restriction of foods in a way that is directly perceivable to the child (e.g. telling the child what they can eat) and covert control refers to restriction that is not perceivable to the child (e.g. limiting availability of unhealthy foods at home). Ogden and colleagues suggest that each type of control may have different outcomes in terms of child healthy and unhealthy food consumption; with covert control being associated with reduced unhealthy snack consumption and overt control being associated with increased unhealthy snack consumption.

Monitoring and self-monitoring have traditionally been a part of behaviourally focused interventions across a wide range of health issues; used as valuable tools for providing feedback about change and promoting motivation around change and change maintenance (NHMRC, 2003b; Vanwormer, Boucher & Pronk, 2006; Yatendra & Yadav, 2002). A number of studies have demonstrated positive impacts of 'general' parental monitoring on child weight, diet and eating behaviours (Arredondo et al., 2006; Clark, Goyder, Bissell, Blank & Peters, 2007; Young & Fors, 2001). Birch et al. (2003), however, identified a positive relationship between restriction as a strategy to control child diet and the use of monitoring, suggesting that the use of monitoring enabled the use of restriction. It appears that 'monitoring' behaviour may also be a negative behavioural technique if used excessively as a restrictive practice to regulate child eating. The issue however, appears to be complex: the use of monitoring as a control strategy has been negatively linked to dietary self-regulation and daughters' control of energy intake, energy intake and weight (Birch & Fisher, 2000; Kral & Faith, 2007), while conversely a number of studies have also found no significant relationship between use of monitoring as a control strategy and diet or weight outcomes (Birch et al. 2001; Campbell, Crawford & Ball, 2006; Spruijt-Metz et al. 2002; Gregory, Paxton & Brozovic, 2010). Further research into the nature of parental monitoring and its different influences on child behaviour appears warranted.

Overall, parental use of pressure to eat, monitoring to enable restriction and restriction of specific types of foods have generally been found to be ineffective in the development of child healthy diet (Lee, Mitchell, Smicklas-Wright & Birch, 2001). Understanding how parents come to use these control strategies or why they use them is important to help target and modify these behaviours in interventions as mediators of child dietary change (Birch, 1998). Some research has been conducted around characteristics of

parents and children associated with the use of parental control strategies, particularly for mothers (e.g. Francis, Hofer & Birch, 2001; Tiggemann & Lowe, 2002). Demographic factors have been explored with research by Arredondo et al. (2006) for example; finding a moderating effect of child gender on the relationship between parental limit setting and child unhealthy dietary patterns. Musher-Eizenman et al. (2009) explored cultural differences between American and French parents and children in relationship to use of parental feeding strategies. They found that while French parents used more monitoring and restriction of their child's diet for weight reasons, American parents used more non-nutritive use of food (e.g. food as a reward or to regulate emotions). Other parent and child characteristics that previous research has identified as being related to use of a variety of child feeding practices include: parent level of education and socio-economic status, child age, mother's use of dietary restraint, parent age, employment and acculturation (Musher Eizenman et al., 2009; Tiggmann & Lowe, 2002; Arredondo et al., 2006, Fisher & Birch, 1999b; Francis et al., 2001; Kroller et al. 2009). However, many studies have used different measures, studied different practices, and a number of the studies are limited to the study of mothers and daughters. Furthermore, contradictory findings regarding associations between parental and child demographic factors (e.g. age, socio-economic status) and parental control practices have been found in a number of studies (e.g. Francis et al., 2001), suggesting further research is required to determine particular subgroups in the population which might be targeted by intervention and prevention efforts.

3- Modifiable intervention targets for parental influences on child diet: a role for parental self-efficacy?

The research examining the impact of modifiable factors that contribute to parental use of control practices and choices for home food environment, potentially important to inform intervention designs, is somewhat limited. Individual psychological factors such as self-efficacy, personality, beliefs, attitudes, emotional state and perceived control (locus of control) impact on the health behaviours people do or do not engage in (Albery & Munafo, 2007; Caltabiano & Sarafino, 2002). Such factors are prominent in theories of health behaviour and health behaviour change such as the Health-Beliefs Model (Rosenstock, 1960; Maiman & Becker, 1974) and Theory of Planned Action (Azjen, 1991) which have been developed specifically to explain health behaviour, inform health behaviour intervention and facilitate health behaviour change.

Self-efficacy, in particular, is a construct common to many theories of health behaviour and health behaviour change such as the Health Beliefs Model and Social Cognitive Theory, (National Cancer Institute, 2005; Nutbeam & Harris, 2004). Self-efficacy has been identified as one of the most important predictors of positive health behaviours in boys and girls (Klein-Hessling, Lohaus & Ball, 2005) and as an important, modifiable intervention target in dietary interventions for adolescents, children and adults (Cerin, Barnett & Baranowski, 2009; Rimal, 2000). Furthermore, research supports self-efficacy as an important factor in the success of some dietary interventions (Cerin et al., 2009; Rimal, 2000). In relation to child fruit and vegetable intake specifically, studies measuring self-efficacy of children and adolescents in relationship to dietary intakes also demonstrate that children with higher fruit and vegetable consumption have higher levels of self-efficacy (De Bourdeaudhuji et al., 2008).

The concept of self-efficacy originates from Bandura's Social Cognitive Theory (1977, 1986) and refers to a person's level of confidence or beliefs regarding their ability to perform certain tasks or behaviours (Bandura, 1977, 1986). People who believe they are competent at certain tasks are said to have high self-efficacy for those tasks, but those who do not believe they have the ability or competency for a task are said to have low self-efficacy for that task. Self-efficacy is different from a person's outcome expectancies, which refers to the belief that performing certain actions will results in certain outcomes (Bandura, 1977; Liebert & Liebert, 1998): outcome expectancies are beliefs about the responsiveness of the environment, whereas self-efficacy are beliefs about one's competency to perform.

Bandura (1977) explores what individual and environmental factors contribute to the development of self-efficacy. Bandura argues that beliefs around self-efficacy develop from previous experiences of mastery or failure (performance accomplishments), modelling from others about good or poor parenting (vicarious experience), verbal persuasion by self or others that such beliefs are true, and by differing physiological states such as emotional arousal from anxiety about parenting. Bandura theorised that a person's level of self-efficacy will vary depending on the level of magnitude, generality and strength of the task at hand. The magnitude of a task may impact self-efficacy in that the more complex and difficult tasks are *perceived* to be, the lower self-efficacy may be. Generality refers to whether experiences that promote or reduce self-efficacy are then generalised to promote/reduce self-efficacy in more than one area, or are limited to a more specific situation/task. The strength of self-efficacy belief will also determine how robust or amendable to change self-efficacy may be, with a strong belief in a person's level of efficacy (or lack thereof) being harder to influence than a weaker level of belief.

Self-efficacy is not constant across all areas of a person's life. People may have high self-efficacy in one area of their life, and at the same time have low self-efficacy for a different area (John, Robins & Pervin, 2008). Bandura (1990) recommends using more specific measures relating to the area of interest rather than global or domain measures of self-efficacy. A number of different measures have been developed to measure self-efficacy for specific life areas (domains) or more specific tasks. Further, the impact of self-efficacy has been extended not only to a person's own individual health behaviours, but also to parents parenting behaviours and health promoting activities on behalf of their children (Salonen et al., 2009). Task-specific measures have been found to be better predictors of behaviour (Bandura, 1990; John, Robins & Pervin, 2008; Liebert & Liebert, 1998). For example, in a sample of mothers of children aged 2-8 years old with and without conduct problems, Sanders and Wooley (2005) found that maternal self-efficacy for managing difficult child behaviours (task-specific self-efficacy) was a better predictor of maternal discipline style than general self-efficacy (global self-efficacy) and parental self-efficacy (domain level self-efficacy).

Parental self-efficacy refers to a parent's beliefs about their competency to perform parenting roles/tasks (Salonen et al., 2009), and is an example of domain self-efficacy which covers multiple behaviours and tasks related to the overall task of parenting and caring for children. It has been related to parenting styles such as coercive parenting which includes the use of hitting, yelling or scolding (Bors & Sanders (2004) and parenting strategies and practices such as reasoning, engagement and "power assertion" (Laforce, 2005; Sanders & Woolley, 2005). Parental self-efficacy also has been identified as a primary outcome for a number of parenting interventions targeting child diet and nutrition,

and, interventions targeting parenting practices in the community (Cullen et al., 2009; Sanders, Markie-Dadds, Rinaldis, Firman and Baig, 2007).

A model developed by Golan and Weizman (2001; see Figure 2) proposes a family-based framework for treating childhood obesity, and includes targeting parental self-efficacy with respect to providing a healthy and positive eating environment and parents own healthful eating as an important element in child behaviour change. Self-efficacy is argued to be a cognitive mechanism for change which contributes to persistence in attempting child dietary change in the face of obstacles. The model does not include the child as involved in obesity intervention, instead focusing on the family and on parents as the only means of change (Golan & Weizman, 2001). Recent research has suggested that such a parent-only focus may result in better weight outcomes than a combined parent and child focused approach or a child only approach (Golan, 2006; Golan & Crow, 2004; Golan, Kaufman & Shahar, 2006). However, while parental self-efficacy is proposed as the mechanism of cognitive change for parent only focused interventions; many studies have not included measures of parenting self-efficacy.

A study by West, Sanders, Cleghorn and Davies (2010) examined parental self-efficacy in the context of a parent-only focused intervention for childhood obesity (Group Lifestyle Triple P). As a part of the randomised trial of a 12 week lifestyle intervention versus waitlist control, parental self-efficacy for managing child weight-related problem behaviours was measured using the confidence scale of Lifestyle Behaviour Checklist by West and Sanders (2009). This scale examines the confidence of parents in managing child eating and physical activity problem behaviours. West et al. found that parental self-efficacy for managing child problem behaviours around weight (eating & physical activity combined) was significantly improved post intervention, compared with no improvements

found in the control group. Moreover, these improvements in parental self-efficacy were maintained after 12 months, while weight outcomes improved further 12 months post-intervention compared to immediately post-intervention (West et al., 2010). Although limited somewhat by small sample sizes, this study nevertheless provides some support for parental self-efficacy as a mechanism for change in parent only interventions for childhood obesity.

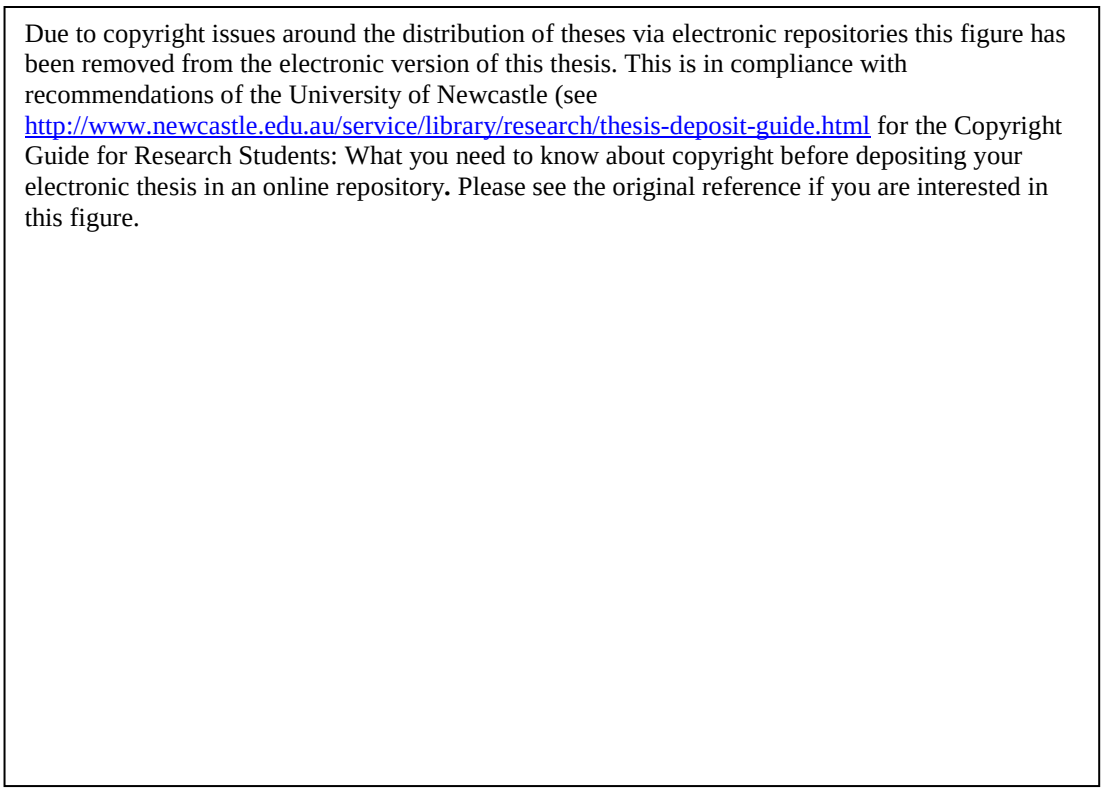

Figure 2: Golan & Weizman's (2001) model of child obesity treatment involving parent and family intervention targets.

Many studies that do examine parental self-efficacy around child diet issues have done so in the context of evaluation of an intervention to improve child diet or weight (e.g. Cullen et al., 2009). The underlying assumption for such evaluations is that self-efficacy mediates the relationship between intervention and dietary outcomes (Golan & Weizman,

2001); so that while an intervention might target education or skills, this intervention ought to help to improve parental self-efficacy to use their newly acquired knowledge and skills. A recent study by Cullen et al., (2009) represents parental self-efficacy as a mediator between intervention and outcomes, in an evaluation of the Expanded Food and Nutrition Education Program (website: http://www.fshn.cahs.colostate.edu/efnep/Default.aspx) for improving home food environment and prevention of childhood obesity. In addition to primary outcome measures of participant Body Mass Index (BMI) and diet, Cullen et al., examined a number of proposed mediating variables based on social cognitive theory including parental self-efficacy for three different behaviours: a) modelling fruit, vegetable and juice consumption, b) planning or encouraging fruit, vegetable and juice consumption and c) making fruit, vegetables and juice available. Nevertheless, there are significant potential benefits to expanding research to further understand how parental self-efficacy relates to child diet especially given proposals of parent only focused interventions as superior to child only and child and parent combined interventions (e.g. Golan & Weizman, 2001; Golan, 2006). Such benefits might include the ability to develop more targeted, efficient and effective interventions.

While some qualitative studies have suggested a relationship between parental self-efficacy and child diet (Borra, Kelly, Shirreffs, Neville & Geiger, 2003; Hoerr, Utech & Ruth, 2005) and theoretically the link appears valid, only four published studies provide empirical evidence of the relationship between parental self-efficacy and dietary issues. A study by Cullen et al. (2000) used a cross-sectional design to examine the influence of parental style and practices, parental and family barriers to fruit vegetable and juice consumption, parental self-efficacy to provide/encourage healthy diet for their children and fruit, vegetable and juice home availability on child intakes of fruits, vegetables and juices.

Parents of fourth-sixth grade children in Texas (n = 109), completed interview style questionnaires (face to face and via telephone), with their children filling out their own food records (measure of dietary intake) in class. Overall, Cullen et al. found that higher parental self-efficacy around planning and encouraging their child to eat more fruit, vegetables and juice, and parental self-efficacy around making fruit, juice and vegetables available was related to increased fruit, vegetable and juice consumption at dinner time and to the availability of fruit, vegetables and juice in the home.

Kratt, Reynolds and Shewchuk (2000) examined food availability as a moderator of the relationship between parent and child outcome expectations, knowledge and self-efficacy and parent and child fruit and vegetable consumption. Kratt et al., used multi-group structural equation modelling with cross-sectional data from 1, 196 child-parent pairs to examine food availability as a potential moderator. Parental efficacy was measured in relation to two behaviours, parents own intake and parents confidence in serving fruits and vegetables to their children. Kratt et al found good support for food availability as a moderator of the relationships between child and parent fruit and vegetable intake and outcome expectations, knowledge and self-efficacy. However, while parent self-efficacy was related to parent intake of fruits and vegetables, it did not directly relate to child intake. It should be noted that there was an indirect (mediated) effect of parental self-efficacy on child fruit and vegetable intake for families with high fruit and vegetable availability only. Nevertheless, the relationships of the end model were moderate at best (see Figure 3) and particularly poor for child fruit and vegetable intake (r^2 =.02) suggesting a significant amount of unexplained variance in child intake of fruits and vegetables in the model (Kratt et al., 2000).

Figure 3: Model reproduced from Kratt et al. (2000) representing the relationships between parent and child psychological variables and fruit and vegetable intake for home food environments where fruit and vegetables are of Medium/High availability vs low availability.

West and Sanders (2009) developed a lifestyle questionnaire focusing on parent reports of child problem behaviours with eating, physical activity, sedentary behaviours, general weight related behaviours and parental self-efficacy for dealing with these problems. In a cross-sectional study examining the psychometric properties of this scale; West and Sanders asked parents of obese, overweight and healthy weight children to complete their new Lifestyle Behaviour Checklist and three criterion measures. They were able to demonstrate, not only adequate reliability and validity of their tool, but also that parents of obese children had poorer self-efficacy for dealing with child problem behaviours in eating and exercise than those of non-obese children and that their measure of parent self-efficacy also predicted child weight status.

Finally, a cross-sectional study by Campbell, Hesketh, Silveri and Abott (2010) examined specific types of maternal self-efficacy in relation to diet in early childhood. They developed three measures including maternal self-efficacy for promoting healthy eating, maternal self-efficacy for limiting non-core foods and maternal self-efficacy for promoting physical activity in order to reduce television viewing time. Sixty first time mothers of children aged 6 to 20 months old and 80 mothers of a child who were 4-5 years old at the time of the study participated through completing the three measures of self-efficacy and reporting on demographic information, child diet, child television viewing time and their own (maternal) weight (BMI). Campbell et al. found that maternal self-efficacy for promoting healthy eating was associated with less cake consumption and increased vegetable consumption in one year old children and with increased water, fruit and vegetable consumption and less cordial consumption in 5 year old children. Furthermore, maternal self-efficacy for limiting non-core foods was associated with less cordial and cake consumption in one year old children but not associated with any food or beverage consumption in 5 year old children (Campbell et al., 2010).

Of these four studies, only Campbell, Hesketh et al., (2010) exclusively focused on the influence of parental self-efficacy on child diet. Nevertheless, all four studies found some support for a role of parental self-efficacy in child dietary patterns, even though Kratt et al., (2000) only found support for an indirect effect. It should be noted that all these studies used new measures of parental self-efficacy that specifically related to different parental influences on or management of child diet in some way. The evidence from these studies highlights the need for further research into the influences of parental self-efficacy on child diet.

Research into the relationship between parental self-efficacy and home food environment and parental feeding practices is also limited. Shriver, Hildebrand and Austin (2010) conducted a series of focus groups which identified poor parental self-efficacy for preparation of fruit and vegetables as a barrier to making fruit and vegetables more available and accessible at home for Hispanic parents in the Head Start Program. To date only one published study by Mitchell, Brennan, Hayes and Miles (2009) has examined the relationship between individual factors (including parental self-efficacy) and parental feeding practices. Mitchell et al (2009) examined self-efficacy as a potential predictor of parental feeding styles and practices, however, while a significant negative correlation was found between parental self-efficacy and parental use of restriction, general parenting self-efficacy (as measured by the Parenting Sense of Competency Scale; Johnston & Mash, 1989) was not a significant predictor of parenting use of pressure to eat or restriction of certain foods. However, it should be noted that the measure of parental self-efficacy was not specific to management of their child's diet or eating behaviour. In keeping with Bandura's (1990) guidance that specific measures will have greater predictive utility, the question remains from Mitchell et al.'s study as to whether a more specific measure might have been a significant predictor of parental practices. The limited nature of research examining parental self-efficacy in children's diet and eating behaviour and the influence self-efficacy may have on the practices parents engage in and the home food environment they provide leaves a gap in research literature to date.

While there has been some interest and development of more specific measures of parental self-efficacy in recent years, there has to date been no specific measure for parental self-efficacy for overall child diet management. The closest measure being the Lifestyle measure by West and Sanders (2009), which focuses on parental –efficacy for managing

child behaviour problems associated with eating, rather than the parental self-efficacy for managing issues around providing a healthy diet for their children and managing their child's eating in general. Other studies have used scales examining parental self-efficacy around parent modelling of fruit and vegetable intake, parent planning/encouragement of fruit and vegetable intake and parents making fruits and vegetables available/accessible in the home (Cullen et al., 2003; Cullen, et al. 2009). While the sorts of measures used by Cullen and colleagues and Kratt et al., (2000) ought to be good predictors of positive aspects such as the availability of fruits and vegetables at home for example, they do not include questions around the less healthy aspects of diet (e.g. junk food, soft drink etc) which have been argued to be more salient targets for improving dietary and weight outcomes (Cohen et al., 2010). The work of Bandura (1977, 1986, 1990), suggests that a more specific measure around parents confidence in managing child healthy and unhealthy dietary intakes, which is not limited to provision, modelling and encouragement of fruit and vegetable intake, ought to have greater ability to predict outcomes for this specific area (child diet management) that can be applied to multiple areas of diet compared to a more general measure (parenting efficacy). No such measure was identified at the time the research described in this thesis was conducted. More recently, research by Campbell, Hesketh et al., (2010) has reported a new measure of parental self-efficacy including parental self-efficacy for limiting non-core foods and parental self-efficacy for promoting healthy eating incorporating a component around unhealthy eating.

4. A bigger picture model: linking multiple aspects of parental influence on child dietary outcomes.

Understanding how different parental influences impact on child diet can aid in the development of interventions to prevent and treat child health issues related to poor eating,

such as obesity (Golan, 2006; Golan & Weizman, 2001). Furthermore, understanding the interactions between parental factors is also important to the development of interventions (Lindsay, Sussner, Kim & Gortmaker, 2006). Further exploration of potential relationships between multiple parental influences on child diet is required.

Of particular interest are studies which have used analytical approaches to explore mediating and moderating relationships amongst some of the contributing factors to child diet such as parental feeding practices, home food environment and child and parent individual factors such as self-efficacy (e.g. Kratt et al., 2000). Mediating relationships are those where a mediator variable at least partially explains the relationship between an independent and dependent variable (Howell, 2010). That is, where the independent variable influences the mediator, which then influences the dependent variable, demonstrating an "indirect" effect of the independent variable on the dependent variable. In contrast, moderating relationships are those whereby the relationship between an independent variable and dependent variable varies or fluctuates according to the level of a third, moderating variable (Howell, 2010). That is, where the moderator acts on the *relationship* between the independent and dependent variable. An example of such relationships can be found in Kremers et al. (2006) Environmental Research framework for weight Gain prevention (EnRG framework, see Figure 4). Here it can be seen that the environmental factors (independent variable) act through the cognitive mediators (e.g. perceived behavioural control) on behaviour and that the moderators (e.g. person demographics) act on the relationships between environmental factors and behaviour and on the relationship between cognitive mediators and behaviour.

Figure 4: EnRG framework model proposed by Kremers et al. 2006.

Kreamers et al.'s model is also of interest as it makes certain theoretical arguments around what variables may act as mediators and those that might act as moderators in the relationship between environmental factors and dietary behaviour. As can be seen here, they propose that the environment acts on and through individual cognitive factors (mediators) such as attitudes and intention, while moderators acting on the relationships include current behavioural factors (e.g. habits & strength of such habits) and individual fixed and unfixed factors (demographics, awareness etc). While this model is broad, it provides a beginning framework for considering current evidence around mediating and moderating relationships in relation to dietary (also physical activity) behaviour.

Research has been conducted in regards to mediating and moderating relationships where child dietary intake/s have been the target variables. Table 1 summarises some research that links parental self-efficacy, parenting practices and home food environment to child diet and provides evidence for potential mediating and/or moderating relationships

Table 1: *Summary of studies which demonstrate direct, mediating and moderating relationships between parental self-efficacy, home food environment, parental controlling feeding practices and child dietary intakes.*

Study Authors & Date	Type of Relationship	Dependent and Independent Variables Examined	Provides Evidence for a Link between
Mitchell et al., 2009	Direct Correlation	General Parental Self-efficacy	Parental Self-Efficacy
		Parental Use of Restriction	Parent Control Practices
Ventura & Birch 2008	Direct Correlation	Parental Use of Restriction	Parent Control Practices
	(Review)	Parental Use of Pressure to Eat	Child Diet
		Child Diet	
Shriver, Hildebrand & Austin	Qualitatively Reported	Parental Self-Efficacy	Parental Self-Efficacy
2010	Barrier	Fruit & Vegetable Availability	Home Food Environment
Cullen et al., 2003	Direct Correlation	Fruit Juice & Vegetable Availability	Home Food Environment
		Fruit Juice & Vegetable Accessibility	Child Diet
		Child Fruit, Juice & Vegetable Intake	
Campbell, Hesketh et al.,	Direct Correlation	Maternal Self-efficacy promoting healthy eating	Parental Self-efficacy
2010		Maternal Self-efficacy limiting non-core foods	Child Diet
		Child Intake: Cake	
		Child Intake: Vegetables	
		Child Intake: Fruit	
		Child Intake: Water	
		Child Intake: Cordial	
Neumark-Stainzer et al., 2003	Mediating	Fruit & Vegetable Availability	Home Food Environment
		Social Support for Healthy Eating	Child Diet
		Family Meal Patterns	
		Food Security	
		Socioeconomic Status	
		Fruit & Vegetable Intake	
Kratt et al., 2000	Moderating	Fruit & Vegetable Availability	Parental Self-efficacy
		Parental Self-efficacy (own & child diet)	Home Food Environment
		Child Fruit & Vegetable Intake	Child Diet
Sandvik et al., 2010	Moderating	Socio-economic Status	Home Food Environment
		Fruit & Vegetable Availability	Child Diet
		Child Fruit & Vegetable Intake	
Arredondo et al., 2006	Moderating	Child Gender	Parent Control Practices
		Parent Control	Child Diet
		Parent Limit Setting	
		Child Unhealthy Diet	
Lubans et al. 2010	Moderating	Child Gender	Child Gender
		Child Fruit & Vegetable Pre-Intervention	Child Diet Change post intervention
		Child Fruit & Vegetable Post-Intervention	

between these variables. No studies have examined the link between all these factors. Research on mediating relationships include studies by Neumark-Sztainer, Wall, Perry & Story (2003) and Ventura and Birch (2008). Neumark-Sztainer et al.(2003) examined the relationships between personal, behavioural and socio-environmental factors and fruit and vegetable intake among adolescents. Neumark-Sztainer et al., conducted structural equation modelling on cross-sectional data from 3957 adolescents who attended public middle and high schools in Minnesota, USA. They found that availability of fruit and vegetables at home mediated the relationships between social support for healthy eating, family meal patterns, food security and social-economic status with adolescent fruit and vegetable intake. However, adolescent self-efficacy for making healthy food choices was not including in the final model produced. Nevertheless, a large amount of research has examined child and adolescent self-efficacy as a mediator through which interventions into child diet and weight act (Cerin, et al., 2009; Rimal, 2000). Alternatively, Ventura and Birch (2008) conducted a systematic review of studies examining the effect of parenting (e.g. feeding practices) on child eating and weight which has been discussed earlier in this introduction. They reported evidence that parenting impacts child weight through the mediating variable of child eating behaviour. Strong evidence was found for a relationship between the parenting practices of restriction and pressure to eat with child eating behaviour and with 12/12 and 15/15 studies respectively showing a significant association between these control practices and child eating behaviour which included studies with cross-sectional, longitudinal, and experimental methodologies. The link between child eating and child weight was less consistent with only 8/12 studies demonstrating a significant association (Ventura & Birch, 2008).

A number of studies have examined potential moderators on relationships between child diet and it predictors. Sandvik, Gjestad, Samdal, Brug & Klepp (2010) examined socio-economic status as a potential moderator of the relationships between adolescent fruit intake and variables from an adapted version of the Attitudes Social influence self Efficacy model (ASE). Sandvik et al., compared model fits using cross-sectional data from three samples of children in Norway, Spain and Austria. They found support for socio-economic status (parent education & work status) as a moderator of the relationships between self-efficacy and intention to eat fruit and between availability of fruit in the home and fruit intake. Two studies also examined child gender as a potential moderator. Lubans, Morgan, Callister, Collins & Plotnikoff (2010) explored mechanisms of intervention change in the Program X intervention for adolescents which targeted physical activity and dietary behaviours. In a cluster randomised control trial they used structural equation modelling, mediation and moderation analyses to examine the theoretical structure of change six months post intervention. From their moderation analyses, Lubans et al. found a moderating effect of gender on an intervention focusing on fruit and vegetable consumption in school children, but no other mediation or moderation effects. Arredondo et al (2006), in contrast, conducted a cross-sectional study with Latino child-parent pairs including survey and anthropometric data examining the relationship of parenting style with child healthy eating and physical activity. Eight hundred and twelve child-parent pairs completed the study. Arredondo et al., found a moderating effect of child gender on the relationship between parent use of control strategies and unhealthy eating behaviour and of child gender on the relationship between parent use of limit setting and child unhealthy eating behaviour. Finally, Kratt et al. (2000), as previously described, examined fruit and vegetable availability at home as a moderator of parental and child individual factors and parental and

child fruit and vegetable intake. This is interesting, as it was the first time that fruit and vegetable availability had been considered as having a potentially moderating relationship with child dietary outcomes and the predictors of child dietary outcomes.

5. The Present Study: Aims and Hypotheses

Utilising a sub-sample of parents of children aged 3 to 5 years interviewed at baseline in a larger intervention randomised control trial (RCT), the aim of this project is: to explore and develop a model of the relationships between parental self-efficacy relating specifically to parents' perceived competence in managing their child's diet with home food environment, parental feeding strategies and child diet.

For the purpose of this study, availability and accessibility of foods in the home are used as measures of home food environment. This study focuses on parental feeding practices rather than style, mainly due to the "direct" impact that Darling and Steinberg (1993) propose between practices and diet outcomes and uses Birch et al.'s (2001) concepts of restriction, pressure to eat and monitoring. Child diet includes those elements identified as being particularly important for healthy weight including fruit and vegetable intake, junk food intake, sweetened beverages intake and fat from dairy intake (Magarey et al., 2009). The following research questions and hypotheses have been identified:

1. Are there relationships between home food environment and child diet?

    H1. Increased availability of fruit and vegetables at home will be associated with increased child fruit and vegetable intake (Patrick & Nicklas, 2005; Reinaerts et al., 2007).

H2. Increased accessibility of fruits and vegetables, non-core foods and sweetened beverages will be associated with increased consumption of these foods (Cullen et al., 2003; Patrick & Nicklas, 2005; Ezendam et al., 2010).

2. Are there relationships between parent control feeding practices as measured by Birch et al., (2001) and child diet?

H3. Higher use of controlling parental feeding practices (pressure, restriction, monitoring) will be associated with decreased child fruit and vegetable intake (Patrick & Nicklas, 2005; Ventura & Birch, 2008)

H4. Higher use of controlling parental feeding practices (pressure, restriction, monitoring) will be associated with increased unhealthy food consumption (Birch & Fisher, 2000; Patrick & Nicklas, 2005; Ventura & Birch, 2008).

3. Are there relationships between parental self-efficacy for managing child diet and home food environment, parental control feeding practices, and, child diet?

H5. High parental self-efficacy for managing child diet will be associated with healthier child diet including increased child fruit and vegetable intake, and, reduced non-core foods, sweetened beverages and fat from dairy (Campbell et al., 2010).

H6. High parental self-efficacy for managing child diet will be associated with high-availability of fruit and vegetables in the home food environment and less access to non-core foods and sweetened beverages (Shriver et al., 2010).

H7. High parental self-efficacy for managing child diet will be associated with less use of controlling parental feeding practices (Mitchell et al., 2009).

4. Do parental feeding practices and home food environment mediate the relationship between parental self-efficacy for managing child diet, and child diet?

   H8. It is hypothesised that multiple mediators may exist between parental self-efficacy and child diet, including parental control feeding practices and home food environment. See Figure 5 for the proposed model.

5. Can any variables be identified which act as moderators of the relationships between parental self-efficacy for managing child diet, home food environment, parental control feeding practices and child diet?

   H9. Socio-economic status (including parent education level and household income), child gender and availability of fruits and vegetables are hypothesised to act as potential moderators of relationships between parental self-efficacy for managing child diet, home food environment, parental control feeding practices and child diet.

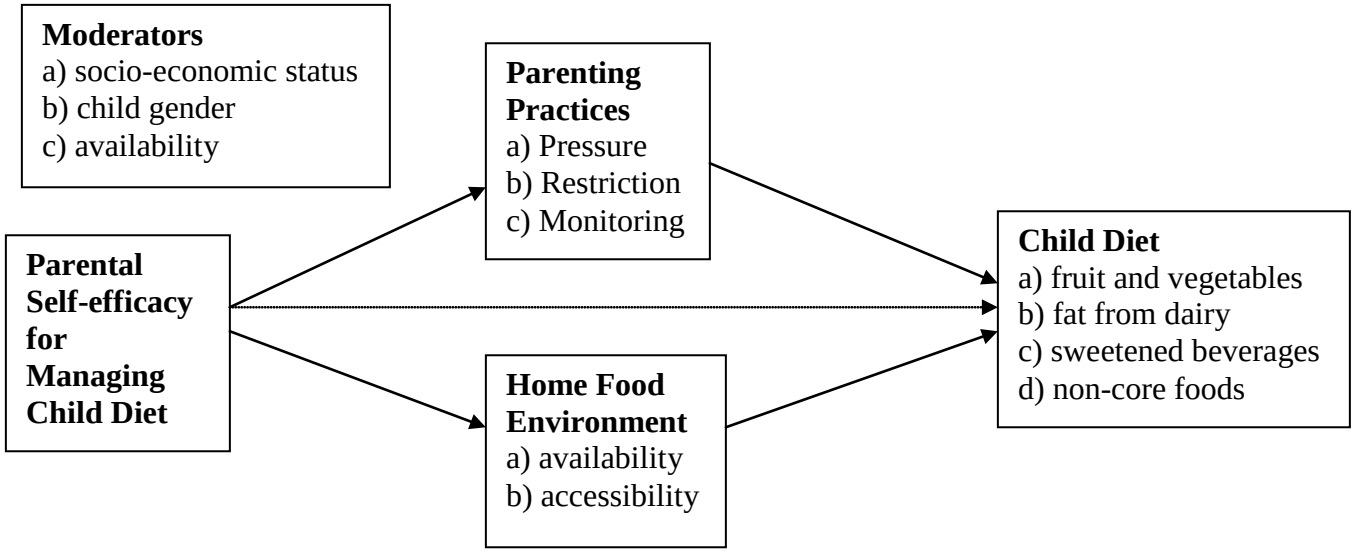

Figure 5: Proposed mediating and moderating relationships to be examined in this study

Method

6. Design and Setting

This study is a cross-sectional analysis of baseline data collected as part of the Healthy Habits randomised control trial (RCT). The Healthy Habits RCT involved the provision of a telephone based supportive intervention to parents around children's fruit and vegetable consumption compared to the provision of self-help materials. This project has been undertaken by researchers located at the University of Newcastle in the state of New South Wales (NSW) Australia. A protocol for this RCT has been published by the researchers (Wyse et al., 2010) outlining the full methodology. Only the components of this protocol/methodology relevant to this study's research questions have been described here. This project utilised data obtained in a baseline telephone survey undertaken with participating parents in the RCT who have preschool aged children (aged 3-5 years). Data for this part of the study was collected between the 30th of April and 5th August 2010.

7. Participants

Participants were parents of children who attended preschool in the Newcastle area, N.S.W. Australia. Target preschools were those which were licensed to provide care to 3-5 year old children. Preschools were excluded if they provided meals to children in their care, catered exclusively to special needs children, were Government preschools or if they had participated in child healthy eating research projects in the six months prior to this research commencing. A total of 30 preschools (71%) agreed to participate in the Healthy Habits RCT.

To be eligible for the RCT participants needed to be parents of a child aged 3-5 years old who: attended a participating preschool, resided with their child at least four days

per week, had some responsibility of provision of child meals, and able to understand spoken and written English (Wyse et al., 2010). Parents of children with special dietary requirements were included/excluded dependent on the outcomes of a consultation with a dietician who advised whether the intervention was appropriate. Parent eligibility was assessed through items included on the consent forms at point of contact. Two thousand, one hundred and sixty eight parents of children aged 3-5 years attending randomly selected Newcastle Preschools were invited to participate in the RCT. Four hundred and sixteen parents agreed to participate (178 refused) with a consent rate of 19.2% and response rate of 27.4% at baseline.

For this study, a consecutive sample of 202 participants who completed the baseline survey between the 30th of April 2010 and the 5th August 2010 were used, representing parents recruited from 26 preschools. Parents who completed the survey before the 30th of April (N = 88) did not answer questions related to use of restriction and monitoring (child feeding practices) and therefore their data was excluded from this study. The appropriate sample size for adequate power (below) was reached by the 5th of August, so parents who completed the survey after this date were not included in this study.

8. Procedures

Survey data was collected through completion of a computer assisted telephone interview (CATI) with the parent. The telephone survey was piloted and conducted by trained telephone interviewers with Hunter New England Population Health (HNEPH). The survey on average took approximately 31 minutes to complete.

8.1- Recruitment.

Parents from the Healthy Habits RCT were recruited from 30 randomly selected, consenting preschools in the Newcastle region. The sampling frame preschools consisted of all preschools in the Greater Newcastle area. This database was generated by HNEPH and comprised centres supplied by the State Office of Childcare from the Department of Community Services. Preschools which did not have the relevant age groups of children attending or which cater for children with special needs were excluded.

Eligible preschools were sent letters requesting permission to recruit participants through their service. If a preschool declined to participate a letter was sent to the next preschool on the list until 30 preschools are recruited. A research officer with HNEPH contacted the consenting Authorised Supervisors of preschools to discuss their preferred recruitment method and gather information regarding their preschools' (number of children in attendance, best days/times to recruit, delivery of consent materials to preschool & if any onsite assistance is required to support parent recruitment). A research officer also provided preschool staff with the participant recruitment packs, developed as part of the larger study. Distribution of the information and consent packs was conducted using methods considered most appropriate by the preschool's authorised supervisor (eg. children's pigeon holes or lockers or handed to parents). Reminder letters were distributed in the same way 1-2 weeks later. Consent forms were returned by parents in a sealed envelope provided and placed in a box at the preschool for collection. Participants had 2-3 weeks in total to respond.

The recruitment pack contained the information sheet and consent form. Eligible parents who provide written consent and a contact telephone number completed the

baseline telephone survey. Eligibility, as outlined above, was assessed either by a research officer and where relevant, by a dietician.

8.2- Conduct of baseline interviews/data collection.

CATI interviewers, in addition to their regular training regarding CATI operations and procedures, also received project specific training. This included relevant background information and rationale for the project, introduction to the survey procedures and script, practice sessions and piloting of the survey. Data collection was also monitored as a quality assurance procedure. Further details may be obtained from Wyse et al., (2010).

9. Measures/Materials

The baseline survey was completed by Computer Assistant Telephone Interview (CATI). The survey included demographic questions and selected items from the following self-report scales: the Child Dietary Questionnaire (CDQ; Magarey, Golley, Spurrier, Goodwin & Ong, 2009), the Healthy Home Survey (HHS: Bryant, Ward, Hales, Vaughn, Tabak & Stevens, 2008) and the Family Food Environment Questionnaire (FFEQ: Campbell, Crawford & Ball, 2006). A new parental self-efficacy measure examining specific parental self-efficacy for providing their child with a healthy diet was also developed. Questionnaires are described in detail below. See Appendix B for full version of the baseline CATI.

9.1- Demographic questions.

Demographic items were sourced from the National Health Survey (Australian Bureau of Statistics [ABS], 2009). Parents were asked about their age, gender, indigenous status, level of education, annual household income before tax, the number of children up

to 16 years of age living at home with them and the number of children at home attending preschool. They were also asked about their child's age, gender and indigenous status for the child identified as the target child for the RCT.

9.2- Children's Dietary Questionnaire (CDQ; Magarey et al., 2009).

The CDQ measures child dietary patterns for recommended and discouraged foods according to Australian dietary guidelines (Magarey et al., 2009). Items include a mix of open and close ended question. This measure includes four subscales which are the: fruit and vegetable index (FVI), fat from dairy products index (FDI), sweetened beverages index (SBI) and non-core foods index (NCFI). The psychometric properties of the CDQ have been rigorously evaluated with Australian children < 6 years of age (Magarey et al., 2009). The subscales had varying levels of internal consistency with SBI $\alpha = 0.13$, FDI $\alpha = 0.44$, NCFI $\alpha = 0.56$ & FVI $\alpha = 0.76$). Test-retest reliability for the subscales ranged from 0.51 for the FDI to 0.90 for the NCFI (SBI = 0.55 & FVI = 0.75). All subscales had the ability to detect change six months following intervention ($p<.05$). The relative validity of each scale was assessed using Spearman correlation, Bias (with 95% limits of agreement) and slope of the regression line measures. Magarey et al., note mixed results in terms of relative validity. While all four subscales demonstrated significant Spearman's correlations, bias (95% limits of agreement) and regression slope measures (at the group level only), acceptable relative validity was found only for the FVI and NCFI (see Table 2; Magarey et al., 2009).

Table 2: *Relative Validity of CDQ subscales including Spearman correlations, bias, limits of agreement and regression slope measures reproduced from Magarey et al., (2009).*

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9.3- Healthy Home Survey (HHS; Bryant et al, 2008).

The HHS measures features of the home environment which influence children to participate (or not participate) in healthy behaviours that directly contribute maintaining healthy weight (e.g. physical activity & diet; Bryant et al., 2008). The HHS is a relatively new, but previously validated survey for which each item has been individually assessed for reliability and validity (Bryant et al., 2008). Items include a mix of open and closed ended questions. HHS items have been validated against home audit visits among parents of children 3-8 years. As each item has been individually examined for reliability and validity, this allows researchers to select individual items appropriate to what they want to measure rather than to need to include the entire question set. Items selected for inclusion in this study include items measuring accessibility of foods (fruit, vegetables, salty snacks, sweet snacks, confectionary & soft drink) and the variety of fruits and vegetables available. These items were selected as availability and accessibility of foods have been identified by previous research as important predictors of dietary patterns in children (Rasmussen et al., 2006; Cullen et al., 2003; Reinaerts et al., 2007). Items measuring the quantity of foods available were not included as the authors of the scale noted difficulties with their quantity measures, particularly in terms of how package sizes were measured (small, medium, large)

and trying to transform these into volume or weight quantities (Bryant et al., 2008). The reliability and validity results are summarised below for availability and access.

1. *Food availability (variety)*: Includes items measuring the availability of fruit and vegetables, other snack foods and confectionary. Reliability for these items has been shown with .65-.89 agreement, with the exception of fresh fruit (.37; Bryant et al., 2008). Validity was shown also to be reasonable for most items with .48-.88, excepting sweet snacks (.30; Bryant et al., 2008). However, the larger RCT and this study used an adapted version of the variety of fruit and vegetable availability questions. Instead of an open ended question around how many varieties of fruit are in the home at the moment (and another identical question for vegetables), this question was transformed into providing a list of fruits matching the list of fruits in the CDQ. Parents answer yes/no for each item listed and are able to identify further fruits available at home at the moment with an open "other fruits available" option at the end. We also made these questions about all types of fruit/vegetables rather than having individual questions about fresh, canned, frozen or dried fruit/vegetables as is the case in the original HHS. This option was taken to reduce the number of questions required and increase the comparability of CDQ and HHS questions (i.e. so they both equally target the same type/number of fruits and vegetables individually). Furthermore, a more closed format (i.e. reduced open ended questions) has been noted to reduce costs in terms of time to the respondents and in terms of analyses (Frazer & Lawley, 2000). It is unknown how this may have affected the reliability and validity of these two questions as this is the first time a study has adapted these

questions in this specific way. We did not measure the variety of salty snacks, sweet snacks, candy or soda available.

2. *Food access:* Includes items measuring children's access to fruits and vegetables, sweet and salty snack foods, soda and confectionary. Reliability for these items has been shown with 79.1-86% agreement with fruit = 81.8%, vegetables = 79.1%, confectionary = 86%, soda = 85.4%, sweet snacks = 81.8% and savory snacks = 84.1% agreement across interviews. Validity has been demonstrated with 57.7-78.2% agreement with fruit = 78.2, vegetables = 75.7%, confectionary = 60.3, soda = 61.5, sweet snack = 65.4% and salty snacks = 57.7% (Bryant et al., 2008). Sensitivity and specificity for these items was as follows: fruit sensitivity = 0.89, specificity = 0.41; vegetables sensitivity = 0.79, specificity = 0.67; confectionary sensitivity = 0.57, specificity = 0.68; soda sensitivity = 0.54, specificity = 0.77; sweet snacks sensitivity = 0.63, specificity = 0.73; and, salty snacks sensitivity = 0.63, specificity = 0.45 (Bryant et al., 2008).

9.4- Family Food Environment Questionnaire (FFE; Campbell et al, 2006).

The FFE measures family environment and parental feeding practices. Items use a five-point Likert scale, rating level of agreement or frequency. Seven subscales were identified by Campbell et al. (2006) within this scale including: Perceptions of adequacy of child's diet, modelling of eating, parental-feeding strategies (pressure, restriction & monitoring), food availability, confidence in cooking, cost of and preference for fruits and vegetables, and mealtime interruptions. However, only items from the parental-feeding strategies were of interest for this study. These items had been originally sourced by Campbell et al. from Birch et al.'s (2001) Child Feeding Questionnaire and re-validated as a

part of Campbell et al.'s questionnaire. Campbell et al.'s tool was used instead of Birch et al.'s as it measured other variables of interest to the larger study also. Campbell et al. were able to reproduce restriction, monitoring and pressure to eat as separate factors within their scale, with these factors accounting for 6, 5.7 and 3.7% of variance respectively for the scale. Cronbach alpha statistics were calculated for each subscale as a measure of internal consistency with restriction, monitoring and pressure to eat achieving alpha's equal to 0.73, 0.90 and 0.75 respectively (Campbell et al., 2006).

9.5- Parental Self Efficacy for Child diet (PSEC).

The development of this measure, undertaken by the larger research team, was informed by Bandura's (2006) guide for constructing self-efficacy scales and a review of earlier self-efficacy scales by the research team. This new scale uses a six point Likert scale of 1 = strongly agree, 2 = agree, 3 = slightly agree, 4 = slightly disagree, 5 = disagree and 6= strongly disagree. A Likert scale is a common structure for many scales and may facilitate ease of administration and scoring compared to open ended items (Frazer & Lawley, 2000). Furthermore, use of Likert scales has been demonstrated to be a valid and reliable way of measuring self-efficacy (Maurer & Pierce, 1998). A mixture of forward and reverse scoring was utilised.

The content of the items was developed to specifically target self-efficacy around provision of healthy diet (e.g. Providing a healthy diet for children is difficult to manage) and management of child diet (e.g. I can solve most problems with my child's eating habits if I invest the necessary effort). Items were also included that focus on self-efficacy in the face of barriers to provision of healthy diet to children (e.g. I am able to provide healthy foods to my child, even when I have other time commitments). Items were pre-tested with

parents, health promotion experts and a clinical psychologist to determine face validity and ease of administration and understanding of items. The final version of the PSEC can be seen in Appendix C.

10. Data Analysis

10.1- Sample size/power estimate.

For this study, a sample of 200 participants was selected from a total sample of 400 participants involved in the larger RCT study. The power for this sample size is adequate for all descriptive and process calculations including: descriptive statistics (frequencies, means etc) factor analyses (of scales), Pearson correlations and multiple linear regression. For example, for Pearson's correlations, to detect a correlation of 0.3 and α= 0.05 (two tailed) Power = 0.99 (using the formula provided by Howell, 2010). Also, using G*Power (Faul, Erdfelder, Buchner & Lang, 2009; Faul, Erdfelder, Lang & Buchner, 2007) a statistical package recommended by Howell, 2010 for more complex calculations, a sample size of 171 would provide power of 0.80, α= 0.01 and effect size = 0.15 for multiple linear regression calculations using 12 predictors[1]. There has been limited research into the required sample size and power calculations for mediational analyses, though there have been some relatively recent advances in this area that were not available at the onset of the design of this study. For example, Thoemmes, MacKinnon & Reiser published a paper on power analysis for complex mediational designs in the second half of 2010. This will be of particular use for the design of future studies in this area.

[1] The term predictor in this context and throughout the methodology of this thesis refers to the statistical term used to desdcribe independent variables which contribute to a regression equation as opposed to indicating a causal link as might be indicated in longitudinal studies.

10.2- Sample characteristics and participant reports of parental influences and child dietary intake.

All data were analysed using SPSS version 18 software (SPSS inc, 2009). The first phase of data analyses included descriptive statistics (mean, standard deviation frequency data) of the sample's demographic characteristics (e.g. average age, socio-economic status, child characteristics) which are reported in the results of this report. Descriptive statistics (means, standard deviation, & frequency data) were also examined for parent self-reports of self-efficacy, use of parental control strategies for child feeding, home availability and accessibility of foods and child dietary intakes. Paired sample t-tests and related samples McNemar tests were undertaken where appropriate to accurately describe Parent's self-reports on measures (e.g. whether they reported significant differences in use of parenting strategies or availability).

10.3- Examining the psychometric properties of the PSEC.

As a newly developed scale by the research team, it was important to examine the properties of the PSEC. Factor analyses was conducted using principal axis factoring extraction methods with direct oblimin rotations. Principal axis factoring was preferred over other methods such as maximum likelihood extraction as principal axis functioning is not dependent on multivariate normal distributions and is less likely provide "improper solutions" (Fabrigar, Wegener, MacCallum, & Strahan, 1999). Direct oblimin rotations were selected as a commonly used oblique rotation method. An oblique rotation was preferred to allow calculation of between factor correlations, as such correlations are held at zero for orthogonal extractions, an inherent weakness given that many variables in health research, like restriction and monitoring, may be significantly related (Costello & Osborne, 2005). Extraction of factors only included those factors with eigenvalues equal or greater

than one, however, the scree plot was also examined as relying on eigenvalues alone is not recommended (Costello & Osborne, 2005). Use of the scree plot to estimate a cut-off for number of factors in Factor Analyses was proposed by Cattell in 1966 and shown to have strengths over the Kg criteria where eigenvalues less that 1 are excluded as factors (Cattell & Vogelmann, 1977). Factor loadings less than .3 were suppressed as the apriori floor of minimally acceptable loadings for this study. Internal reliability analyses were also conducted involving the calculation of Cronbach alpha internal reliability statistics and individual item analyses. Comparison to baseline data of a previously validated general parental self-efficacy measure, the Parent Sense of Competency Scale (PSOC; Johnston & Mash, 1989) was also conducted as a measure of convergent and discriminant validity whereby it should be expected that both measures are significantly related as measures of parental self-efficacy, but not so highly related that they are measuring the exact same concept. See Appendix D for details of the PSOC.

10.4- Analyses undertaken to address the research questions and test hypotheses.

Research questions one to three were questions about relationships between the different variables measured in this study. These questions, and their corresponding hypotheses (H1-H7) were examined by conducting Pearson's correlations between parental self-efficacy for managing child diet, variety of fruits available, variety of vegetables available, fruit accessibility, vegetable accessibility, parental use of restriction, pressure to eat and monitoring and child fruit and vegetable intake, fat from dairy intake, sweetened beverage intake and non-core foods intake. These results can be seen in the main body of the results. Pearson correlation analyses were conducted also between all variables of

interest and sample demographic characteristics, to determine potential demographic covariates or influences and can be viewed in Appendix E.

Stepwise (forward) regressions were also conducted to determine the importance of parental self-efficacy for managing child diet, parental use of restriction, pressure to eat and monitoring, and the availability and accessibility of foods in predicting child dietary intakes. These analyses allowed for an investigation of the optimal number of predictors and to determine which predictors were the strongest predictors compared to other potential predictors, in order (Howell, 2002). As a comparison, Stepwise (backwards) regressions were also conducted to compare how robust the predictors and regression models are. That is, a robust predictor will be significant in both forward and backward models, and forward models that are identical or very similar to backwards regression analyses which use the same pattern of independent and dependent variables will be more robust than those which are not. Regression analyses were conducted without including any demographic variables in the first instance, and then repeated with demographics. One of the criticisms of the use of stepwise regression has been from studies which indiscriminately include many variables as possible predictor variables. Studies which do this increase the likelihood that the analyses will find a significant effect which could be due to Type I error (a significant result due to chance rather than reflecting a true relationship; Howell, 2002; Banks, Olszewski & Maxion, 2003; Pacheco, Casado, Nunez & Gomez, 2006). Given that demographic factors were not the main focus of this study, but nevertheless should not be ignored, conducting these analyses twice was considered a middle ground approach for managing this issue..

Addressing research question 4 and hypothesis 8, examining possible mediating relationships, required firstly that the existence of associations between key variables were

established as a preliminary step to proceeding further. Specifically self-efficacy needs to relate to diet, and home food environment and/or restrictive parenting *and* restrictive parenting and home food environment need to be related to child diet. If these conditions are not met, then a mediating relationship is not supported. There has been an argument put forth that the direct relationship between independent and dependent variables is not necessary for mediating relationships (e.g. MacKinnon, Krull & Lockwood, 2000; Shrout & Bolger, 2002). However, Shrout and Bolger (2002), as early proponents of the bootstrapping techniques used here, noted that demonstrating a relationship direct relationship between independent and dependent variables is not necessary *if* there is an a priori belief that either a suppression relationship might exist or else that effect sizes of the mediation analyses are likely to be small. As no such a priori belief was held when this research was being conducted, it was decided, for this study, to maintain the criteria of needing a relationship between parental self-efficacy for managing child diet and child dietary outcomes to support mediation analyses. Where these relationships were found and where the independent variables (e.g. parental self-efficacy, availability and accessibility of foods, parental use of control strategies) were found to be significant predictors of child diet at the regression level, then multiple mediation analyses (in case of multiple potential mediators) were conducted using bootstrapping resampling techniques as proposed by Preacher and Hayes (2008). This method of conducting meditational analyses has a number of benefits in terms of the use of non-parametric resampling techniques, which use fewer assumptions than parametric tests, and in terms of viability in small to medium samples (Preacher & Hayes, 2008). Using bootstrapping resampling methods has been recommended in small to medium samples, as evidence has shown that bootstrapping performs better for power and error over other methods. This is helpful as usually methods

for conducting meditational analyses require very large samples (Preacher & Hayes, 2008). For each outcome where a multiple mediation model was attempted, predictor variables from the regression analyses for each child diet outcome were included if the predictor was shown to consistently be significant at the .05 level across previous regression analyses. However, where regression models demonstrated inconsistency, the model with the least number of predictors accounting for the greatest amount of variation (r-squared) was preferred in line with Occam's Razor which states that the simplest solution is the preferred solution.

For research question 5 moderation analyses were conducted by examining the interaction between significant predictor variables from regression analyses and hypothesised moderators (parent socio-economic status, child gender, fruit and vegetable availability) in an univariate Analysis of Variance (ANOVA) for each child diet outcome (i.e. fruit and vegetable intake, non-core food intake, fat from dairy intake and sweetened beverage intake. Significant interaction effects indicated a significant moderation effect.

11. Ethics Approval

University of Newcastle HREC approval number is H-2008-0410

Results

12. Sample Characteristics

Participants' (N= 202) demographic information can be seen in Table 3. Participating parents were predominantly female, mothers, had higher levels of education, were not of indigenous background, had moderate to high levels of household income and had on average 2.3 children. Parents had a mean age of 35.6 years (SD = 5.28) and all lived with their child at least four days per week and were responsible for provision of meals at least half the time or more. The preschool aged children of participating parents had an average age of 4.3 years (SD= 0.61); with just over half being male (51.5%), and a small proportion (5.5%) being of Aboriginal or Torres Strait Islander background.

Table 3: *Participant Demographic Information.*

Participants (N=202)	N(%)	Mean (SD)
Gender: Female	192 (95%)	-
Male	10 (5%)	-
Parent Age	-	35.6 years (5.28)
Education Level: Years 7-9	4 (2%)	-
School Certificate (Year 10)	27 (13.4%)	-
HSC (Year 12)	20 (9.9%)	-
TAFE Certificate or Diploma	47 (23.3%)	-
University, tertiary institute degree or higher	104 (51.5%)	-
Indigenous Status: Aboriginal and/or TSI	7 (3.5%)	-
Household Income: less than $20,000	10 (5%)	-
$20,000-$39,999	19 (9.4%)	-
$40,000-$59,999	25 (12.4%)	-
$60,000-$79,999	26 (12.9%)	-
$80,000-$99,999	32 (15.8%)	-
$100,000 or more	84 (41.6%)	-
Don't Know	4 (2%)	-
Refused	2 (1%)	-
Number of children <16years:	-	2.3 (0.74)
Number of children at preschool: One	188 (93.1%)	-
Two	14 (6.9%)	-
Relationship to child: Mother	191 (94.6%)	-
Father	9 (4.5%)	-
Other	2 (1%)	-

13 Parent self-report of self-efficacy, use of parent control strategies in feeding, availability and accessibility of foods and child dietary intakes.

For continuous independent and dependent variables descriptive statistics were calculated (See Table 4). It can be seen that for all child diet measures, intake was reported to be in the lower half of the total possible range. Parental self-efficacy for managing child diet is shown to be in the higher end of the range of possible scores. For the HHS it was shown that parents report having a greater variety of vegetables, compared to fruits at home ($t = -23.542$, $p < .001$). Parental use of pressure to eat was shown to occur more frequently than use of restriction ($t = 10.365$, $p < .001$) and monitoring strategies ($t = 23.538$, $p < .001$) and parental use of restriction was shown to have significantly higher reported use over monitoring ($t = 7.834$, $p < .001$).

Table 4: *Descriptive statistics for non-demographic dependent and independent variables.*

Variables	N*	Mean (SD)	Possible Range
Fruit & Vegetable Index	202	12.43 (3.10)	0-28
Fat from Dairy Index	202	3.61 (2.25)	0-15
Sweetened Beverage Index	202	2.23 (1.33)	0-5.9
Non-core Foods Index	202	2.55 (1.06)	0-10.3
Variety of fruits available	201	8.47 (2.7))	Continuous
Variety of vegetables available	202	13.54 (3.23)	Continuous
Use of pressure to eat	202	2.93 (0.77)	1-5
Use of restriction	201	2.09 (1.03)	1-5
Use of monitoring	201	1.39 (0.596)	1-5
Parental self-efficacy for child diet	202	4.71 (0.56)	1-6

* Differences in Ns due to missing data

Frequency data were calculated for categorical dependent and independent variables (See Table 5), including the following items: fruit accessibility, vegetable accessibility, salty snack accessibility, sweet snack accessibility, confectionary accessibility and soft drink accessibility. This showed that parents reported higher levels of child access to fruits and vegetables at 94.5% and 76.2% positive response rates (i.e. responding yes, my child could access this food on their own without permission and/or assistance) compared to

snack foods, confectionary and soft drinks which all had positive response rates less than 40%. Related-sample McNemar tests demonstrated that fruit accessibility was significantly higher than vegetable accessibility ($p < .001$), vegetable accessibility was significantly higher than sweet snack accessibility ($p < .001$) and salty snack accessibility was significantly higher than soft drink accessibility ($p = .01$). No significant differences were found between sweet and salty snack accessibility or between soft drink and confectionary accessibility.

Table 5: *Frequency data for non-demographic categorical variables*

Variables	N*	% Yes responses
Fruit accessibility	201	94.5
Vegetable accessibility	202	76.2
Salty snack accessibility	202	34.2
Sweet snack accessibility	202	38.6
Confectionary accessibility	202	16.3
Soft drink accessibility	202	22.8

* Differences in Ns due to missing data

14 Scale properties of the Parental Self Efficacy for Child diet (PSEC) scale.

This is a new scale, with no previous data available. Principal axis factoring analyses were conducted using direct oblimin rotation. The Kaiser-Meyer Olkin measure of sampling adequacy (KMO) and Barlett's Test of Sphericity (BTS) were adequate (KMO=0.81, BTS $\chi 2 = 387.29$, $p<.001$; Dziuban & Shirky, 1974). Results showed a three factor solution (See Table 6) accounting for 36.56% of variance using extraction sums of squared loadings. However, examination of the scree plot is suggestive of a one factor solution (see Figure 6), hence the PSEC was treated an unitary scale in all further analyses. Even so, correlations between factors were weak to moderate, with the correlation between Factor 1 and 2 = .352, between Factor 1 and 3 = .466 and Factor 2 and 3 = .369.

Internal reliability and comprehensive item analyses was also completed. For this new scale Cronbach's alpha was equal to 0.735. All items improved the Cronbach alpha

statistic, except one: "Providing a healthy diet for children is difficult to manage". If this item were removed from the scale the Cronbach's alpha statistic would improve by 0.008 (α=0.743); which was not considered sufficient to warrant removing this item from the scale. Correlations were then performed between the PSEC total score and a general measure of parental self-efficacy (PSOC, Johnston & Mash, 1989) to ascertain whether there is a relationship between the two types of self-efficacy. Results demonstrated a weak correlations between the original PSOC and the PSEC (r = 0.421).

Table 6. *Results of Principal Axis Factoring with Direct Oblimin Rotation for the PSEC**

PSEC Items	Factor 1	Factor 2	Factor 3
I am certain that I can choose healthy foods when shopping (Reverse Scored)	.685		
Even when faced with more appealing unhealthy foods, I am able to provide healthy foods to my child (Reverse Scored)	.529	.	.339
I meet my own personal expectations and goals for the foods I provide to my child (Reverse Scored)	.485		
I am able to keep trying to encourage my child to eat healthy foods even when I am under a lot of pressure. (Reverse Scored)	.457		
I honestly believe I have all the skills necessary to provide healthy foods to my child. (Reverse Scored)		.705	
I can solve most problems with my child's eating habits if I invest the necessary effort (Reverse Scored)		.537	
Providing a healthy diet for children is difficult to manage			.444
It's very difficult to prepare healthy foods for my child			.408
It's too hard to provide my child with healthy food when I'm feeling tired			.389
I am able to provide healthy foods to my child, even when I have other time commitments (Reverse Scored)#			

* loadings .3 and less were suppressed. # did not load on any factor.

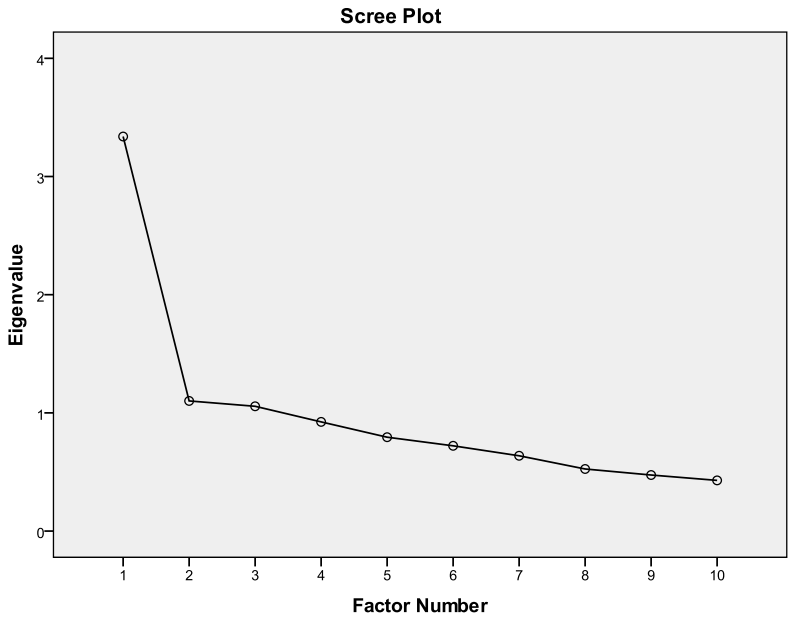

Figure 6: Scree plot of eigenvalues for the PSEC.

15 Are there relationships between parental feeding practices, home food environment and child diet?

To test hypotheses 1-7 Pearson correlations were conducted between child dietary, environmental (availability & accessibility) and parental (efficacy & feeding strategies) variables. Analyses were also conducted between demographic variables and the above variables in preparation for later hypothesis testing where certain demographic variables have been predicted to moderate some relationships and can be seen in Appendix E. The relationships between child diet, environmental (availability & accessibility) and parental (feeding strategies) factors (testing Hypotheses 1-4) can be seen in Table 7. No significant correlations were found between child diet measures and fruit, vegetable, sweet snack, confectionary or soft drink accessibility. However, support was found for Hypotheses 1 with fruit and vegetable availability being significantly and positively correlated with child fruit and vegetable intake and vegetable availability being negatively correlated with child

sweetened beverage intake. Interestingly salty snack accessibility was negatively correlated with child non-core food intake which is in contrast to Hypothesis 2 that proposed a positive relationship between accessibility of unhealthy foods and unhealthy food intakes. Hypothesis 3 was also not supported with child fruit and vegetable intake being positively associated with parental use of restriction. Hypothesis 4 was not supported as parental use of restriction was negatively associated with child non-core food intake and use of pressure to eat was negatively associated with fat from dairy intake. However, parental use of monitoring was positively associated with both child sweetened beverage and non-core food intakes reported by parents. All relationships between variables are weak (<.4).

Table 7: *Pearson Correlations between Child Dietary, Environmental and Parental Factors*

	Fruit & Vegetable Index	Fat from Dairy Index	Sweetened Beverages Index	Non-core Foods Index
Variety of fruit available	.395**	.082	-.106	-.109
Variety of vegetables available	.351**	-.038	-.215**	-.105
Fruit accessibility	-.051	.073	-.024	-.038
Vegetable accessibility	-.082	.066	.016	.078
Salty snack accessibility	.053	.051	-.069	-.209*
Sweet snack accessibility	.026	-.084	-.130	-.115
Confectionary accessibility	.056	.066	-.039	-.036
Soft drink accessibility	.076	.063	-.035	-.113
Use of pressure to eat	-.025	-.151*	-.103	.011
Use of restriction	.188**	.110	-.136	-.221**
Use of monitoring	.009	.090	.197**	.282**
Parental self-efficacy for child diet	.246**	.001	-.103	-.253**

* p< .05, ** p< .01.

Correlations were also performed between environmental (availability & accessibility) and parental factors (feeding strategies). However, only one significant weak correlation was found between salty snack accessibility and parental reported use of monitoring (r = -.17, p<.05).

16 Are there relationships between parental self-efficacy and parental feeding practices, home food environment, and, child diet?

In support of Hypothesis 5, parental self-efficacy for managing child diet was positively related to child fruit and vegetable intake and negatively related to child non-core food intake (Table 7). No associations were found between the PSEC and child intakes of fat from dairy products or sweetened beverages. Pearson correlation analyses were also conducted between parental self-efficacy for child diet and environmental (availability & accessibility) and other parental factors (feeding strategies; See Table 8). The positive association found between the PSEC and variety of vegetables available is in support of Hypothesis 6; however, the positive association between the PSEC and parental use of restriction is in contradiction to Hypothesis 7. Correlations were weak (all less than .4). No associations were found between the PSEC and fruit, vegetable, salty snacks, sweet snacks, confectionary or soft drink accessibility.

Table 8: *Pearson Correlations between Parental Self Efficacy measures and Environmental and Parental Factors*

	PSEC
Variety of fruit available	.079
Variety of vegetables available	.211**
Fruit accessibility	.007
Vegetable accessibility	-.013
Salty snack accessibility	.019
Sweet snack accessibility	.054
Confectionary accessibility	-.001
Soft drink accessibility	.123
Use of pressure to eat	-.022
Use of restriction	.277**
Use of monitoring	-.177*

* p< .05, ** p< .01.

17 Parental self-efficacy, home food environment and parental feeding practices as predictors of child diet

For each outcome measure, stepwise forward and stepwise backwards regressions were performed. Regressions were originally conducted without including demographics as potential predictors. Results of these analyses are reported below. Regressions were re-conducted including demographics, because there is some evidence in our data (see Appendix E) that some demographics are related to the diet outcome measures in keeping with Hypothesis 9. Results for analyses including demographics as potential predictors of child diet can be seen in Appendix F.

17.1- Fruit and Vegetable Index.

Final models for stepwise and backwards regressions using the FVI as the outcome measure were identical (See Table 9). The following variables consistently appeared to be significant predictors: the variety of fruits available; the variety of vegetables available; parental use of restriction; and, the PSEC. Nevertheless the model statistic (r-squared) was moderate at best. Compared to conducting stepwise forward and backward regressions without including demographic variables for the FVI (Model 1), it can be seen that including demographics (Model 2) in these analyses resulted in highly similar results. No demographic variable significantly predicted the FVI, though including demographic variables in the analyses did have a minor influence on the r-squared statistic, which increased slightly from .248.

Table 9: *Stepwise and Backward Regression final model results for the FVI not including demographic predictors(Model 1) and including demographic predictors (Model 2).*

	Child Fruit and Vegetable Intake	
Variable	Stepwise Forward Model B(p)	Stepwise Backwards Model B(p)
Model 1		
Constant	2.468 ns	2.468 ns
Variety of fruit available	.346**	.346**
Parental self-efficacy for child diet	.779*	.779*
Variety of vegetables available	.178*	.178*
Use of restriction	.455*	.455*
R^2	.248	.248
F	16.04**	16.04**
Model 2		
Constant	2.214 ns	2.214 ns
Fruit Variety Availability	.356**	.356**
PSEC total	.815*	.815*
Vegetable Variety Availability	.179*	.179*
Use of Restriction	.430*	.430*
R^2	.255	.255
F	16.47**	16.47**

*p<.05, **p<.01

17.2- Fat from Dairy Index.

For the stepwise and backwards regressions using the CDQ Fat from Dairy Index (FDI) as the outcome measure, similar results were found for forwards and backwards stepwise regressions (See Table 10). Use of pressure and restriction were consistent significant predictors and use of monitoring was consistently a borderline significant predictor (ps = .066). It should be noted that both models had weak r-squares (See Table 10). For the FDI, including demographics (Model 2) in the stepwise forward and backward regression analyses did impact the results. In particular, child age and the number of children under 16 years of age living at home displaced use of pressure and use of restriction as significant predictors in the stepwise forward analyses. In the stepwise backward analyses, child age and the number of children under 16 years of age living at home were additional predictors to use of pressure and use of restriction. Household

income was furthermore a borderline significant predictor included in the stepwise backwards model (p = .072).

Table 10: *Stepwise and Backward Regression final model results for the FDI not including demographic predictors (Model 1) and including demographic predictors (Model 2).*

	Child Fat from Dairy Intake	
Variable	Stepwise Forward Model B(p)	Stepwise Backwards Model B(p)
Model 1		
Constant	4.447**	3.794**
Use of pressure to eat	-.517*	-.562**
Use of restriction	.325*)	.375*
Use of monitoring	.131 bs#	.490 bs
R^2	0.044	.060
F	4.505*	4.184**
Model 2		
Constant	5.441**	6.97**
Use of Pressure	-.123 ns#	-.432*
Use of Restriction	.134 ns#	.359*
Child Age	-.719**	-.727**
Number of children under 16 years	.549**	.536**
at home	-.125 ns#	-.169 bs
Household Income	.076	.132
R^2	8.00**	5.80**
F		

*p<.05, **p<.01, bs = borderline significant (.1>p>.05), # not included in final model

17.3- Sweetened Beverage Index.

For the stepwise and backwards regression analyses using the CDQ Sweetened Beverage Index (SBI) as the outcome measure, it can be seen that models for stepwise forwards and backwards regressions were identical. Consistently, parental use of monitoring and, the variety of vegetables available at home were found to be significant predictors of the SBI. R-squares for these models were very weak (See Table 11). For the SBI, including demographic variables in the stepwise forward and backward analyses (Model 2) resulted in parent education level being identified as a further consistent predictor. Child indigenous

status was a borderline significant predictor for the stepwise backwards model only (p = .057).

Table 11: *Stepwise and Backward Regression final model results for the SBI not including demographic predictors (Model 1) and including demographic predictors (Model 2).*

	Child Sweetened Beverage Intake	
Variable	Stepwise Forward Model B	Stepwise Backwards Model B
Model 1		
Constant	2.823**	2.823**
Variety of vegetables available	-.089**	-.089**
Use of monitoring	.447*	.447*
R^2	.085	.085
F	9.147**	9.147**
Model 2		
Constant	4.426**	5.612**
Vegetable Variety Availability	.445*	-.068*
Use of Monitoring	-.074*	.409**
Parent Education Level	-.298**	-.249**
Child Indigenous Status	-.136 ns#	-.783 bs
R^2	.154	.169
F	11.669**	9.790**

*p<.05, **p<.01*p<.05, **p<.01, ns = non-significant, bs = borderline significant (.1>p>.05), # not included in final model.

17.4- Non-core Foods Index.

For the stepwise and backwards regressions using the CDQ Non-core Foods Index (NCFI) as the outcome measure the following variables were consistently included in both regression models as significant predictors: Use of monitoring, parental self-efficacy for child diet and salty snack access (see Table 12). Use of restriction was found to be a borderline significant predictor for both stepwise forward and backward models (p = .057 in both models). Nevertheless, r-squared statistics were relatively weak. For the NCFI, including demographics in the stepwise forward and backward regression analyses (Model 2) only the number of children attending preschool was found to be an additional borderline

significant predictor (p = .065 & .075 for forward and backward stepwise regressions respectively). Nevertheless, number of children attending preschool did not relate to the NCFI at the correlation level suggesting that this finding may be due to Type I error. Use of restriction remained borderline significant for both forward and backward stepwise regression analyses when demographic variables were included and use of monitoring, the PSEC and salty snack accessibility remained significant predictors.

Table 12: *Stepwise and Backward Regression final model results for the NCFI not including demographic predictors (Model 1) and including demographic predictors (Model 2).*

	Child Non-core Food Intake	
Variable	Stepwise Forward Model B(p)	Stepwise Backwards Model B(p)
Model 1		
Constant	4.627**	4.618**
Use of monitoring	.382**	.358**
Parental self-efficacy for child diet	-.409**	-.344**
Salty snack accessibility	-.405**	-.392**
Use of restriction	-.131 bs#	-.135 bs
R^2	.154	.17
F	11.893**	9.956**
Model 2		
Constant	4.701**	5.26**
Use of Monitoring	.389**	.362**
PSEC total	-.426**	-.366**
Salty Snack Accessibility	-.407**	-.415**
Use of Restriction	-.123 bs# .077	-.123 bs .088
Number of children at preschool	-.122 bs# .065	-.504 bs .075
R^2	.159	.186
F	12.156**	8.742**

*p<.05, **p<.01, ns = non-significant, # not included in final model

18 Do parental feeding practices and home food environment mediate the relationship between parental self-efficacy and child diet?

Multiple mediator analyses (Preacher & Hayes, 2008) were conducted for two of four outcome variables. Analyses were not conducted on the FDI or SBI as the new measure of parental self-efficacy for managing child healthy and unhealthy diet was not

found to be a significant predictor in the regression models. Therefore a mediating relationship between self-efficacy, parental feeding practices/home food environment and child intake of fat from dairy sources was not supported. Results for the FVI and NCFI are found below.

18.1- Fruit and Vegetable Index.

The following variables were included as potential mediators in multiple mediator analyses between the PSEC and the outcome measure of FVI: Variety of fruits available, variety of vegetables available, parental use of restriction. These were selected from the previous stepwise and backward regression models as consistent predictors of FVI across models. Mediation analyses were supported through regression analyses and when examining Pearson correlations which show the PSEC also relates to all potential mediators except variety of fruits available. It would be expected from this that while the variety of fruits available would not mediate the relationship between the PSEC and FVI, it would still contribute significantly to FVI by itself.

Household income was the only demographic significantly correlated to the FVI which might provide sufficient grounds for controlling for household income during these analyses. Furthermore, as one primary indicator of socio-economic status, household income may moderate some relationships within the model (hypothesis 6; Sandvik et al., 2010). However, household income did not significantly predict FVI in any regression analyses (see Appendix F). Nevertheless, it was decided to initially control for household income to test the potential of household income to impact upon the results formally. When controlling for household income, the partial effect of household income on FVI was found to be insignificant ($p = .27$), suggesting that the impact of household income on FVI does

not warrant controlling for household income in these analyses. As such the analyses reported below reflects the model where household income was not controlled for.

All model paths were significant except for the indirect effect of the PSEC on Variety of Fruit Available (p=.27; see Figure 7). This is an expected insignificant result given the lack of correlation between these two variables. However, while significant indirect effects were found, demonstrating a mediation effect of use of restriction and vegetable variety availability between the PSEC and the FVI, a significant direct effect also remained. Overall, the total direct and indirect (i.e. entire model) impact of Parent Self-efficacy for managing child diet on child fruit and vegetable intake was significant (B=1.36, p<.001), with the tested model resulting in an r-squared statistic of .25 (F(4, 195)=16.04, P<.0001).

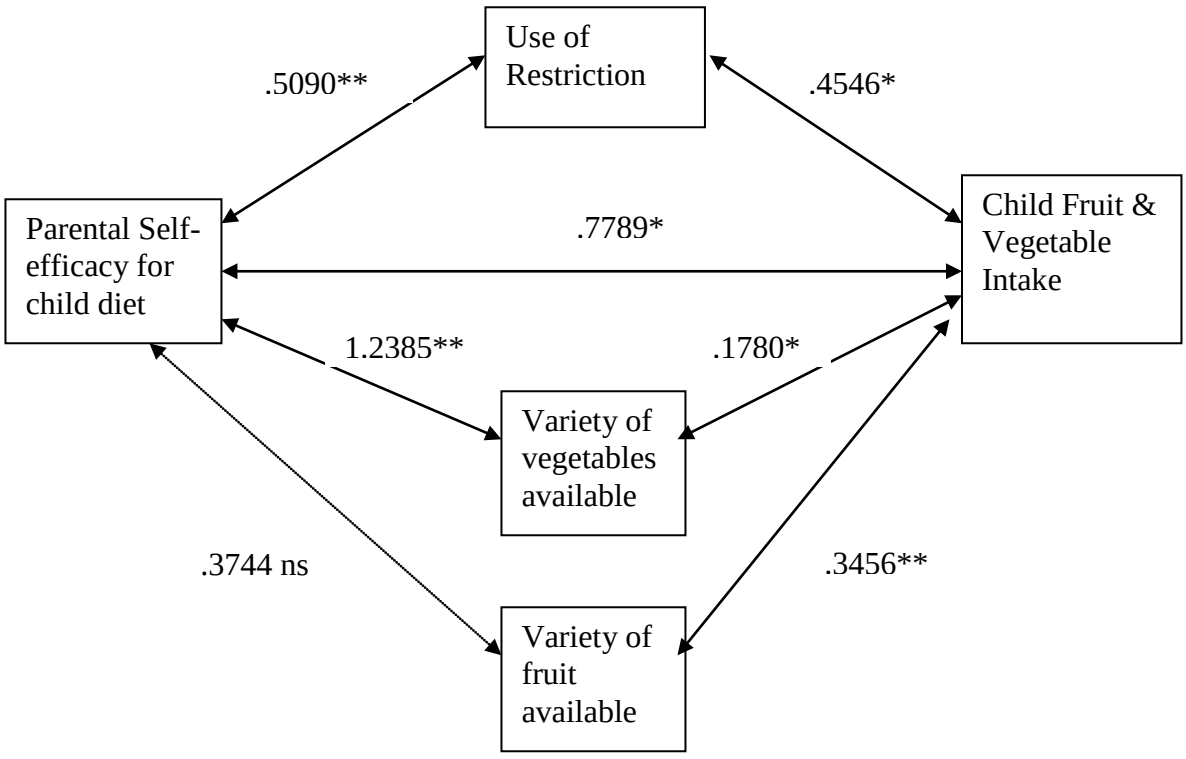

Figure 7: Multiple Mediation Model for the Fruit and Vegetable Index where paths marked* p<.05 and paths marked ** p<.01.

Bootstrapping results from 1000 resamples and normal theory tests from the model can be seen in Table 13. There was no significant difference between the effect sizes of variety of fruit available, variety of vegetables available or parental use of restriction (all contrasts with p>.05). For the total indirect effects, variety of vegetables available and parental use of restriction but not variety of fruit available, were found to be significant in terms of both normal theory tests and bootstrap Bias Corrected & Accelerated 95% Confidence Intervals (which are not inclusive of zero). This provides support for Hypothesis 8 with variety of vegetables available and parental use of restriction being significant partial mediators of the relationship between parental self-efficacy for managing child diet and child fruit and vegetable intake.

Table 13: *Bootstrapping results and normal theory tests for multiple mediation model for CDQ FVI*

	Normal Theory Tests			Bootstrapping Effect	Bias Corrected & Accelerated 95% CI	
	Effect	SE	Z		Lower	Upper
Total	.5813**	.2121	2.7408	.5724	.1605	1.0217
Variety of fruit available	.1294 ns	.1209	1.0706	.1293	-.0906	.3970
Variety of vegetables available	. 2205*	.1107	1.9924	.2162	.0584	.4826
Use of Restriction	.23141*	.1137	2.0354	.2270	.0585	.5104
Contrast Measure 1	-.0911 ns	.1471	-.6193	-.0870	-.3474	.1896
Contrast Measure 2	-.1020 ns	.1670	-.6106	-.0977	-.4233	.2055
Contrast Measure 3	-.0109 ns	.1576	-.0690	-.0107	-.3070	.3012

*p<.05, **p<.01, ns = Not Significant, Contrast Measure 1 is between Variety of Fruit Available and Variety of Vegetables Available, Contrast Measure 2 is between Variety of Fruit Available and parental use of Restriction and Contrast Measure 3 is between Variety of Vegetables Available and parental use of Restriction

18.2- Non-core Foods Index.

The following variables were included as potential mediators in multiple mediator analyses between the PSEC and the outcome measure NCFI: parental use of monitoring, salty snack access and parental use of restriction. These were selected from the previous stepwise and backward regression models as consistent predictors of NCFI across models. Mediation analyses was supported through regression analyses and when examining Pearson correlations which show the PSEC also relates to all potential mediators except salty snack accessibility. Hence similar to the FVI it might be expected that, salty snack accessibility would significantly contribute to the dietary outcome (in this case NCFI), but would not mediate the relationship between the PSEC and NCFI. No demographics were controlled for as the only demographic which was borderline significant in regressions, the number of children attending preschool, was not found to have a significant Pearson's correlation with NCFI (or any other variable in this study). This suggests that the borderline significance of this variable is likely due to chance, rather than being reflective of an actual relationship in the sample.

Results for the overall model were significant, with r-squared equal to .17 ($F(4, 196)= 9.99$, $p<.0001$). The total effects (direct and indirect) was significant ($B=-.48$, $p<.001$) and all paths except one were significant/borderline significant (See Figure 8). The only insignificant path was between the PSEC and salty snack accessibility ($p=.81$), as expected given the lack of significant Pearson correlation between these two variables. The path between use of restriction and the NCFI was only borderline significant ($p = .06$). Bootstrapping results from 1000 resamples indicated that only the total indirect effects and parental use of monitoring were significant in terms of Normal Theory Tests and Bootstrap Bias Corrected & Accelerated 95% CI (See Table 14). Contrast Measures between the three

proposed mediators found a borderline significant difference between the effect sizes of salty snack accessibility and use of monitoring. However the contrasts between salty snack accessibility and use of restriction and between use of monitoring and use of restriction were insignificant, indicating no significant differences between the effect sizes for these particular contrasts.

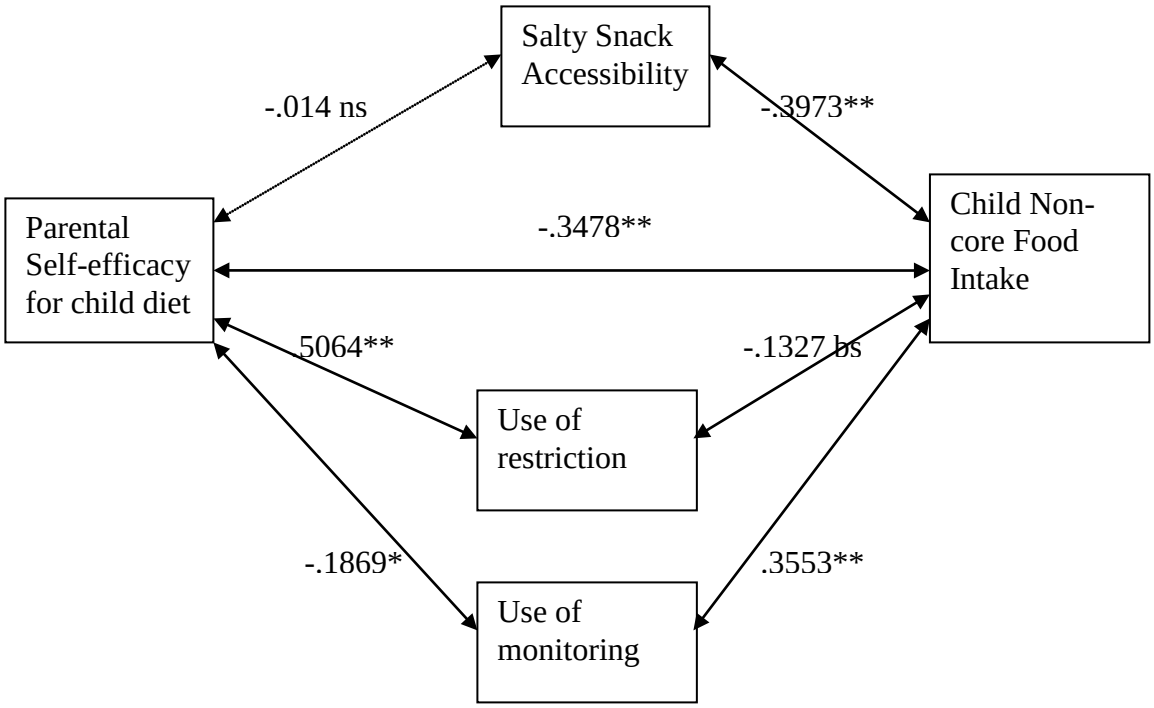

Figure 8: Multiple Mediation Model for the CDQ Non-core Food Index where paths marked* p<.05, paths marked ** p<.01 and paths marked bs (borderline significant) .1>p>.05.

Table 14: *Bootstrapping results and normal theory tests for multiple mediation model for CDQ NCFI*

	Normal Theory Tests			Bootstrapping Effect	Bias Corrected & Accelerated 95% CI	
	Effect	SE	Z		Lower	Upper
Total	-.1280*	.0590	-2.1697	-.1266	-.2924	-.0169
Salty snack accessibility	.0056 ns	.0238	.2347	.0061	-.0392	.0677
Use of monitoring	-.0664 bs	.0344	-1.9312	-.0657	-.1743	-.0111
Use of restriction	-.0672 bs	.0390	-1.7253	-.0669	-.1744	.0055
Contrast measure 1	.0720 bs	.0389	1.8505	.0718	.0018	.1528
Contrast measure 2	.0728 ns	.0450	1.6163	.0730	-.0146	.1944
Contrast measure 3	-.0008 ns	.0526	.0158	-.0012	-.1199	.1229

*p<.05, **p<.01, ns = non-significant, bs = borderline significant .1>p>.05. Contrast measure 1 is between salty snack accessibility and use of monitoring, contrast measure 2 is between salty snack accessibility and use of restriction and contrast measure 3 is between use of monitoring and use of restriction

19 Can any variables be identified which act as moderators of the relationships between parental self-efficacy, home food environment, parental feeding practices and child diet?

Data was also examined for potential moderating relationships between parental self-efficacy for child diet and home food environment and/or parental feeding practices for FVI, FDI, SBI and NCFI. Based on previous research, parent socio-economic status (income, parent education level), child gender, variety of fruits available and variety of vegetables available were examined as potential moderators (Sandvik et al., 2010; Lubans et al. 2010; Arredondo et al., 2006 Kratt et al., 2000). Moderation was explored by examining the interaction effects of these variables with the significant predictors from the regression analyses using univariate Analysis of Variance (ANOVA). Analyses calculated one interaction variable at a time, and then were re-conducted until all potential interaction effects between significant predictors and potential moderators (e.g. household income, parent education level) were complete. This was in order to reduce the number of

calculations per analysis and hence maintain a higher level of statistical power. All variables used for all moderation analyses were centred prior as part of the data cleaning process to avoid issues of multicollinearity and of evaluating one variable in the context of an extreme of the other variable (Howell, 2010).

19.1- *Fruit and Vegetable Index as the outcome measure for moderation analyses*

For the FVI, potential moderation effects of child age, parent education level and household income were evaluated on significant predictors including the PSEC, variety of vegetables available, variety of fruits available and parental use of restriction. Variety of vegetables available was not included as a potential moderator as this variable already demonstrated a mediating effect between the PSEC and FVI. Variety of fruit available was not included as a potential moderator as it was a part of the final model, with a direct effect on FVI. Results can be seen in Table 15. No significant interaction effects were noted between household income, parent education level and child gender for any of the significant predictors of FVI. That is no moderation effect has been found for any predictor variable for FVI.

Table 15: *Individually calculated interaction effects using significant predictors and selected potential moderators for FVI*

Interaction variables	Sum of Squares	Degrees of freedom	F
Parental self-efficacy for child diet *Income	2.437	1	.328 ns
Variety of vegetables available*Income	6.026	1	.813 ns
Variety of fruit available*Income	8.037	1	1.086 ns
Use of restriction*Income	16.930	1	2.301 ns
Parental self-efficacy for child diet*Parent education	13.362	1	1.796 ns
Variety of vegetables available*Parent education	.295	1	.039 ns
Variety of fruit available*Parent education	.166	1	.022 ns
Use of restriction*Parent education	052	1	.007 ns
Parental self-efficacy for child diet*Child gender	1.331	1	.177 ns
Variety of vegetables available*Child gender	.469	1	.062 ns
Variety of fruit available*Child gender	1.481	1	.197 ns
Use of restriction*Child gender	15.766	1	2.122 ns

*p<.05, **p<.01, ns = not significant

19.2- Fat from Dairy Index as the outcome measure for moderation analyses

For the FDI, potential moderation effects of child gender, parent education level, household income, variety of fruit available and variety of vegetables available were evaluated on significant predictors from stepwise regression models including the parental use of restriction and parental use of pressure to eat. As during the regression analyses it was found that child age and number of children living at home under 16 years of age were found to be additional predictors, child age and number of children living at home under the age of 16 were included as potential moderators. Results can be seen in Table 16. Similar to the FVI, no significant interaction effects were noted between household income, parent education level, child age, child gender, fruit or vegetable availability or number of children under 16 years residing at home for any of the significant predictors of FDI. That is no moderation effect has been found for these variables for FDI.

Table 16: *Individually calculated interaction effects using significant predictors and selected potential moderators for FDI*

Interaction variables	Sum of Squares	Degrees of freedom	F
Use of pressure to eat*Income	.365	1	.075 ns
Use of restriction*Income	6.511	1	1.349 ns
Use of pressure*Parent Education	.945	1	.193 ns
Use of restriction*Parent Education	2.720	1	.557 ns
Use of pressure*Child Gender	5.636	1	1.155 ns
Use of restriction*Child Gender	.720	1	.147 ns
Use of pressure*Variety of Vegetables Available	.125	1	.025 ns
Use of restriction*Variety of Vegetables Available	.017	1	.004 ns
Use of pressure*Variety of Fruit Available	.331	1	.068 ns
Use of restriction*Variety of Fruit Available	3.547	1	.733 ns
Use of pressure*Number of Children <16	.064	1	.014 ns
Use of restriction* Number of Children <16	4.712	1	1.005 ns
Use of pressure*Child Age	3.547	1	.753 ns
Use of restriction*Child Age	1.702	1	.361 ns

*p<.05, **p<.01, ns = not significant

19.3- Sweetened Beverage Index as the outcome measure for moderation analyses

For the SBI, potential moderation effects of child gender, parent education level, household income and, variety of fruit available were evaluated on significant predictors from stepwise regression analyses including the parental use of monitoring, and variety of vegetables available. It was considered that while parent education was a significant predictor during regression analyses, parent education would be examined as a potential moderator, not as a predictor, because of previous research indicating a potential moderating effect (Sandvik et al., 2010). All other significant predictors found in the regression model continued to be treated as predictors rather than moderators. Results can be seen in Table 17. Similar to the FVI and FDI, no significant interaction effects were noted between household income, parent education level, child gender, or fruit availability for any of the significant predictors of SBI. That is no moderation effect has been found for these variables for SBI.

Table 17: *Individually calculated interaction effects using significant predictors and selected potential moderators for SBI*

Interaction variables	Sum of Squares	Degrees of freedom	F
Use of monitoring*Income	2.930	1	1.947 ns
Variety of vegetables available*Income	.154	1	.102 ns
Use of monitoring*Parent education	1.411	1	.952 ns
Variety of vegetables available*Parent education	.073	1	.049 ns
Use of monitoring*Child gender	.989	1	.621 ns
Variety of vegetables available*Child gender	1.98	1	1.247 ns
Use of monitoring*Variety of fruit available	8.709E-5	1	.000 ns
Variety of vegetables available*Variety of fruit available	.186	1	.116 ns

*p<.05, **p<.01, ns = not significant

19.4- Non-core Food Index as the outcome measure for moderation analyses

For the NCFI, potential moderation effects of child gender, parent education level, household income, variety of fruit available and variety of vegetables available were evaluated on significant predictors including the PSEC, salty snack accessibility, use of monitoring, and use of restriction. Results can be seen in Table 18. NCFI is the only outcome variable where significant interaction effects were found. The variety of vegetables available was found to moderate the relationship between the PSEC and NCFI, and the variety of fruit available was found to moderate the relationship between parental use of restriction and NCFI. The interaction effects for the PSEC and variety of fruit available and for the parental use of restriction and variety of vegetables available were both borderline significant (p = .098 & p = .053 respectively).

Table 18: *Individually calculated interaction effects using significant predictors and selected potential moderators for NCFI*

Interaction variables	Sum of Squares	Degrees of freedom	F
Parental self-efficacy for child diet*Income	.029	1	.030 ns
Salty snack accessibility*Income	.428	1	.442 ns
Use of monitoring*Income	.960	1	.977 ns
Use of restriction*Income	.048	1	.049 ns
Parental self-efficacy for child diet*Parent education	.234	1	.238 ns
Salty snack accessibility*Parent education	.019	1	.887 ns
Use of monitoring*Parent education	1.694	1	1.738 ns
Use of restriction*Parent education	.024	1	.025 ns
Parental self-efficacy for child diet*Child gender	.079	1	.081 ns
Salty snack accessibility*Child gender	.882	1	.917 ns
Use of monitoring*Child gender	.732	1	.749 ns
Use of restriction*Child gender	.105	1	.107 ns
Parental self-efficacy for child diet*Variety of vegetables available	6.156	1	6.531*
Salty snack accessibility* Variety of vegetables available	.113	1	.118 ns
Use of monitoring* Variety of vegetables available	.575	1	.592 ns
Use of restriction* Variety of vegetables available	3.625	1	3.793
Parental self-efficacy for child diet*Variety of fruit available	2.648	1	2.760 ns
Salty snack accessibility* Variety of fruit Available	.857	1	.895 ns
Use of Monitoring* Variety of fruit available	.137	1	.141 ns
Use of Restriction* Variety of fruit available	8.024	1	8.612**

*p<.05, **p<.01, ns = not significant

Discussion

This study is one of the few that have examined the relationships between determinants of preschool aged child eating behaviour and multiple dietary outcomes related to health and wellbeing. Most other studies examining these relationships have been with older children and limited to fruit and/or vegetable intake (e.g. Cullen et al., 2003, Kratt et al., 2000; Mitchell et al., 2009). Examining entire dietary patterns has been more common in intervention studies (e.g. Cullen et al., 2009) and a greater focus on junk foods and/or soft drink consumption has been apparent in some recent research (e.g. Cohen et al., 2010; Feinstein et al., 2008; Ranjit et al., 2010).

In this sample, similar to other studies (e.g. Booth et al., 2006; Hardy et al., 2011; Centre for Epidemiology and Research, 2008; NHMRC, 2003a), fruit and vegetable consumption by children was reported to be less than recommended by Australian dietary guidelines (Magarey et al., 2009; see Appendix G for Magarey et al.'s Child Dietary Questionnaire cut off scores for meeting NHMRC guidelines). Alternatively, fat from dairy, sweetened beverage and non-core food consumption by children was reported to be greater than recommended by Australian dietary guidelines (Magarey et al., 2009). Again this is consistent with other Australian research (e.g. CSIRO, University of South Australia, 2008).This further supports a need for intervention in this target population.

20 Relationships between home food environment and child diet

Overall the results supported the hypothesis that higher availability of fruits and vegetables would be related to higher child consumption of fruits and vegetables. That is, weak but positive associations were found between the variety of fruits available and variety of vegetables available with child fruit and vegetable intakes. Interestingly, there

was also a negative association between the variety of vegetables available and child intake of sweetened beverages, suggesting that the wider variety of vegetables that is available at home the less a child will consume sweetened beverages.

That child intake of fruits and vegetables was found to be related to availability of fruits and vegetable, is to some extent a logical finding in that children can't eat what is not available to them. Few previous studies have examined the impact of fruit and vegetable availability (or other food availabilities) on child diet in preschool aged children specifically. Two studies that have examined the impact of fruit and vegetable availability in preschool aged children were conducted by Spurrier, Magarey, Golley, Curnow and Sawyer (2008) and Haire-Joshu et al., (2008), with which the findings of the current study were largely consistent. Spurrier et al., (2008) examined home environment impacts upon preschool aged children's diet, including the impact of availability of foods on fruit and vegetable, fat from dairy, sweetened beverage and non-core food intakes. Similar to the current study, Spurrier et al., found multiple positive associations between availability of foods in the home and preschool child intakes of those foods, including for fruit and vegetable intakes. Additionally, Haire-Joshu et al., (2008), completed an intervention study with parents of preschool aged children. They found that availability of fruits and vegetables predicted change in preschool children's dietary intakes of fruits and vegetables. This finding supports the importance of fruit and vegetable availability in the home in increasing the likelihood of preschool child intakes of these foods.

It was hypothesised that accessibility to fruits and vegetables, salty snacks, sweet snacks, confectionary and soft drinks would be related to increased child consumption of these foods. However, while a relationship was found between salty snack access and child non-core food intake, this relationship was negative, suggesting that increased access to

salty snack foods is related to less intake of non-core foods. No relationship was found between measures of child access to fruits and vegetables, sweet snacks, confectionary or soft drink with and measures of child food intake, which is also inconsistent this hypothesis.

The finding of a negative relationship between ability to access salty snacks and non-core food consumption may appear counter-intuitive. However, in another study by Zive et al. (1998), preschool children's access to food was found to have a negative relationship with child's overall energy intake and another negative association was reported between availability of food at home and child fat intake. These 'counter-intuitive' results were considered by Zive et al., as reflective that increased child autonomy and support to learn to self-regulate foods choices leads to better food choices by children. Zive et al. suggested that reduced use of parental control strategies was the mechanism that enables children to learn self-control and self-regulation. Zive et al.'s interpretation relates to findings by Fisher & Birch (1999), Savage et al., (2007) and others which suggest that use of parental control strategies decreases the ability of children to self-regulate their dietary intakes and hence leads to poorer food choices. While in this study, there was no relationship between salty snack access and use of restriction or pressure, there was a negative relationship with parental use of monitoring. Parental use of monitoring in turn was associated positively with non-core food intake, which could potentially support Zive et al.'s (1998) argument that the negative associations they found were due to increased child autonomy and learning of self-control and self-regulation. Hence, it is feasible that where a child has learned skills to help self-regulate food intake, increased accessibility to foods that should only be eaten in moderation and for overall food access may have a negative relationship with intake of non-core foods and overall energy intake. While there

is no way of testing Zive et al.'s hypothesis in the current study, this is an area which may be useful to examine in future research.

The lack of significant results concerning accessibility of fruit and vegetables, confectionary, soft drink and sweet snacks and child intakes of these foods is contrary to a number of previous research results (e.g. Cullen et al., 2003; Hearn, et al., 1998). However, there is limited research regarding the impact of accessibility of foods in the home with preschool aged children and most research (including in older samples) has been restricted to fruit and vegetable intakes. Zive et al.'s (1998) study is one of the few which target preschool aged children, and their findings were contrary to the expected outcome, finding negative, rather than positive associations between child access to foods at home and food intakes. Hildebrand and Betts (2009) also conducted a study which included a measure of child accessibility to fruits and vegetables. However this study did not examine associations of accessibility with fruit and vegetable intakes, but rather examined stage of change of parents for implementing change in their serving fruits and vegetables to their preschool aged children.

There appears to be more variability in results around the impact of accessibility of fruit and vegetables at home compared to availability (e.g. Van der Horst, Oenema et al., 2007; McClain, Chappuis, Nguyen-Rodriguez, Yaroch & Spruijt-Metz, 2009). However, there has also been heterogeneity in the measurement of accessibility across target populations. For example, Reinarts et al., (2007), measured accessibility of fruits and vegetables as having these foods 'ready-to-eat', Hildebrand and Betts (2009) used number of serves as a proxy measure of accessibility in young children, and van Assema, Glanz, Martens and Brug (2007) appeared to combine availability and accessibility together as one construct. Cullen et al.'s (2003) definition of accessibility as related to factors that facilitate

consumption of food items, including timing, form (i.e. ready to eat) and location (visibility, ease of obtaining etc) is particularly comprehensive. In contrast to the results of the current study, Cullen et al., did find that fruit vegetable and juice accessibility accounted for a significant amount of variation in child fruit, vegetable and juice consumption in school aged children. Overall, variation in the operational definition of accessibility in previous research makes identifying the true nature of the relationship, if any, between fruit and vegetable accessibility and fruit and vegetable intake, difficult.

Overall, the current study has replicated research regarding the positive association of availability of fruit and vegetables in the home and had mixed findings regarding the relationship of accessibility of foods with child dietary intakes. While previous research suggests an important role of food availability and accessibility for child dietary intake, most previous research has been limited to fruit and vegetable intake (Van der Horst, Oenema et al., 2007; McClain, Chappuis, Nguyen-Rodriguez, Yaroch & Spruijt-Metz, 2009), and targets school aged children or adolescents (Blanchette & Brug, 2005; Rassmussen, 2006). Furthermore, measurement issues may exist for child food accessibility in particular (e.g. Reinarts et al., 2007; Hildebrand & Betts, 2009; van Assema et al., 2007) and the practice in some research of combining availability and accessibility into a single or interchangeable concept may need to be addressed. Further research in this area is recommended.

21 Relationships between parental use of control strategies and child diet

The hypothesis that there would be a negative relationship between controlling feeding practices and fruit and vegetable intake was not supported. Only one weak positive association with parental use of restriction was found; in the opposite direction to that

predicted. The findings were similar, for the most part, with respect to the relationships between controlling feeding practices and other dietary outcomes (i.e. fat from dairy, sweetened beverages, non-core foods); only negative relationships between child fat from dairy intake and parental use of pressure to eat, and, between child intake of non-core foods and parental use of restriction, when positive relationships had been expected. The only relationships which were consistent with the hypothesis were the positive associations between parental use of monitoring and child intake of sweetened beverages and non-core foods.

Findings of previous research examining the relationship between parental use of restriction and preschool children's dietary intake have been mixed. A number of studies have found a negative impact of parental use of restriction on child dietary intakes, with higher levels of parental use of restriction being associated with higher overall intakes, snack intakes and so forth (e.g. Birch & Fisher, 2000; Fisher & Birch, 1999a; 1999b). In contrast, some research has found a positive influence of parental use of restriction on preschool aged children's diet. For example, Sud, Tamayo, Faith and Keller (2010) found that higher levels of parental restriction at home were associated with preschool aged children selecting food and drink combinations of lower energy density in a laboratory context. Other research has found no association between parental use of restriction and child dietary intake, although such studies examined school aged children, rather than preschool aged children (e.g. Matheson, Robinson, Varady & Killen, 2006; Campbell et al., 2006).

Hence, the findings from the current study were unexpected, but not unique. The positive association between parental use of restriction and child fruit and vegetable intake and negative association between the parental use of restriction and child non-core food

intake suggests that in our sample, parental use of restriction may be working as parents might intend. That is, parental use of restriction to manage their children's diet is associated with increased healthy food consumption and less unhealthy food consumption; though this does not appear to extend to dietary fat intake from dairy products or the consumption of sweetened beverages. Sud et al., (2010) suggested that their findings regarding a positive influence of restriction, somewhat at odds with other research, may have been due to cultural differences given their primarily non-Caucasian, low socio-economic sample. However, this would unlikely to apply to the current study, where the sample did not specifically target indigenous or ethnically diverse populations of parents. Alternatively, recent research by Ogden et al., (2006), suggests that previous mixed findings regarding controlling feeding practices may be related to whether the practice is overt or covert, where covert use is likely to be related to more positive outcomes than overt use. The current study did not allow identification of a parent's use of restriction as being either overt or covert, and this may be worthy of pursuit in future research.

One other explanation for the current results could be due to unrestricted access to foods being uncommon. While Fisher and Birch (1999a, 1999b) have demonstrated in preschool aged children that child intake of restricted foods increases when children are granted free access to restricted foods, it is feasible that few children of preschool age would be granted unrestricted access to restricted foods in real world settings in the short term (i.e. during the study period). Scaglioni et al. (2008), have discussed the short and long term effects of parental use of restriction. In the short term, where restriction may increase attention, preference and initial intake, in 5-11 year olds this may lead to issues with self-regulation of diet, eating in the absence of hunger, weight gain and negative self-evaluation (Scaglioni et al., 2008). While parents may use restriction with some short term

success (i.e. restricting short term intake under controlled conditions), Scaglioni et al., note that problems may not become apparent until the child has grown older and has increased choice and autonomy.

Research examining the relationship between parental use of pressure to eat and child diet intake generally supports a negative impact of parental use of pressure to eat on preschool aged children's dietary intakes, and hence use of pressure to eat was hypothesised to demonstrate a negative relationship with intakes of fruits and vegetables in the current study. Evidence has been found that pressure to eat is associated with lower intakes of fruits and vegetables, increased intakes of unhealthy snacks, higher intakes of fat; neophobia and trends for those children who are pressured to eat to eat less overall (Fisher et al., 2002; Brown et al., 2008; Lee et al., 2001; Galloway et al., 2006). There has been one study which identified a positive outcome in school aged children. Matheson et al. (2006) did found a positive relationship between pressure to eat and vegetable intake in children for those living in food-secure homes. Nevertheless, this appears to be an exception to a larger body of research.

In the current study a negative relationship between parental use of pressure to eat and child fat from dairy intakes was found, but no relationship between use of pressure to eat and any other measure of child diet. This is consistent with research demonstrating reduced overall dietary intake among children in response to parental use of pressure to eat (Galloway et al., 2006), however inconsistent with evidence that parental use of pressure to eat is related to higher intakes of fat (Lee et al., 2001). It is difficult to interpret this finding without further information about the use of pressure in this sample. For example, whether parents are pressuring their children to eat particular foods, in contrast to a general pressure to eat more may have implications for the relationships found in the current study. Some

research does indicate that being pressured to eat specific foods may increase child dislike of these foods which could explain a negative relationship (Birch, 1998; Galloway et al., 2006). Why pressure to eat should relate to full fat dairy intake but no other dietary measure is also difficult to understand. There is evidence suggesting that parents who use pressure to eat often have children who are picky or fussy eaters and also that these parents are more likely to perceive their children to be underweight (Francis et al., 2001; Gregory et al., 2010; Galloway, Fiorito, Lee & Birch, 2005). However this was not measured in the current study and does not actually explain why pressure to eat only relates to full fat dairy intake and not to any other dietary measure.

There is much less research on monitoring of child diet (for children of any age) as a parental control strategy, compared to research on the use of pressure and restriction. Use of monitoring was used in combination with use of restriction and restricted access in a questionnaire tool developed by Birch and Fisher (2000) to assess maternal restrictive practices. These practices in turn significantly related to 5 year old daughter's daily energy intake. While, parental use of monitoring was not found to be significantly related to child weight in the original paper exploring the factor structure of the scale (Birch et al., 2001), subsequent research found that parental use of monitoring, adjusted for adolescent Body Mass Index (BMI), significantly increased the odds of adolescent healthy and unhealthy behaviours respectively (Kenyon Fulkerson & Kaur., 2009). A number of studies have found no relationship between parental use of monitoring and child total fat mass, BMI, eating behaviours such as child fussiness or responsiveness to food, or child diet outcomes (Spruijt-Metz, Li, Cohen, Birch & Goran, 2006; Gregory et al., 2010; Campbell et al., 2006). No significant effect of child weight status has been found for use of monitoring by

parents, suggesting that parents of overweight children do not monitor their child's diet any more or less than parents on healthy weight children (Moens & Braet, 2007).

In the current study parental use of monitoring was associated with increased child intake of both sweetened beverages and non-core food intake and not associated with child fruit and vegetable intake or fat intake from dairy products. One possible explanation for these findings may be that as the amount of energy dense foods and beverages a child consumes increases so does the likelihood that a parent will identify a need to monitor their child's intake of these food. Nevertheless, it is not possible from the analyses conducted in this study to determine a causal link in this direction. It might also be possible that the use of monitoring as a control strategy/restrictive practice draws their child's attention to foods which parents identify as needing to overtly monitor (Scaglioni et al., 2008). Increased attention in combination with the palatability of energy dense foods and beverages, might then lead to increased preference and intake (e.g. Fisher & Birch, 1999a). Further exploration is warranted around the findings related to parental use of monitoring in this study and longitudinal studies which address causality are of specific interest.

22 Parental self-efficacy for child diet: relationships with child diet, home food environment and parental feeding practices.

The new measure of parental self- efficacy concerning management of child diet did significantly relate to a number of measures. As predicted, higher parental self-efficacy for managing child diet related to greater child intakes of fruit and vegetables, lower child intakes of non-core foods, higher variety of vegetables available, and lower parental use of monitoring. The PSEC related only to the parental use of restriction in the opposite direction than predicted.

The findings that higher parental self-efficacy for managing child diet was related to healthier child dietary intakes (i.e. higher fruit and vegetable, lower non-core foods) is consistent with research by Campbell, Hesketh et al., (2010) with parents of 5 year old children; where positive relationships were found between parental self-efficacy and child healthy foods intake (e.g. fruit and vegetables), and negative relationships between parental self-efficacy and child unhealthy foods intake (e.g. cake). While parental self-efficacy for managing child diet did not relate to fat from dairy intake or sweetened beverage intake, it is possible that this may be due to insufficient specificity in the wording of the measure; that is referring to healthy/unhealthy foods, rather than to beverage or dairy related foods specifically.

Parental self-efficacy for managing child diet only related to one aspect of home food environment in this study. Namely, the variety of vegetables available was likely to be wider for parents with higher parental self-efficacy, than lower parental self-efficacy. While Cullen et al., (2003) found a relationship between parental self-efficacy and availability of fruits, vegetables and juice in school children, their measure of self-efficacy was specific to making these foods available (i.e. measured parents' confidence in performing the target behaviour of making fruit, vegetables and juices available at home). Alternatively, Kratt et al., (2000), used a self-efficacy measure not specific to making foods available and found that fruit and vegetable availability moderated the relationship between self-efficacy to eat and provide fruit, juice and vegetables and intake of these foods for school children and their parents. Nevertheless, Kratt et al., did not report correlations between variables, making it difficult to compare their results with the current study.

Parental self-efficacy for managing child diet also related to two parental feeding practices, monitoring and restriction. The relationship between parental self-efficacy and

parental use of monitoring was in the expected negative direction, suggesting that poor self-efficacy in management of child diet is associated with increased monitoring of child diet. No previous published research has examined the relationship between monitoring as a parental control strategy and parental self-efficacy. A number of studies that use the Child Feeding Questionnaire (CFQ) as a measure of parental feeding strategies in preschool and school aged children have excluded the monitoring subscale (e.g. Carper et al., 2000; Mitchell et al., 2009). In contrast, this study demonstrated a positive relationship between parental self-efficacy and parental use of restriction, with more confident parents reporting using more restriction. This is contrary to findings by Mitchell et al. (2009) who found that general parental self-efficacy had a negative relationship with parental use of restriction in parents of school aged children. However, it is possible that this relationship exists in the opposite to predicted direction because as a strategy, parental use of restriction is working as parents intend in this sample (i.e. they are successfully restricting non-core foods and promoting fruit and vegetable intakes through restriction). Hence an argument could be made that parents who are successfully using restriction are likely to be more confident.

23 Parental feeding practices and home food environment as mediators of the relationship between parental self-efficacy and child diet

Due to the heterogeneous findings regarding the different dietary outcomes, the implications of the results for each outcome are discussed separately.

23.1- Fruit and Vegetable Intake as the outcome measure in multiple mediation analyses.

Multiple mediation analyses demonstrated a significant mediator effect of variety of vegetables available and parental use of restriction on the relationship between diet specific parental self-efficacy and child fruit and vegetable intake. Variety of fruit available also

contributed significantly to child fruit and vegetable intake, but was not a mediator between parental-self-efficacy and child fruit and vegetable intake.

While a number of studies have examined predictors and mediators of child fruit and vegetable consumption, not other studies have examined the same combination of variables used in this study. Some studies have found that factors such as intention to eat fruit and perceived barriers to eating fruit and vegetables mediate the relationship between self-efficacy and child intake of fruits and/or vegetables (e.g. Sandvik et al., 2007; Bruening, Kubik, Kenyon, Davey & Story, 2010). However, these studies examine school children/adolescent self-efficacy as a part of individual factors that influence child/adolescent intakes of fruit and vegetables, rather than examining parental influences on child dietary intake. Other research has found that fruit and/or vegetable availability and accessibility mediate relationships between child fruit and vegetable consumption and factors such as socio-economic status, social support, family meal patterns, parent modelling, and gender (Neumark-Sztainer et al,. 2003; Ball et al., 2009; Brug, Tak, te Velde, Bere & de Bourdeaudhuij, 2008).

There are no studies that examine parenting strategies as mediators of self-efficacy and child fruit and vegetable intake. However, some studies have focused on mediators of the relationship between parental feeding practices and child over-weight/obesity or eating characteristics. Parental concern of child over or underweight, have in particular been shown to mediate the relationships between restriction and child food responsiveness and pressure to eat and child food fussiness respectively, in addition to mediating the relationship between parental feeding styles and child weight (Gregory et al., 2010; Webber, Hill, Cooke, Carnell & Wardle, 2010).

In the context of previous research on parental self-efficacy, feeding practices, home food environment and child consumption of fruits and vegetables, the current study expands and covers new ground in terms of the interrelationships between these variables. Availability of vegetables in particular and parental use of restriction (when restriction is working as parents intend, limiting child consumption of non-core foods) are seen to partially mediate the relationship between diet specific parental self-efficacy and child intake of fruits and vegetables. This demonstrates the potential of parental self-efficacy in managing child diet to impact on parent behaviour (use of restriction) and choices in regards to home food environment (making fruit and vegetables available in the home), both of which relate to child consumption of fruits and vegetables.

23.2- Non-core Food Intake as the outcome measure in multiple mediation analyses.

Multiple mediation analyses demonstrated a significant mediator effect of parental use of monitoring on the relationship between diet-specific parental self-efficacy and child intake of noncore foods. Salty snack accessibility also contributed significantly to child noncore food intake, but was not a mediator between parental-self-efficacy and child non-core food intake. While the path between parental use of restriction and parental self-efficacy was significant, the path between parental use of restriction and child intake of non-core foods was not and the indirect effect of diet specific-parental self-efficacy through parental use of restriction was only borderline significant, indicating that the parental use of restriction was not a mediator in this study.

There are no published studies examining mediators of the relationship between parental self-efficacy and child non-core food consumption and few studies examine mediators of child non-core food intake in general. Two studies by Ball et al., (2009) and

Pearson, Ball & Crawford (2011) examined some potential mediators for predictors of adolescent dietary intakes of non-core foods with some success (i.e. they found significant mediators). However, further research is required to examine mediating relationships for the outcome of preschool children's non-core food intakes.

The current study only found one mediating variable between parental self-efficacy for managing child diet and child non-core food intake; the parental use of monitoring. This is a new finding as to date no studies have examined mediators of preschool aged children's intakes of non-core foods. Nevertheless, Campbell et al., (2006) found that parental use of monitoring did not predict sweet or savoury snack consumption in multiple linear regression analyses. Parental use of restriction, which appeared to be a borderline significant mediator, was also found not to predict sweet or savoury snack consumption by Campbell et al. However while parental use of pressure to eat was found to be a significant predictor of sweet and savoury snack consumption by Campbell et al., this was the one measure of parental feeding strategies that was not a significant predictor in the current study for child non-core food intakes, and therefore not included in mediation analyses. It would be of interest to examine further the role of parental feeding practices in child intakes of non-core foods.

23.3- Fat from Dairy and Sweetened Beverage Intakes: not suitable for multiple mediation analyses.

For the outcomes of child fat from dairy intake and child sweetened beverage intake, requirements were not met to conduct a mediation analysis. That is, as parental self-efficacy for managing child diet was not related to the intake of fat from dairy or to the intake of sweetened beverages, there was no relationship to be mediated.

Past research on child full-fat dairy intake is relatively limited in terms of examining mediators and psycho-social determinants of full fat versus reduced fat dairy consumption in children or child dairy consumption at all. Some research has been conducted in adults with chronic diseases, such as cardiovascular disease and type II diabetes (e.g. White, Terry, Troup, Rempel & Norman, 2010) where factors such as planning have been found to mediate the relationship between intentions to eat foods low in saturated fat, perceive behavioural control and intake of foods low in saturated fats. For children, Fisher, Mitchell, Smiciklas-Wright, Mannino & Birch (2004) found that availability of milk mediated the relationship between maternal modelling of milk intake and daughters' consumption of milk.

Research into soft drink and sweetened beverage intake in children is a growing area of research in terms of psycho-social determinants and the relationship between sweetened beverages and child weight. In terms of research examining mediation effects, two studies by Ezendam et al., (2010) and van der Horst, Kremers et al., (2007) have found mediating effects for consumption of sweetened beverages in adolescents. Ezendam et al., (2010), found a mediating effect of perceived behavioural control on the relationship between the availability of sweetened beverages and decreased consumption of sweetened beverages. Van der Horst, Kreamers et al., (2007), found partial mediating effects of adolescent attitude, adolescent self-efficacy and parent modelling on the negative relationship between parental restrictive practices and adolescent consumption of sweetened beverages. Both studies, undertaken with adolescents, highlight the potential for future research in younger target samples of children.

Overall, research is limited in regards to mediation effects for the outcomes of child fat intake from dairy products and child intakes of sweetened beverages. Nevertheless, the

lack of mediation for child fat from dairy intake in the current study is possibly related to the measure of self-efficacy used not being pertinent to the child consumption of dairy products/sweetened beverages, rather than indicative that mediating relationships between parental individual factors and child intakes of these foods and beverages do not exist.

24 Can any variables be identified which act as moderators of the relationships between parental self-efficacy, home food environment, parental feeding practices and child diet?

Due to the heterogeneous findings for the different dietary outcomes, the implications of the results for each outcome will be discussed separately.

24.1- Moderators for child fruit and vegetable intake.

In the current study, none of the relationships between the predictors of child fruit and vegetable intake and child intake from the regression analyses were found to be moderated by parent socio-economic status or child gender. That is, no significant interaction effects were found between parental self-efficacy for managing child diet, variety of fruits or vegetables available or parent use of restriction with parent socio-economic status or child age respectively. This suggests that parent socio-economic status (parent education level, household income) and child gender do not moderate the relationships of any of the predictor variables with preschool children's fruit and vegetable intake.

Limited research has been conducted around moderators of the relationship between parental self-efficacy and child dietary intakes, and none has been conducted with preschool aged children. Sandvik et al. (2010) found that socio-economic status moderated the relationships between home availability of fruit and child fruit intake, child self-efficacy and child fruit intake and child intention to eat fruit and child fruit intake in sixth grade students. In contrast, Lubans et al., found that adolescent gender moderated intervention

effects for fruit and vegetable consumption. Kratt et al. (2000) also has previously found a moderating effect of availability of fruits and vegetables on parent and fourth grade children's intakes of fruit and vegetables.

A number of factors may have contributed to the null results found in the current study for moderation effects of socio-economic status and child gender for child fruit and vegetable intakes. For example, most participants' education level was relatively high with only 15.2% of participants completing year 10 or less. As such, under-representation of lower socio-economic parents may have contributed to a null result. Given approximately equivalent representation of child genders within the current sample (51.5% males), it is unlikely that under-representation has impacted the results. As such the null findings are more likely to be due to there being no gender differences with regards to strength of relationships between child intake of fruit and vegetables and parental self-efficacy in this sample. It is interesting that in many research studies that there may often be found gender differences in the results (e.g. Cullen et al., 2003; Campbell et al., 2007), yet in others no differences are found. Little explanation can be provided as to why and under which circumstances such differences can be found. There do exist statistical techniques to examine, for example, moderated mediation effects (i.e. indirect effects that exist only under certain conditions, see Preacher, Rucker & Hayes, 2007). While this was beyond the scope of the current study, examination for such effects with regards to child gender may be an interesting target for future research.

24.2- Moderators for child non-core food intake.

When the relationships in the mediating model of child non-core food consumption were examined for potential moderation effects of socio-economic status and child gender,

no significant interaction effect were found. This suggests that these demographic variables do not moderate the relationships of any of the predictor variables with child non-core food intake. However, significant interaction effects were found for the variety of fruits available with parental use of restriction and the variety of vegetables available with parental self-efficacy for managing child diet. Furthermore the variety of fruit available also demonstrated a borderline significant interaction with parental self-efficacy for managing child diet and the variety of vegetables available demonstrated a borderline significant interaction with parental use of restriction. Hence the variety of fruits available and the variety of vegetables available have demonstrated moderating effects for the outcome of child non-core food consumption.

There have been no studies of moderator of preschool aged children's intakes of non-core foods. Previously, Arredondo et al., (2006) examined moderating effects of child characteristics on the relationships between parental use of control strategies and child unhealthy eating. They found child gender to be a significant moderator of parental control and child unhealthy eating and of parent limit setting and child unhealthy eating for children in grades Kindergarten to year 2. Alternatively, Ho et al., (2010), found that perceived affluence (socio-economic status) and adolescent gender both were found to moderate the relationship between home proximity to fast food shops and adolescent consumption of junk foods/soft drinks.

The current study found that the variety of fruits and vegetables available acted as a moderator between parental self-efficacy for managing child diet and child intakes of non-core foods and parental use of restriction and child intakes of non-core food respectively. This is an interesting finding in light of arguments that suggest that fruit and vegetable consumption may displace or offset consumption of foods with higher energy densities

(e.g. Centre for Public Health Nutrition, 2003; Dietz & Gortmaker, 2001). Part of this argument relates to evidence that children and adults unconsciously regulate their short term diet intakes based on weight and volume of food content in the stomach rather than energy density or meeting energy needs (de Castro, 2005). So a set volume and weight of fruits and vegetables will lead to feeling "full" may be the same weight and/or volume of non-core foods which lead a person to feeling "full", though the non-core foods will be associated with significant increased energy intake for the meal in question (de Castro, 2005). This suggests that there could be an interchangeable element in dietary intakes base on volume and weight of food alone. The extension could be made from the current results that not only does increased availability of a wide range of fruits and vegetables relate to increased consumption of fruits and vegetables but also that they influence relationships between parental self-efficacy, parental feeding practices and child consumption of non-core foods.

24.3- Moderators for child fat from dairy and child sweetened beverages intakes.

Analyses of potential moderation of the relationships for child consumption of full fat dairy products and child consumption of sweetened beverages demonstrated no significant interaction effects between predictors of consumption of these foods/beverages and any of the potential moderators. That is, socio-economic status, child gender, fruit or vegetable availability did not moderate the relationships between child intakes of fat from dairy and any of the predictors found in the regression model or between child intakes of sweetened beverages and any of the predictors found in the regression model. Two additional demographic features were also examined as potential moderators for child intakes of fat from dairy products only; child age & number of children <16yrs living at

home, as they had both demonstrated relationships with child consumption of full fat dairy products in the correlation analysis. Neither of these demographic variables demonstrated a moderating effect.

No previous studies have examined moderators of full fat dairy consumption in preschool aged-children, while results from the current study do not support a moderated relationship with the variables examined. One previous study by Ho et al., (2010), examined gender and socio-economic status as potential moderators of the relationships between neighbourhood food environment and adolescent consumption of foods including junk food/soft drinks as a combined outcome measure. They found that gender and socio-economic status moderated the relationship between proximity to fast food restaurants and junk food and soft drink intake for adolescents. While the current study has found results that are inconsistent with Ho et al. (2010), there are a number of key differences that preclude a meaningful comparison of results. The target age of children was different, and, the Ho et al., study focused only on soft drink consumption excluding other sweetened beverages.

While no moderators were found for child intakes of fat from dairy products or child intakes of sweetened beverages, there was relatively little variation in reports of child intakes of these foods/beverages. This may have impacted the results of the analyses by providing limited scope for correlation and regression analyses. Further examining moderators of child full fat dairy consumption and sweetened beverage consumption may be warranted in determining moderating factors for consumption of these foods.

25 A brief summary of findings related to the five research questions

It was the aim of this study to explore and develop a model of the relationships between parental self-efficacy for managing child diet, home food environment, parental feeding strategies and preschool aged children's diet. Five research questions were developed, with corresponding hypotheses, to address this aim and it appeared pertinent to briefly summarise the findings of the current study in the context of these research questions given the complexity of the findings and length of discussion above.

The first three research questions aimed to identify the patterns of relationships between; home food environment and child diet, parental feeding practices with child diet and, parental self-efficacy for managing child diet and all of these variables (i.e. home food environment, parental feeding practices & child diet). With regards to the hypothesised relationships between home food environment and child diet, only the availability of fruits and vegetables respectively related to child fruit and vegetable intake, accessibility of these items did not. Furthermore accessibility of salty snacks was the only measure of accessibility to relate to any dietary outcome, and it did so in the opposite than predicted direction by having a negative relationship with child non-core food intakes. Child fat from dairy intakes did not relate to any measure of home food environment and only the availability of vegetables in the home had a relationship (negative) with child sweetened beverage intakes.

With regards to the hypothesised relationships between parental feeding practices and child diet, parental use of monitoring was the only measure that related to child dietary outcomes in the predicted manner. That is, there was a positive association between parental use of monitoring and intakes of sweetened beverages and non-core foods.

However, parental use of restriction had the opposite than predicted relationship with both child fruit and vegetable intakes (positive association) and child non-core food intakes (negative association). Parental use of pressure to eat only related to child fat from dairy intakes in the opposite than predicted direction (negative association).

With regards to the hypothesised relationship of parental self-efficacy for managing child diet with child diet, home food environment and parental feeding practices, parental self-efficacy was related to two of the four dietary intakes in the predicted direction. That is parental self-efficacy for managing child diet had a positive association with child fruit and vegetable intakes and a negative association with child non-core food intakes. Parental self-efficacy for managing child diet did not relate to child fat from dairy intakes or sweetened beverage intakes. Parental self-efficacy for child diet, also related to home food availability of vegetables in the predicted (positive) direction, however did not relate to any other measure of home food availability. Parental self-efficacy for managing child diet; did not relate to parental use of pressure to eat, related to parental use of restriction in the opposite (positive) direction than predicted, and, related to parental use of monitoring in the predicted (negative) direction.

The fourth research question aimed to identify mediators of the relationship between parental self-efficacy and each child dietary outcome. Two mediation models were derived; for the relationships between parental self-efficacy for managing child diet and child fruit and vegetable intake and child non-core food intake respectively. For child fruit and vegetable intakes, the variety of vegetables available and parental use of restriction both partially mediated the relationship between parental self-efficacy for managing child diet and child intakes of fruits and vegetables. For child non-core food intakes, only the

parental use of monitoring partially mediated the relationship between parental self-efficacy for managing child diet and child intakes of non-core foods.

The final research question aimed to identify potential moderators of the relationships found between parental self-efficacy for managing child diet, home food environment, parental feeding practices and each child dietary outcome. Socio-economic status and child gender were not found to moderate of any relationship with child diet. The only moderators found were; the home food availability of vegetables for the relationship between parental self-efficacy for managing child diet and child intakes of non-core foods, and, the home food availability of fruits for the relationship between parental use of restriction and child intakes of non-core foods.

26 Some implications for practice and research

In the broader context of clinical practice, intervention development and theoretical implications there are a number of key considerations for the results of this study. Firstly, parental self-efficacy was demonstrated to continue to have a direct influence on child food intakes of fruit and vegetables and non-core foods, even after accounting for indirect effects (i.e. mediation effects were only partial). This highlights the importance of parental self-efficacy as an intervention target above and beyond the influence it has on parental use of control strategies and the availability of fruits and vegetables in the home. Furthermore, Salonen et al., (2009) have previously suggested that there is potential for using measures of parental self-efficacy in clinical practice. In particular, Salonen et al., argued that a specific measure of parental self-efficacy may be used as a clinical indicator of risk or at risk families even as early as one week following birth of a child (though they did not specify what type of risk). In the context of the present study, Salonen et al.'s suggestion

could be extended to indicate that it may be feasible to use a measure of parental self-efficacy for managing child diet in routine practice in preschool or medical settings for identifying parent-child dyads "at risk" for developing unhealthy eating patterns. Hence, interventions could become more targeted towards those with the highest level of risk. The idea of routine screening could also potentially be extended to other significant risk factors, such as parents with poorer feeding practices or households with limited availability of fruits and vegetables, for the development of an unhealthy diet.

Research examining the relationships between parental influences through individual factors such as self-efficacy, controlling practices and choices around the home food environment on child dietary intakes is relatively limited in preschool aged children. The findings of the current study therefore have specific implications for policy makers and healthcare professionals around the area of early intervention. There has been an increased focus on early intervention and prevention for children in Australia, with the aim to improve child development outcomes. For example the Council of Australian Governments (COAG) in 2009, outlined a National Early Child Development Strategy which highlight early intervention into a number of areas including the prevention of chronic diseases with focus on nutrition and physical activity (COAG, 2009). Early intervention for diet to targeting families of preschool aged children is important as by the time a child begins attending primary school, many eating patterns have already begun to be established in the home environment (Birch, 1998). The findings of the current study may provide some insight into intervention targets (e.g. which dietary intakes to target for which families/parents) and the mechanisms (e.g. self-efficacy) that may be useful to utilise in early intervention programs.

The current study found support for mediating effects of parental feeding practices and home food environment on the relationship between parental self-efficacy for managing child diet and child intakes of fruits and vegetables and non-core foods. Furthermore, the current study found a moderating effect of availability of fruits and vegetables on relationships between parental self-efficacy and non-core food intake and the relationship between parental use of restriction and non-core food intake respectively. Replication and extension, of these results is essential, particularly to further understand potential displacement effects of between child intakes of fruit and vegetables and non-core foods. To further extend these results, other parental individual factors may be worth exploring, such as outcome expectancies, knowledge and attitudes. Furthermore, determining whether these relationships are stable over time (in older children and/or adolescents), and the impact of intervention on these relationships is well worth considering.

There are also some other specific areas that would be worthwhile investigating further. Firstly, minimal results were found in the current study for the outcomes of child full fat dairy and sweetened beverage consumption. Even where significant relationships were found, the independent variables involved explained minimal variance in child consumption of sweetened beverages and full fat dairy. Identifying the specific parental factors, whether they are individual factors (e.g. self-efficacy), behaviours (e.g. parenting practices) or influences (e.g. on home food environment) that relate to these dietary outcomes may have implications for intervention and practice.

Another important consideration for future research is around the issue of accessibility of foods. For example, this study found no significant results indicating that access to different foods influenced the actual food consumption of pre-schooler aged

children. Measurement error may have contributed to this finding, in that it may have been better to measure what the child 'does' access rather than 'could' access in this age group of children, as it is likely that they actually access only what is presented to them by their parents (e.g. Hildebrand & Betts, 2009). There would appear to be an avenue of research which could examine the difference between being able to access foods and actually accessing food. Furthermore there would appear to be an age effect of accessibility with younger children possibly accessing foods differently (e.g. through pressuring parents), which warrants further investigation. It would be important for any future research in this area to clearly differentiate between availability and accessibility.

Finally, there is a paucity of research that includes the use of monitoring as a control strategy, despite the inclusion of monitoring in Birch et al.'s (2001) development of the Child Feeding Questionnaire. The current study found a surprising inverse relationship between the parental use of monitoring with restriction and that parental use of monitoring was inversely associated with child fruit and vegetable consumption and positively associated with child non-core food intake, when parental use of restriction had relationships in the opposite direction. This could indicate that the negative effects of excessive monitoring will appear chronologically earlier than the negative impacts of restriction, which may not occur until children are presented with more opportunity for autonomy in food choice. This finding will require replication and further consideration.

27 Study limitations and strengths

This study is limited in a number of ways, particularly in relation to measurement issues. First, the sample comprised of mostly well-educated mothers in their 30s with moderate to high levels of household income. The lack of variation and particularly the

poorer representation of parents/care-givers from lower socio-economic, less well-educated or younger age groups had the potential to have impacted upon the results. This could include (but is not limited to) possible differences in use of parental strategies, ability to purchase more costly (or higher quantities of) healthier foods and having different levels of self-efficacy. As such it would be valuable for future research to expand sampling to include more parents/care-givers who have lower levels of income, less education and who might be of a younger age group.

With regards to home food environment measures of availability and accessibility, no measures were included for availability of non-core foods, fat from dairy or soft drink and other sweetened beverages, or the accessibility of fat from dairy or sweetened beverages other than soft drink. The non-inclusion of availability (variety) items was partly due to manipulations made to the Healthy Home Survey (HHS) by Bryant et al., (2008). These manipulations including transforming open ended questions around variety of fruits and vegetables to closed answer (yes/no) questions for a pre-determined list of fruits and vegetables with an 'other' option each. This was thought to be able to elicit more consistent responses by ensuring each participant considered the same range of fruits and vegetable as a minimum and enabled them to also add in others not on the list. However, this format is likely to more time consuming and therefore the open ended questions around the variety of salty, sweet, candy and soda items were not able to be included due to the increased size of the baseline survey. The lack of accessibility items for fat from dairy and sweetened beverages other than soft drink, represents one area where the HHS and CDQ (Magarey et al., 2009) are not consistent, with the original HHS not including items regarding accessibility of dairy products or alternative sweetened beverages such as fruit juice or cordial (see Bryant et al., 2008). These limitations around the inclusion of a broader range

of availability and accessibility items means that this study has not been able to include what may be important factors, particularly in regards to the outcome measures of fat from dairy intake, sweetened beverage intake and non-core food intake in children.

There also are limitations in regards to the new measure of self-efficacy developed. In particular, parental self-efficacy for managing child diet only related to two of the four dietary outcomes. This may mean one of two things: that parental self-efficacy for managing child diet does not relate to child consumption of sweetened beverages or full fat dairy products; or, that the measure developed was not specific enough. Very recently, after this study was already collecting data, Campbell, Hesketh et al., (2010) published a paper around the creation of a scale examining parental self-efficacy to influence or control children's eating and sedentary behaviours including a) self-efficacy for promoting healthy eating, b) self-efficacy for limiting non-core foods, c) self-efficacy for promoting physical activity to displace TV viewing and d) self-efficacy for limiting TV viewing. Campbell Hesketh et al.'s measure provides options for specific measurement of parental self-efficacy for parenting practices. The measures now available by Campbell Hesketh et al., (2010) which include self-efficacy for target parental strategies and Cullen et al. (2000) which includes self-efficacy for providing adequate home food environment, could provide alternative measures to the PSEC developed in this study in examining the combination of parental influences on home food environment and use of controlling practices. The question remain to be answered as to whether parental self-efficacy for specific parental influences and behaviours rather than general management of child diet would be preferred in studies of this ilk.

Finally, as suggested by the modest amount of variance explained in stepwise regressions, another limitation of this study relates to the limited number of individual

parental factors utilised; limited to parental self-efficacy alone. While self-efficacy is a key concept in a number of theories, it is by no means the only parental individual factor associated with child dietary outcomes. Other studies (e.g. Kratt et al., 2000) also examine such individual factors such as outcome expectations and knowledge which are also key elements in theories such as Social Cognitive Theory (Bandura, 1977, 1986).

The current study also had a number of strengths. This is one of the few studies examining mediating and moderating relationships for dietary outcomes in preschool aged children. Furthermore, while it was not feasible to include a larger range of parental individual factors in this study, it should be noted that we did measure multiple dietary outcomes as opposed to just focusing on fruit and vegetable intakes which a large proportion of previous research does.

There are also research specific implications in regards to the methods used in this study to examine multiple mediators. This is one of the first studies in this area to use Preacher and Hayes (2008) bootstrapping technique to examine such relationships, though Kiviniemi and Duangdao (2009) also used this technique to examine potential multiple mediations of affection associations for the relationship between cost-benefit beliefs and fruit and vegetable consumption in adults. Traditionally researchers in this area of study use structural equation modelling techniques or regression based techniques to examine multiple mediations effects (e.g. Kroller et al., 2009; Neumark-Sztainer et al., (2003). However, assumptions of normality and large sample sizes/effect sizes are required when using these techniques (Preacher & Hayes, 2008). Alternatively, bootstrapping does not require assumptions of normality to be met and is argued by Preacher and Hayes to provide one of the most powerful methods for obtaining confidence intervals around indirect effects

for multiple mediators. This provides researchers with an alternative tool for modelling multiple mediation effects and will hopefully become well utilised in the area of child diet.

28 Conclusions

Parents are pivotal in the development of child dietary patterns (Birch & Fisher, 1998; Golan, 2006; Young, Fors & Hayes, 2004; Lau, et al., 1990). This study aimed to explore relationships between parental factors that may influence child dietary patterns, including parental self-efficacy for managing child diet (an individual factor), home food environment (an environmental factor), and the of use of parental controlling feeding practices (a behavioural factor); and, outcome measures of child diet. This is one of the few non-intervention studies that examines preschool aged children's dietary outcomes beyond fruit and vegetable intake and included four different dietary outcomes of fruit and vegetable intake, full fat dairy intake, sweetened beverage intake and non-core food intake.

In the current study, relationships between parental self-efficacy and child dietary outcomes were mediated by home food environment and parental use of controlling strategies only for the outcomes of fruit and vegetable intake and non-core food intakes. Moderation effects were only found for the outcome of non-core food intakes. Surprisingly, it was the variety of fruits and vegetables available, not relevant parental and child demographics, which moderated key relationships between child non-core food intake with parental self-efficacy and with parental use of restriction in this study.

Overall, this study provides further evidence of the potential for targeting parental self-efficacy in family-based interventions for improvement of child diet and the prevention of negative dietary outcomes such as childhood obesity. Improving parental self-efficacy for managing child diet would appear to have both indirect and direct (mediated & non-

mediated) impact on child fruit and vegetable, and, non-core food intakes. Furthermore, the moderation of relationships by availability of fruits and vegetables for the outcome of non-core food intake supports the displacement theory of the benefit of fruits and vegetables (beyond nutritional value) being that they offset or displace consumption of unhealthier more energy dense foods (e.g. Centre for Public Health Nutrition, 2003; Dietz & Gortmaker, 2001). Further research is required for replication and extension of these findings.

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Appendix A

Table A1: *Physical, economic and socio-cultural environment influences on diet and physical activity (adapted from Egger & Swinburn, 1997)*

Due to copyright issues around the distribution of theses via electronic repositories this table has been removed from the electronic version of this thesis. This is in compliance with recommendations of the University of Newcastle (see http://www.newcastle.edu.au/service/library/research/thesis-deposit-guide.html for the Copyright Guide for Research Students: What you need to know about copyright before depositing your electronic thesis in an online repository**.** Please see the original reference if you are interested in this table.

Figure A1: An ecological model of obesity which takes into account biological, behavioural and environmental factors from Egger and Swinburn's (1997) discussion of environmental influences on diet and physical activity.

Appendix B

Full baseline survey script as uploaded into the CATI system is as follows:

```
TITL  0         TITLE   1       CATI   NOADD         15
NOLAB

Good for Kids: Healthy Habits. Main trial – baseline survey
************************ TITLE ITEM
************************************
TIME  0         T_START 1
LABEL
MODULE  SUBMODUL
Record starting time
STARTING TIME
****************** GET DURATION ITEM
************************************
LINK  1         P_name  1       QINFORM        QFORMAT
LABEL
MODULE  SUBMODUL        1
T_START gt .
Items in external dataset
DATACATI.CONFID              P_name
Links to external database
****************** LINK TO EXTERNAL DATASET ITEM
***************************
CHCE  1  6      INTRO1  5                      _MAKE_
NOLAB
MODULE  SUBMODUL
P_name gt ' '
Hello, my name is ^_INTVR_^ and I am calling from The 'Healthy Habits'
program.

I am calling to talk to ^_RNAME_^?
Is ^P_name^ able to take this call?
1       Speaking to that person
2       Person called to phone
3       Person not avail (record on log sheet)
4       Time not suitable (record on log sheet)
5       Other (record on log sheet)
.R      Refused
***************** SINGLE CHOICE - CATI VERSION
***************************
OPEN  1 200     INTROTH 2
LABEL
MODULE  SUBMODUL
INTRO1=5
OK, thank you for your time.
[Do not ask, but record reason if given]
Other Reason
****************** OPEN ENDED ENTRY ITEM
*******************************
INFO  1         INTRO2  7
NOLAB
MODULE  SUBMODUL
Intro1=1
```

```
Hi ^P_Name^. I'm calling in response to you volunteering for
this project. It's all about investigating ways that we can assist
parents to encourage their children to form healthy habits.

[IF PARENTS CAN'T REMEMBER: Information about the project was
provided in a brightly coloured envelope distributed at your child's
preschool and you filled in a form saying you were happy to participate]
****************** INFORMATION SCREEN ITEM
*******************************
INFO  1         INTRO3  10
NOLAB
MODULE  SUBMODUL
INTRO1=2
Hello ^P_Name^, my name is ^_INTVR_^ and I am calling from
the "Healthy Habits" project.

I'm calling in response to you volunteering for this project.
It's all about investigating ways that we can assist parents to
encourage their children to form healthy habits.

[IF PARENTS CAN'T REMEMBER: Information about the project was provided
in a brightly coloured envelope distributed at your child's preschool
and you filled in a form saying you were happy to participate]
****************** INFORMATION SCREEN ITEM
*******************************
CHCE  1 3       INTRO4  1                     _MAKE_
NOLAB
MODULE  SUBMODUL
INTRO1 in (3 4)
Could you suggest a more convenient time for me to call back?
1       Yes [Record in Log Sheet]
2       No
.R      Refused
***************** SINGLE CHOICE - CATI VERSION
****************************
INFO  1         INFO1   2
NOLAB
MODULE  SUBMODUL
INTRO4 = 1
OK, thanks for your time.
We'll call you back then.
****************** INFORMATION SCREEN ITEM
*******************************
INFO  1         INFO1a  1
NOLAB
MODULE  SUBMODUL
INTRO4 in (2)
OK, I might try again later. Thanks for your time.
****************** INFORMATION SCREEN ITEM
*******************************
INFO  1         INFO1b  1
NOLAB
MODULE  SUBMODUL
INTRO4 in (.R)
OK, thanks for your time.
****************** INFORMATION SCREEN ITEM
*******************************
```

```
CHCE  1 3       INTRO5  8                       _MAKE_
LABEL
MODULE  SUBMODUL
INTRO2=1 or INTRO3=1
Just to remind you, participating in the program means that you'll be
randomly allocated to be sent some written information, or to receive a
series of four weekly telephone support calls. This first call is just
to get a bit of information about you and your family.

The call should take about 25-30 minutes.

Is now a good time for you or would you like me to call back later?
1       Yes/Appropriate [Thank]
2       No/Call back later
.R      Refused
Appropriate time
***************** SINGLE CHOICE - CATI VERSION
****************************
INFO  1         INTRO6  4
NOLAB
MODULE  SUBMODUL
INTRO5=2
Could you suggest another time that we can call you back?
[Make arrangements for a call back and record in Log Sheet]

Thank you very much for your time. Goodbye.
****************** INFORMATION SCREEN ITEM
******************************
INFO  1         INTRO7  1
NOLAB
MODULE  SUBMODUL
INTRO5=.R
Thank you very much for your time. Goodbye.
****************** INFORMATION SCREEN ITEM
******************************
INFO  1         INFO2   7
NOLAB
MODULE  SUBMODUL
INTRO5=1
First of all I just want to thank you for being willing to be
involved in this program. We're really grateful to have you on board.

Now, I'll start by confirming some details to ensure that this
project is suitable for you.

Before we begin, do you have any questions?
****************** INFORMATION SCREEN ITEM
******************************
CHCE  1 2       PreQb   2                       _MAKE_
LABEL
MODULE  SUBMODUL
INFO2=1
Do you mind giving me an address so that we can send you the
program materials?
1       Happy to provide address
2       Does not want to provide address
WILLING TO SUPPLY ADDRESS
```

```
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 2       PreQbii 4                     _MAKE_
LABEL
MODULE  SUBMODUL
PreQb=2
I'm afraid that we'll need to send materials to you in order to
participate in this program. You don't have to supply your home
address if you don't want to. Is there an alternative address,
perhaps a work address, that we can send things to?
1       Yes
2       No
SUPPLY WORK ADDRESS
***************** SINGLE CHOICE - CATI VERSION
****************************
TABL  1 10      Q10     8
LABEL
MODULE  SUBMOD  3
PreQb=1 or Preqbii=1
That's great - thank you.

What address should I send them to?

[NOTE TO INTERVIEWERS:
- Prompt "And how do you spell that?" NB. Capitalise street name
- Don't enter NSW (if other state, enter in 'Postcode' e.g. VIC 3636)
- Enter postcode, then click on 'Suburb' square before moving on]
numc                    3
Street                                        C
Suburb                                        C
Postcode                                      C
Current address
********************TABLE ENTRY ITEM - NO BUTTONS
************************
INFO  1         PreQc   7
NOLAB
MODULE  SUBMODUL
Preqbii=2
Unfortunately, if we can't send the materials to you, it will be really
difficult for you to participate, as receiving the materials is
an essential component of this program.

Thanks for being willing to participate. We really appreciate
your time, but we'll end the survey there, so as not to take up
any more of your time.
******************* INFORMATION SCREEN ITEM
******************************
MULT  1 38      Q11     5                                       1
MLTLB
MODULE  SUBMODUL
Q10 eq 3 and q10c1 ne ' ' and q10c2 ne ' ' and q10c3 ne ' '
And can I just confirm from which preschool you were recruited
into this program?

[NOTE TO INTERVIEWER: If they ask why this is necessary, tell them that
we just want to make sure that they are allocated to the right group.]
1       Adamstown Heights    (Adamstown)
```

```
2       Awabakal             (Glendale)
3       Belmont North        (Belmont North)
4       Boolaroo-Speers Point(Boolaroo)
5       Carey Bay            (Carey Bay)
6       Catherine            (East Maitland)
7       Caves Beach Uniting  (Caves Beach)
8       Cooks Hill           (Cooks Hill)
9       Cooranbong Valley    (Cooranbong)
10      East Maitland-Brunswick St (Maitland)
11      East Maitland-George St    (Maitland)
12      Edgeworth            (Edgeworth)
13      Felton Street        (Gateshead)
14      Hamilton Community   (Hamilton)
15      Jowen                (Belmont)
16      Jumping Jacks        (New Lambton)
17      Karingal             (Nelson Bay)
18      KU - Bel Air         (Adamstown)
19      KU - Merewether      (Merewether)
20      KU - Peninsula       (Tanilba Bay)
21      KU - Swansea         (Swansea)
22      KU - Wickham         (Wickham)
23      KU - Windale         (Windale)
24      Lake Macquarie       (Mt Hutton)
25      Macquarie Hills      (Cardiff)
26      Maitland             (Maitland)
27      Medowie              (Medowie)
28      Mindaribba           (Metford)
29      Nords Wharf          (Nords Wharf)
30      Orana                (Wallsend)
31      Redhead              (Redhead)
32      Seaham               (Seaham)
33      St. Andrew's Church  (Newcastle)
34      Tomaree              (Callaghan)
35      Wallalong            (Wallalong)
36      Wangi Peter Pan      (Wangi Wangi)
37      Williamtown          (Williamtown RAAF Base)
38      OTHER                (RECORD FULL DETAILS)
PRESCHOOL ATTENDED
Adamstown Heights
Awabakal
Belmont North
Boolaroo-Speers Point
Carey Bay
Catherine
Caves Beach Uniting
Cooks Hill
Cooranbong Valley
East Maitland-Brunswick St
East Maitland-George St
Edgeworth
Felton Street
Hamilton
Jowen
Jumping Jacks
Karingal
KU - Bel Air Preschool
KU - Merewether Preschool
```

```
KU - Peninsula Preschool
KU - Swansea Preschool
KU - Wickham Preschool
KU - Windale Preschool
Lake Macquarie
Macquarie Hills
Maitland
Medowie
Mindaribba
Nords Wharf
Orana
Redhead
Seaham
St. Andrew's Church
Tomaree
Wallalong
Wangi Peter Pan
Williamtown
OTHER
******************MULTIPLE CHOICE - CATI
VERSION**************************
OPEN  1 200     Q11_oth 1
LABEL
MODULE  SUBMODUL
substr(Q11,38,1) = '1'
RECORD PRESCHOOL NAME AND SUBURB MENTIONED ABOVE
Which preschool they attend
****************** OPEN ENDED ENTRY ITEM
*********************************
CHCE  2 2       Q1      2                       _MAKE_
LABEL
MODULE  SUBMODUL
substr(Q11,1,37) gt '0000000000000000000000000000000000000000' or
Q11_oth gt ' '
OK, and now some questions about you.
Are you Male or Female?
1       Male
2       Female
Participants sex
***************** SINGLE CHOICE - CATI VERSION
****************************
NUM   1         Q2      4    MM QINFORM        QFORMAT
LABEL
MODULE  SUBMODUL
Q1 in (1 2)
Could you please tell me how old you are today?

[NOTE TO INTERVIEWER:
- Record age today. It doesn't matter if their birthday is tomorrow]
17                      55
15                      75
Age of participant
******************** NUMERIC OR DATE ENTRY - CATI VERSION
******************
CHCE  1 6       Q2a     1                       _MAKE_
LABEL
MODULE  SUBMODUL
```

```
Q2 gt .
And ^P_name^, are you of Aboriginal or Torres Strait Island origin?
1       Yes, Aboriginal
2       Yes, Torres Strait Islander
3       Yes, both Aboriginal and Torres Strait Islander
4       No
5       Don't Know
.R      Refused
Parent-Aboriginal Torres Strait Islander
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 10      Q3      2                       _MAKE_
LABEL
MODULE  SUBMODUL
Q2a gt .
What is the level of the highest education qualification
you have completed?
1       Less than primary
2       Completed primary
3       Completed Years 7-9
4       Completed School Certificate/Intermediate/Year 10/4th Form
5       Completed HSC/Leaving/Year 12/6th Form
6       TAFE Certificate or Diploma
7       Uni/College Advanced Ed/other tertiary institute degree or higher
8       Other
9       Don't know
.R      Refused
Highest education qualification
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 9       Q5      1                       _MAKE_
LABEL
MODULE  SUBMODUL
Q3 gt .
What is your annual household income before tax? Would it be?
1       Less than $10,000
2       $10,000-$19,999
3       $20,000-$39,999
4       $40,000-$59,999
5       $60,000-$79,999
6       $80,000-$99,999
7       $100,000 or more
8       Don't know
.R      Refused
Annual household income before tax
***************** SINGLE CHOICE - CATI VERSION
****************************
INFO  1         infoA   5
NOLAB
MODULE  SUBMODUL
Q5 gt .
During this survey I'll be asking you questions about the foods
that you and your child eat, including fruit and vegetables.

Please DON'T include fruit or vegetable JUICE in your answers unless I
specifically ask you to count it.
```

```
****************** INFORMATION SCREEN ITEM
*****************************
NUM   1         Q41     8    MM QINFORM        QFORMAT
LABEL
MODULE  SUBMODUL
InfoA=1
And now some questions about what you eat ...

How many serves of vegetables do you usually eat each day? One ADULT
serve is a 1/2 cup of cooked vegetables or 1 cup of salad vegetables.

[NOTE TO INTERVIEWER:
- Prompt with size "And would that be equivalent to e.g. 1 cup of salad?"
- 0 = don't eat vege, 99 = don't know, Juice NOT included
0                       10
0                       99
Participant vegie serves/day
******************** NUMERIC OR DATE ENTRY - CATI VERSION
*****************
NUM   1         Q42     7    MM QINFORM        QFORMAT
LABEL
MODULE  SUBMODUL
Q41 gt .
How many serves of fruit do you usually eat each day? An ADULT serve
is 1 medium piece or 2 small pieces of fruit or 1 cup of diced pieces.

[NOTE TO INTERVIEWER:
- Juice is NOT included
- Prompt with size "And would that be equivalent to e.g. 1 medium piece?"
- 0 = don't eat fruit, 99 = don't know
0                       10
0                       99
Participant serves of fruit each day
******************** NUMERIC OR DATE ENTRY - CATI VERSION
******************
NUM   1         Q42a    6    MM QINFORM        QFORMAT
LABEL
MODULE  SUBMODUL
Q42 gt .
How many cups of water (tap or bottled) do you usually drink in a day?

[NOTE TO INTERVIEWER:
- 250 mls = 1 cup
- 1 Litre = 4 cups
- if don't know select '99']
0                       10
0                       99
Cups of water per day
******************** NUMERIC OR DATE ENTRY - CATI VERSION
******************
NUM   1         Q15     4    MM QINFORM        QFORMAT
LABEL
MODULE  SUBMODUL
Q42a gt .
How many children under 16 years of age live in your household?

[NOTE TO INTERVIEWER:
```

- prompt if needed "So you've got ____ kids under 16?"
0 10
0 20
Num of child 2-15yrs
********** NUMERIC OR DATE ENTRY - CATI VERSION **********
CHCE 1 6 Q7a 2 MAKE
LABEL
MODULE SUBMODUL
Q15 gt .
And how many children do you have ATTENDING PRESCHOOL between 3 to 6 years of age.
1 1
2 2
3 3
4 4
5 5
6 6 or more
Children attending childcare
********** SINGLE CHOICE - CATI VERSION **********
CHCE 1 2 otherPS 4 _MAKE_
LABEL
MODULE SUBMODUL
Q7a=1
Does your child attend any other preschools apart from the one you mentioned earlier?

This does NOT include Long Day Care or Family Day Care
1 Yes - attends OTHER preschools
2 No
Enrolled in other preschools
********** SINGLE CHOICE - CATI VERSION **********
CHCE 1 2 otherPSa4 _MAKE_
LABEL
MODULE SUBMODUL
Q7a in (2 3 4 5 6)
Do your children attend any other PRESCHOOLS apart from the one you mentioned earlier?

This does NOT include Long Day Care or Family Day Care
1 Yes – attends OTHER preschools
2 No
Enrolled in other preschools
********** SINGLE CHOICE - CATI VERSION **********
MULT 1 38 Q11_2 5 10
MLTLB
MODULE SUBMODUL
otherPS=1 or otherPSa=1
And which other preschool or preschools do they attend?

[NOTE TO INTERVIEWER: If they ask why this is necessary, this is just to find out what other information they might have received about healthy eating for their child through the Good For Kids program.]
1 Adamstown Heights (Adamstown)

```
2       Awabakal             (Glendale)
3       Belmont North        (Belmont North)
4       Boolaroo-Speers Point(Boolaroo)
5       Carey Bay            (Carey Bay)
6       Catherine            (East Maitland)
7       Caves Beach Uniting  (Caves Beach)
8       Cooks Hill           (Cooks Hill)
9       Cooranbong Valley    (Cooranbong)
10      East Maitland-Brunswick St (Maitland)
11      East Maitland-George St    (Maitland)
12      Edgeworth            (Edgeworth)
13      Felton Street        (Gateshead)
14      Hamilton Community   (Hamilton)
15      Jowen                (Belmont)
16      Jumping Jacks        (New Lambton)
17      Karingal             (Nelson Bay)
18      KU - Bel Air         (Adamstown)
19      KU - Merewether      (Merewether)
20      KU - Peninsula       (Tanilba Bay)
21      KU - Swansea         (Swansea)
22      KU - Wickham         (Wickham)
23      KU - Windale         (Windale)
24      Lake Macquarie       (Mt Hutton)
25      Macquarie Hills      (Cardiff)
26      Maitland             (Maitland)
27      Medowie              (Medowie)
28      Mindaribba           (Metford)
29      Nords Wharf          (Nords Wharf)
30      Orana                (Wallsend)
31      Redhead              (Redhead)
32      Seaham               (Seaham)
33      St. Andrew's Church  (Newcastle)
34      Tomaree              (Callaghan)
35      Wallalong            (Wallalong)
36      Wangi Peter Pan      (Wangi Wangi)
37      Williamtown          (Williamtown RAAF Base)
38      OTHER                (RECORD FULL DETAILS)
PRESCHOOL ATTENDED
Adamstown Heights
Awabakal
Belmont North
Boolaroo-Speers Point
Carey Bay
Catherine
Caves Beach Uniting
Cooks Hill
Cooranbong Valley
East Maitland-Brunswick St
East Maitland-George St
Edgeworth
Felton Street
Hamilton
Jowen
Jumping Jacks
Karingal
KU - Bel Air Preschool
KU - Merewether Preschool
```

```
KU - Peninsula Preschool
KU - Swansea Preschool
KU - Wickham Preschool
KU - Windale Preschool
Lake Macquarie
Macquarie Hills
Maitland
Medowie
Mindaribba
Nords Wharf
Orana
Redhead
Seaham
St. Andrew's Church
Tomaree
Wallalong
Wangi Peter Pan
Williamtown
OTHER
******************MULTIPLE CHOICE - CATI
VERSION**************************
OPEN  1 200     Q11O_pt21
LABEL
MODULE  SUBMODUL
substr(Q11_2,38,1) = '1'
RECORD PRESCHOOL NAME AND SUBURB MENTIONED ABOVE
Which preschool they attend
****************** OPEN ENDED ENTRY ITEM
*********************************
NULL  3         NULL2   1
NOLAB
MODULE  SUBMODUL
substr(Q11_2,1,37) gt '0000000000000000000000000000000000000' or
Q11O_pt2 gt ' ' or
otherPS=2 or otherPSa=2
A comment line goes here.
************************NULL ITEM - DOES
NOTHING************************
INFO  1         Q7b     4
NOLAB
MODULE  SUBMODUL
Null2=1 and Q7a in (2 3 4 5 6)
For this project, let's focus on the PRESCHOOL child who is
next to have a birthday.

[NOTE TO INTERVIEWER: If twins, choose first born]
****************** INFORMATION SCREEN ITEM
*******************************
OPEN  1 200     Q7c     5
LABEL
MODULE  SUBMODUL
(Null2=1 and Q7a=1) or Q7b=1
What is the child's first name?

[NOTE TO INTERVIEWER:
- Prompt if needed "And how do you spell that?"
- Capitalise first letter]
```

```
Child's name
****************** OPEN ENDED ENTRY ITEM
*********************************
CALC  1         Q7d     0
NOLAB
MODULE  SUBMOD  3
Q7c gt ' '
length name $ 20.;
name=trim(left(Q7c));
Q7d=1;
********************** CALCULATION ITEM
*********************************
CHCE  1 2       Q8      1                       _MAKE_
LABEL
MODULE  SUBMODUL
Q7d=1
Is ^name^ a Boy/Girl?
1       Boy
2       Girl
Childs sex
***************** SINGLE CHOICE - CATI VERSION
****************************
NUM   1         Q9      3    MM ddmmyy10       date9
LABEL
MODULE  SUBMODUL
Q8 in (1 2)
What is ^name^'s date of birth

[Enter as dd/mm/yyyy]
01/01/2003              01/05/2007
01/01/2003              31/08/2007
Child's date of birth
******************** NUMERIC OR DATE ENTRY - CATI VERSION
******************
CALC  1         hisherC 0
NOLAB
MODULE  SUBMOD  5
Q9 gt .
Length hisher $ 3.;
if Q8=1 then hisher='his';
else if Q8=2 then hisher='her';
hisher=lowcase(hisher);
hisherC=1;
********************** CALCULATION ITEM
*********************************
CHCE  1 7       Q12new  8                       _MAKE_
LABEL
MODULE  SUBMODUL
hisherC=1;
How many days per week does ^name^ attend any sort of childcare
OUTSIDE THE HOME, including preschool, long day care, family day
care or regular childcare from a family member or friend?

[NOTE TO INTERVIEWER:
- Don’t include short periods e.g. 1hr while they do the shopping.
Include days where they are in the care of someone outside their
immediate family for 3hrs or more, INCLUDING weekends?
```

```
1       1
2       2
3       3
4       4
5       5
6       6
7       7
DAYS/WK ATTENDS PRESCHOOL
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 4       Q14     4                       _MAKE_
LABEL
MODULE  SUBMODUL
Q12new gt .
Do you live in the same house as ^name^?

[NOTE TO INTERVIEWER:
- Prompt "And on average how many days per week do you reside together?"]
1       Yes: 1-3 days
2       Yes: 4-6 days
3       Yes: 7 days
4       No: Do not reside with child
CONFIRM RESIDE WITH CHILD
***************** SINGLE CHOICE - CATI VERSION
****************************
INFO  1         PreQai  11
NOLAB
MODULE  SUBMODUL
Q14 in (1 4)
Unfortunately, this program might not be very suitable for you at
this point, as we are focusing on the home environment where ^name^
resides most of the time.

Thanks for being willing to participate. We really appreciate
your time, but we'll end the survey there, so as not to take up
any more of your time.

I'll send you some information about healthy eating which may interest
you,
but we won't contact you again with any more surveys.
Thanks for your time.
****************** INFORMATION SCREEN ITEM
******************************
CALC  1         himherC 0
NOLAB
MODULE  SUBMOD  5
Q14 in (2 3)
Length himher $ 3.;
if Q8=1 then himher='him';
else if Q8=2 then himher='her';
himher=lowcase(himher);
himherC=1;
********************** CALCULATION ITEM
********************************
CHCE  1 5       Q155    4                       _MAKE_
LABEL
MODULE  SUBMODUL
```

himherC=1
When ^name^ is at home, how often are you responsible for
providing meals and snacks for ^himher^?

[NOTE TO INTERVIEWER: Read out response options]
1 Always
2 Most of the time
3 Half of the time
4 Seldom
5 Never
How often responsible for food?
********** SINGLE CHOICE - CATI VERSION
****
CHCE 1 3 Q155exit7 _MAKE_
LABEL
MODULE SUBMODUL
Q155 in (4 5)
Unfortunately, this program might not be very suitable for you at
this point, as the information and strategies that we talk about are
best to be implemented by someone who usually determines when and what
^name^ eats. So it might be difficult for you to put this into practice.

Is there anyone else who usually provides meals and snacks for ^name^
who might be interested in participating in the Healthy Habits study?
1 Yes
2 No
3 Not sure
Recruiting other parent
********** SINGLE CHOICE - CATI VERSION
****
INFO 1 Q155exi18
NOLAB
MODULE SUBMODUL
Q155exit=1
OK - that's great. I'll send out an information sheet about the study
and another consent form to the address you've just given me and
[THE PERSON THEY JUST MENTIONED] can fill it in and let us know
whether they want to participate or not.

[NOTE TO INTERVIEWER:
Record name of alternative person if you can (so that we can address
the envelope) and note on log sheet that interview was stopped.
********** INFORMATION SCREEN ITEM
****
INFO 1 Q155exi28
NOLAB
MODULE SUBMODUL
Q155exit=2
That's OK. Thanks for being willing to participate. We really appreciate
your time, but we'll end the survey there, so as not to take up any more
of your time.

I'll send you some information about healthy eating which may interest
you,
but we won't contact you again with any more surveys.

Thanks again for your time.

```
****************** INFORMATION SCREEN ITEM
******************************
INFO  1         Q155exi35
NOLAB
MODULE  SUBMODUL
Q155exit=3
OK - that's fine. I'll send out an information sheet about the study
and another consent form to the address you've just given me and
if the person who usually provides meals to ^name^ wants to participate,
all they have to do is fill in the form. Otherwise, they don't have to
do anything.
****************** INFORMATION SCREEN ITEM
******************************
INFO  1         Q155exi45
NOLAB
MODULE  SUBMODUL
Q155exi1=1 or Q155exi3=1
Thanks for being willing to participate. We really appreciate
your time, but we'll end the survey there, so as not to take up
any more of your time.

Thanks again.
****************** INFORMATION SCREEN ITEM
******************************
CHCE  1 6       Q10a    1                       _MAKE_
LABEL
MODULE  SUBMODUL
Q155 in (1 2 3)
Is ^name^ of Aboriginal or Torres Strait Islander origin?
1       Yes Aboriginal
2       Yes Torres Strait Islander
3       Yes both Aboriginal and Torres Strait Islander
4       No
5       Don't Know
.R      Refused
Child-Aboriginal and/or Torres Strait Islander
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 11      Q12     1                       _MAKE_
LABEL
MODULE  SUBMODUL
Q10a gt .
What is your relationship to ^name^ (Child)?
1       Mother
2       Father
3       Step mother
4       Step father
5       Grand mother
6       Grand father
7       Aunt
8       Uncle
9       Legal Guardian / foster parent
10      Other
.R      Refused
Relationship to child
***************** SINGLE CHOICE - CATI VERSION
****************************
```

```
CALC  1         hesheC  0
NOLAB
MODULE  SUBMOD  5
Q12 gt .
Length heshe $ 3.;
if Q8=1 then heshe='he';
else if Q8=2 then heshe='she';
heshe=lowcase(heshe);
hesheC=1;
********************** CALCULATION ITEM
**********************************
INFO  1         InfoB   3
NOLAB
MODULE  SUBMODUL
hesheC=1
In answering the remaining questions, just remember that there are no
right or wrong answers. Families have all sorts of different
eating routines. So please just answer as honestly as possible.
****************** INFORMATION SCREEN ITEM
******************************
MULT  1 7       Q154    7                                       6
MLTLB
MODULE  SUBMODUL
InfoB=1
Now thinking about all the snacks and meals that you ate yesterday. . .
Would ^name^ have SEEN YOU eat fruit at any of the following times?

[NOTE TO INTERVIEWER:
- Read out response options
- It doesn't matter how much fruit they ate, or what fruit they ate
  when ^name^ wasn't around]
1       at breakfast
2       at morning tea
3       at lunch
4       at afternoon tea
5       dinner (including dessert)
6       supper
-7      None of these times
SEEN EAT FRUIT
breakfast
morning tea
lunch
afternoon tea
dinner/dessert
supper
None
******************MULTIPLE CHOICE - CATI
VERSION***************************
MULT  1 7       Q154b   8                                       6
MLTLB
MODULE  SUBMODUL
substr(Q154,1,7) gt '0000000'
And thinking about all the snacks and meals you ate yesterday . . .

Would ^name^ have SEEN YOU eat vegetables at any of the following times?

[NOTE TO INTERVIEWER:
```

```
- Read out response options
- It doesn’t matter how much they ate, or what they ate when ^name^
  wasn’t around]
1       at breakfast
2       at morning tea
3       at lunch
4       at afternoon tea
5       dinner
6       supper
-7      None of these times
Seen eat vegetables
breakfast
morning tea
lunch
afternoon tea
dinner
supper
None
******************MULTIPLE CHOICE - CATI
VERSION**************************
MULT  1 7       Q45     7                                       6
MLTLB
MODULE  SUBMODUL
substr(Q154b,1,7) gt '0000000'
Now, thinking about what you ACTUALLY GAVE to ^name^,
REGARDLESS of if, or how much ^heshe^ ate...

Yesterday, did you provide ^name^ fruit. . .

[NOTE TO INTERVIEWER:
- Read out response options]
1       at breakfast
2       at morning tea
3       at lunch
4       at afternoon tea
5       dinner (including dessert)
6       supper
-7      None of these times
OCCASIONS SERVE FRUIT
breakfast
morning tea
lunch
afternoon tea
dinner (including dessert)
supper
NONE OF THE ABOVE
******************MULTIPLE CHOICE - CATI
VERSION**************************
MULT  1 7       Q46     7                                       6
MLTLB
MODULE  SUBMODUL
Substr(Q45,1,7) gt '0000000'
And again, thinking about what you ACTUALLY GAVE ^name^,
REGARDLESS of if or how much ^heshe^ ate ...

Yesterday, did you provide ^name^ vegetables . . .
```

[NOTE TO INTERVIEWER:
- Read out response options
1 at breakfast
2 at morning tea
3 at lunch
4 at afternoon tea
5 dinner (including dessert)
6 supper
-7 None of these times
OCCASIONS SERVE VEGETABLES
breakfast
morning tea
lunch
afternoon tea
dinner (including dessert)
supper
NONE OF THE ABOVE
**********MULTIPLE CHOICE - CATI VERSION**********
MULT 1 13 Q40 7 11
MLTLB
MODULE SUBMODUL
Substr(Q46,1,7) gt '0000000'
And ^P_name^, can you tell me what are some of the things that you think make it difficult to encourage ^name^ to eat more fruit or vegetables?

[NOTE TO INTERVIEWER:
- record as many as they mention
- ask them to repeat if necessary
1 My child doesn't like them
2 I don't like them
3 Other family members don't like them
4 Cost
5 Quality
6 Wastage
7 too much time to prepare
8 too difficult to prepare
9 Don't know how to prepare
10 Advertising (less healthy options)
11 Don't know
12 Other
-13 None
WHY F&V CONSUMPTION IS DIFFICULT
My child doesn't like them
I don't like them
family members don't like
Cost
Quality
Wastage
too much time to prepare
too difficult to prepare
Don't know how to prepare
Advertising
Don't know
Other
None

```
******************MULTIPLE CHOICE - CATI
VERSION**************************
OPEN  1 200     Q40OTH   1
LABEL
MODULE  SUBMODUL
Substr(Q40,12,1)='1'
Please specify other
Other
****************** OPEN ENDED ENTRY ITEM
********************************
INFO  2         CDQ1    8
NOLAB
MODULE  SUBMODUL
substr(Q40,1,13) gt '0000000000000' and substr(Q40,12,1)='0'
or Q40OTH gt ''
I'm now going to ask you some questions about the sorts of
foods that ^name^ may eat.

I'll ask about many different types and varieties of foods.

Many children of this age don't eat a great variety of foods.
However, I'll ask you about a range of foods to make sure we
don't miss anything.
******************* INFORMATION SCREEN ITEM
******************************
MULT  1 21      CDQA1   8                                       20
MLTLB
MODULE  SUBMODUL
CDQ1=1
I'm now going to read you a list of FRUITS. Could you please tell me
which of the following fruits ^name^ has eaten over the past 7 DAYS?
The fruit can be fresh, tinned or stewed.

[NOTE TO INTERVIEWER:
- Read out all options
- ** Only include if not already mentioned (don't double count]
- Dried apricots counts as 'Dried Fruit', NOT 'Apricots'
1       Kiwi fruit
2       Peach
3       Banana
4       Apricot (not dried)
5       Pear
6       Nectarine or peacharine
7       Grapes
8       Strawberries
9       Mango
10      Watermelon
11      Rockmelon
12      Mandarin
13      Plum
14      Orange
15      Paw Paw
16      Apple
17      Pineapple
18      Dried Fruit** Count dried apricots here, NOT 'apricots'
19      Fruit Salad** containing any fruit not already mentioned
20      Other
```

```
-21     No fruit eaten over the last 7 days
Fruit eaten by child
Kiwi fruit
Peach
Banana
Apricot
Pear
Nectarine / peacherine
Strawberries
Mango
Watermelon
Rockmelon
Grapes
Mandarin
Plum
Orange
Pawpaw
Apple
Pineapple
Dried fruit
Fruit salad
Other
No fruit
********************MULTIPLE CHOICE - CATI
VERSION**************************
OPEN  1 200     CDQA1i   1
LABEL
MODULE  SUBMODUL
Substr(CDQA1,20,1)='1'
Please specify other
Other
****************** OPEN ENDED ENTRY ITEM
********************************
MULT  1 26      CDQA2   8                                       25
MLTLB
MODULE  SUBMODUL
(CDQA1 gt repeat('0', 19) and substr(CDQA1,20,1)='0') or CDQA1i gt ' '
I am now going to read you a list of VEGETABLES. Could you
please tell me which of the following vegetables ^name^ has eaten
over the past 7 DAYS?

[NOTE TO INTERVIEWER:
- read out all options
- vegetables can be cooked or raw
- ** Only include if not already mentioned (don't double count]
1       Pumpkin
2       Cauliflower
3       Potato (not hot chips)
4       Peas & beans
5       Lettuce
6       Celery
7       Eggplant
8       Carrot
9       Broccoli
10      Corn
11      Legumes (chickpeas, lentils, kidney beans)
12      Tomato
```

```
13      Capsicum
14      Zucchini
15      Cabbage
16      Brussel sprouts
17      Sweet potato
18      Spinach
19      Cucumber
20      Mushroom
21      Squash
22      Olives
23      Vegetables in mixed dishes e.g. soups & stews ** not already
mentioned
24      Mixed frozen vegetables** not already mentioned
25      Other
-26     No vegetables eaten over the last 7 days
Vegetable eaten by child
Pumpkin
Cauliflower
Potato (not hot chips)
Peas & beans
Lettuce
Celery
Eggplant
Carrot
Broccoli
Corn
Legumes (chickpeas, lentils, kidney beans)
Tomato
Capsicum
Zucchini
Cabbage
Brussel sprouts
Sweet potato
Spinach
Cucumber
Mushroom
Squash
Olives
Vegetables in mixed dishes (soups, stews)
Mixed frozen vegetables
Other
No vegies
******************MULTIPLE CHOICE - CATI
VERSION*************************
OPEN  1 200     CDQA2i   1
LABEL
MODULE  SUBMODUL
Substr(CDQA2,25,1)='1'
Please specify other?
Other
****************** OPEN ENDED ENTRY ITEM
*********************************
INFO  1         CDQB    6
NOLAB
MODULE  SUBMODUL
(CDQA2 gt repeat('0', 25) and substr(CDQA2,25,1)='0') or CDQA2i gt ' '
I'll now read you a list of foods and drinks.
```

Could you please tell me how often ^name^ had each of the following food & drink items IN THE PAST 24 HOURS?

Nil, Once, Twice, 3 Times, 4 Times or 5+ Times?
********** INFORMATION SCREEN ITEM
****
CHCE 1 6 CDQB1 1 _MAKE_
LABEL
MODULE SUBMODUL
CDQB=1
Fruit Juice/Fruit Drink.
1 Nil
2 Once
3 Twice
4 3 Times
5 4 Times
6 5+ Times
Fruit Juice / Fruit Drink
********** SINGLE CHOICE - CATI VERSION
****
CHCE 1 6 CDQB2 8 _MAKE_
LABEL
MODULE SUBMODUL
CDQB1 gt .
Water.

[NOTE TO INTERVIEWER:
If they have water from a bottle, ask how many times per day would they be offered the bottle. Try to get them to put an equivalent number of times
against this "And how many times per day would this be equivalent to?"
If they have the bottle ALL the time and are continuously drinking then give 5+ Times]
1 Nil
2 Once
3 Twice
4 3 Times
5 4 Times
6 5+ Times
Water
********** SINGLE CHOICE - CATI VERSION
****
CHCE 1 6 CDQB3 2 _MAKE_
LABEL
MODULE SUBMODUL
CDQB2 gt .
Full cream/Full fat milk
- including flavoured milk. As a drink or on cereal
1 Nil
2 Once
3 Twice
4 3 Times
5 4 Times
6 5+ Times
Milk – full cream or fat

```
***************** SINGLE CHOICE - CATI VERSION
***************************
CHCE  1 6       CDQB4   5                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQB3 gt .
Reduced fat milk
- including flavoured milk. As a drink or on cereal

[NOTE TO INTERVIEWER:
- This includes ANY reduced fat milk e.g. lite / half / skim / semi-skim]
1       Nil
2       Once
3       Twice
4       3 Times
5       4 Times
6       5+ Times
Reduced fat milk
***************** SINGLE CHOICE - CATI VERSION
***************************
CHCE  1 6       CDQB5   1                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQB4 gt .
Cheese and/or cheese spreads.
1       Nil
2       Once
3       Twice
4       3 Times
5       4 Times
6       5+ Times
Cheese or cheese spreads
***************** SINGLE CHOICE - CATI VERSION
***************************
CHCE  1 6       CDQB7   1                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQB5 gt .
Reduced fat/low fat yoghurt OR custard.
1       Nil
2       Once
3       Twice
4       3 Times
5       4 Times
6       5+ Times
Reduced fat yoghurt or custard
***************** SINGLE CHOICE - CATI VERSION
***************************
CHCE  1 6       CDQB6   1                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQB7 gt .
Regular yoghurt OR custard.
1       Nil
2       Once
3       Twice
4       3 Times
```

```
5       4 Times
6       5+ Times
Regular yoghurt/custard
***************** SINGLE CHOICE - CATI VERSION
***************************
CHCE  1 6       CDQB8   7                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQB6 gt .
Vegetables - raw or cooked
For example salad in a sandwich and vegetables at the evening meal count
as "twice". Vegetable juices ARE included here.

[NOTE TO INTERVIEWER:
- If asked, include vegetables in soups and stews
- Juice is included here]
1       Nil
2       Once
3       Twice
4       3 Times
5       4 Times
6       5+ Times
Vegetables
***************** SINGLE CHOICE - CATI VERSION
***************************
CHCE  1 6       CDQB9   6                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQB8 gt .
Fruit; fresh, tinned, stewed, dried. Fruit juices ARE included here.
For example: An apple at lunch and juice at breakfast and at afternoon
tea,
counts as 3 TIMES.

[NOTE TO INTERVIEWER:
- Juice is included here
1       Nil
2       Once
3       Twice
4       3 Times
5       4 Times
6       5+ Times
Fruit
***************** SINGLE CHOICE - CATI VERSION
***************************
CHCE  1 6       CDQB10  7                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQB9 gt .
And how many different vegetables - raw or cooked has ^name^
had IN THE PAST 24 HOURS? NOT including juice

[NOTE TO INTERVIEWER:
- The same vegetable served different ways counts as ONE vegetable
  e.g. tomato in salad and tomato in soup
- Juice is NOT included]
1       None
```

```
2       One
3       Two
4       3
5       4
6       5+
Different vegetables
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 6       CDQB11  2                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQB10 gt .
How many different fruits - fresh, tinned, stewed or dried
but NOT including juice?
1       None
2       One
3       Two
4       3
5       4
6       5+
Different fruits
***************** SINGLE CHOICE - CATI VERSION
****************************
INFO  1         CDQC    3
NOLAB
MODULE  SUBMODUL
CDQB11 gt .
How often has ^name^ had the following
food and drink items in the past 7 DAYS
Nil, Once, Twice, 3 Times, 4 Times, 5 Times or 6+ Times?
****************** INFORMATION SCREEN ITEM
******************************
CHCE  1 7       CDQC1   1                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQC=1
Peanut butter or Nutella
1       Nil
2       Once
3       Twice
4       3 Times
5       4 Times
6       5 Times
7       6+ Times
Peanut butter or nutella
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 7       CDQC2   2                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQC1 gt .
Pre-sugared cereals e.g. Coco Pops, Fruit Loops, or sugar added
to cereal?
1       Nil
2       Once
3       Twice
4       3 Times
```

```
5       4 Times
6       5 Times
7       6+ Times
Pre-sugared cereals
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 7       CDQC3   1                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQC2 gt .
Sweet biscuits, cakes, muffins, doughnuts or fruit pies?
1       Nil
2       Once
3       Twice
4       3 Times
5       4 Times
6       5 Times
7       6+ Times
Sweet cakes & pastry
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 7       CDQC4   1                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQC3 gt .
Potato chips/crisps or savoury biscuits?
1       Nil
2       Once
3       Twice
4       3 Times
5       4 Times
6       5 Times
7       6+ Times
Potato chips/crisps or savoury biscuits
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 7       CDQC5   1                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQC4 gt .
Lollies, muesli bars or fruit bars?
1       Nil
2       Once
3       Twice
4       3 Times
5       4 Times
6       5 Times
7       6+ Times
Confectionary/muesli or fruit bars
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 7       CDQC6   1                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQC5 gt .
Chocolate - bar, block, coated biscuits?
1       Nil
```

```
2       Once
3       Twice
4       3 Times
5       4 Times
6       5 Times
7       6+ Times
Chocolate (bar/block/coated biscuits)
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 7       CDQC7   1                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQC6 gt .
Soft drink or cordial - not diet varieties?
1       Nil
2       Once
3       Twice
4       3 Times
5       4 Times
6       5 Times
7       6+ Times
Soft drink/cordial (non diet)
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 7       CDQC8   1                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQC7 gt .
Ice-cream or ice-blocks?
1       Nil
2       Once
3       Twice
4       3 Times
5       4 Times
6       5 Times
7       6+ Times
Ice-cream/ice-blocks
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 7       CDQC9   1                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQC8 gt .
Cheese and/or cheese spreads?
1       Nil
2       Once
3       Twice
4       3 Times
5       4 Times
6       5 Times
7       6+ Times
Cheese or cheese spreads
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 7       CDQC10  1                       _MAKE_
LABEL
MODULE  SUBMODUL
```

```
CDQC9 gt .
Pie, pasty or sausage roll?
1       Nil
2       Once
3       Twice
4       3 Times
5       4 Times
6       5 Times
7       6+ Times
Pie/pasty/sausage roll
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 7       CDQC11  1                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQC10 gt .
Pizza?
1       Nil
2       Once
3       Twice
4       3 Times
5       4 Times
6       5 Times
7       6+ Times
Pizza
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 7       CDQc12  1                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQC11 gt .
Hot chips or french fries?
1       Nil
2       Once
3       Twice
4       3 Times
5       4 Times
6       5 Times
7       6+ Times
Hot chips/french fries
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 7       CDQc13  4                       _MAKE_
LABEL
MODULE  SUBMODUL
CDQc12 gt .
Hot dog, fritz, processed meats?

[If asked: "Processed meats include sausages, frankfurters, devon,
ham, hamburgers and chicken nuggets."]
1       Nil
2       Once
3       Twice
4       3 Times
5       4 Times
6       5 Times
7       6+ Times
```

Hot dog/fritz/processed meats
********** SINGLE CHOICE - CATI VERSION
****
CHCE 1 7 CDQc14 1 _MAKE_
LABEL
MODULE SUBMODUL
CDQc13 gt .
Takeaway e.g. McDonalds, KFC, Fish n Chips/Chicken Shop?
1 Nil
2 Once
3 Twice
4 3 Times
5 4 Times
6 5 Times
7 6+ Times
Takeaway
********** SINGLE CHOICE - CATI VERSION
****
CHCE 1 8 CDQc15 6 _MAKE_
LABEL
MODULE SUBMODUL
CDQc14 gt .
Ok, thanks.
And now how many days in the last week did ^name^ have some vegetables - raw or cooked?

[NOTE TO INTERVIEWER:
- Juice is NOT included]
1 None
2 1
3 2
4 3
5 4
6 5
7 6
8 Everyday
Eat vegetables in the last week
********** SINGLE CHOICE - CATI VERSION
****
CHCE 1 8 CDQc16 2 _MAKE_
LABEL
MODULE SUBMODUL
CDQc15 gt .
How many days in the last week did ^name^ have some fruit - fresh, tinned, stewed or dried, EXCLUDING juice?
1 None
2 1
3 2
4 3
5 4
6 5
7 6
8 Everyday
Eat fruit in the last week
********** SINGLE CHOICE - CATI VERSION
****

INFO 1   INFO6   7
NOLAB
MODULE SUBMODUL
CDQc16 gt .
Now I'll ask some questions about your home and the foods in your house at the moment. It may be that you have to leave the phone and go and look to see what is in your home, otherwise if you would like to move into your kitchen now, that may help.

Please choose the option that most closely describes your response.
AND REMEMBER THERE ARE NO RIGHT OR WRONG ANSWERS
********** INFORMATION SCREEN ITEM
****
CHCE 1 2   Q125   1   _MAKE_
LABEL
MODULE SUBMODUL
INFO6=1
Do you have any fresh fruit in your home?
1   Yes
2   No
Fresh fruit in home
********** SINGLE CHOICE - CATI VERSION
****
CHCE 1 2   Q125a   3   _MAKE_
LABEL
MODULE SUBMODUL
Q125=1
Without opening any doors (including doors to your garage, refrigerator or pantry doors) would you be able to see fresh fruit in your home now; displayed out in the open?
1   Yes
2   No
See fresh fruit
********** SINGLE CHOICE - CATI VERSION
****
CHCE 1 2   Q125ai 7   _MAKE_
LABEL
MODULE SUBMODUL
Q125a gt .
Do you have any ready to eat fresh fruit on a shelf in the refrigerator or on the kitchen counter NOW? This includes fruit that you have washed or chopped to make ready to eat, like bunches of grapes, berries, or oranges

[NOTE TO INTERVIEWER:
- This relates to RIGHT NOW, not whether they have ever done this]
1   Yes
2   No
Ready to eat fresh fruit
********** SINGLE CHOICE - CATI VERSION
****
CHCE 1 2   Q126   1   _MAKE_
LABEL
MODULE SUBMODUL
Q125ai gt . or Q125=2
Do you have any tinned or jarred fruit in your home?
1   Yes

```
2       No
Tinned or jarred fruits in home
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 2       Q127    8                       _MAKE_
LABEL
MODULE  SUBMODUL
Q126 gt .
Do you have any dried fruit, such as raisins, dried apricots,
or dates in your home now?

This does not include dried fruit that is part of a trail mix.

[NOTE TO INTERVIEWER:
- Trail mix is a combination of dried fruit, grains, seeds, nuts,
  and sometimes chocolate]
1       Yes
2       No
Dried fruit in home
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 2       Q128    1                       _MAKE_
LABEL
MODULE  SUBMODUL
Q127 gt .
Do you have any frozen fruit in your home now?
1       Yes
2       No
Frozen fruit in home
***************** SINGLE CHOICE - CATI VERSION
****************************
MULT  1 20      Avail   8                                       20
MLTLB
MODULE  SUBMODUL
Q125=1 or Q126=1 or Q127=1 or Q128=1
Now I'll read the same list of fruits as I did earlier.
Could you please tell me if you have any of these fruits
in your home AT THE MOMENT. They could be in any form;
fresh, tinned, frozen or dried;

[NOTE TO INTERVIEWER:
- Read out all options
- juice is NOT included]
1       Kiwi fruit
2       Peach
3       Banana
4       Apricot (not dried)
5       Pear
6       Nectarine or peacharine
7       Grapes
8       Strawberries
9       Mango
10      Watermelon
11      Rockmelon
12      Mandarin
13      Plum
14      Orange
```

```
15      Pawpaw
16      Apple
17      Pineapple
18      Dried fruit
19      Fruit salad
20      Other
Fruit eaten by child
Kiwi fruit
Peach
Banana
Apricot
Pear
Nectarine / peacherine
Strawberries
Mango
Watermelon
Rockmelon
Grapes
Mandarin
Plum
Orange
Pawpaw
Apple
Pineapple
Dried fruit
Fruit salad
Other
******************MULTIPLE CHOICE - CATI
VERSION**************************
OPEN  1 200     Qavail2 1
LABEL
MODULE  SUBMODUL
Substr(Avail,20,1)='1'
Please specify other
Other
****************** OPEN ENDED ENTRY ITEM
********************************
CHCE  1 2       Q128b   7                       _MAKE_
LABEL
MODULE  SUBMODUL
substr(Avail,1,19) gt '0' or Qavail2 gt ' '
Would it be possible for ^name^ to get any type of fruit (fresh,
tinned, dried or frozen) on ^hisher^ own, without your help?

[NOTE TO INTERVIEWER:
- This relates to ACCESS not PERMISSION
- If they can access the fruit, even if they don't have permission,
  answer YES
1       Yes
2       No
Get ANY fruit on their own
***************** SINGLE CHOICE - CATI VERSION
***************************
CHCE  2 2       Q129    4                       _MAKE_
LABEL
MODULE  SUBMODUL
Q128b gt . or
```

(Q125=2 AND Q126=2 AND Q127=2 AND Q128=2)
Do you have any fresh vegetables in your home now?

[NOTE TO INTERVIEWER: Fresh vegetables include potatoes and onions but not garlic]
1 Yes
2 No
Fresh vegetables in home
********** SINGLE CHOICE - CATI VERSION
****
CHCE 1 2 Q129a 7 _MAKE_
LABEL
MODULE SUBMODUL
Q129=1
Do you have any READY TO EAT fresh vegetables on a shelf in the refrigerator or on the kitchen counter now? These include baby carrots, cherry tomatoes, or vegetables that you have sliced to make them ready to eat.

[NOTE TO INTERVIEWER:
- This relates to RIGHT NOW, not whether they have ever done this]
1 Yes
2 No
Ready to eat fresh vegetables
********** SINGLE CHOICE - CATI VERSION
****
CHCE 1 2 Q130 1 _MAKE_
LABEL
MODULE SUBMODUL
Q129a gt . or Q129=2
Do you have any tinned or jarred vegetables in your home?
1 Yes
2 No
Tinned or jarred vegetables in home
********** SINGLE CHOICE - CATI VERSION
****
CHCE 1 2 Q131 1 _MAKE_
LABEL
MODULE SUBMODUL
Q130 gt .
Do you have any frozen vegetables in your home now?
1 Yes
2 No
Frozen vegetables in home
********** SINGLE CHOICE - CATI VERSION
****
MULT 1 25 avai3 8 25
MLTLB
MODULE SUBMODUL
Q129=1 or Q130=1 or Q131=1
And, now I'll read the list of vegetables again.
Could you please tell me if you have any of these vegetables in your home AT THE MOMENT. They could be in any form; fresh, tinned or frozen;

[NOTE TO INTERVIEWER:
- Read out all options / juice is excluded]

```
- ** Only include if not already mentioned (don't double count]
1       Pumpkin
2       Cauliflower
3       Potato (not hot chips)
4       Peas & beans
5       Lettuce
6       Celery
7       Eggplant
8       Carrot
9       Broccoli
10      Corn
11      Legumes (chickpeas, lentils, kidney beans)
12      Tomato
13      Capsicum
14      Zucchini
15      Cabbage
16      Brussel sprouts
17      Sweet potato
18      Spinach
19      Cucumber
20      Mushroom
21      Squash
22      Olives
23      Vegetables in mixed dishes (soups & stews) **
24      Mixed frozen vegetables **
25      Other
Vegetable eaten by child
Pumpkin
Cauliflower
Potato (not hot chips)
Peas & beans
Lettuce
Celery
Eggplant
Carrot
Broccoli
Corn
Legumes (chickpeas, lentils, kidney beans)
Tomato
Capsicum
Zucchini
Cabbage
Brussel sprouts
Sweet potato
Spinach
Cucumber
Mushroom
Squash
Olives
Vegetables in mixed dishes (soups, stews)
Mixed frozen vegetables
Other
******************MULTIPLE CHOICE - CATI
VERSION**************************
OPEN  1 200     Qavail4 1
LABEL
MODULE  SUBMODUL
```

```
Substr(avai3,25,1)='1'
Please specify other?
Other
****************** OPEN ENDED ENTRY ITEM
*********************************
CHCE  1 2       Q131b   7                       _MAKE_
LABEL
MODULE  SUBMODUL
substr(Avai3,1,24) gt '0' or Qavail4 gt ' '
Would it be possible for ^name^ to get any type of vegetable (fresh,
tinned, or frozen) on ^hisher^ own, without your help?

[NOTE TO INTERVIEWER:
- This relates to ACCESS not PERMISSION
- If they can access the vegies, even if they don't have permission,
  answer YES
1       Yes
2       No
Get ANY fruit on their own
***************** SINGLE CHOICE - CATI VERSION
****************************
INFO  1         INFO7   3
NOLAB
MODULE  SUBMODUL
Q131b gt . or (Q129=2 AND Q130=2 AND Q131=2)
Now I am going to ask you about what snacks you have in your home.
Again, please respond as accurately as possible and remember that
you are not being judged on your answers.
****************** INFORMATION SCREEN ITEM
*********************************
CHCE  1 2       Q132    3                       _MAKE_
LABEL
MODULE  SUBMODUL
INFO7=1
Do you have any salty snacks in your home?

[If asked: "Salty snacks include chips & crisps, peanuts, and pretzels"]
1       Yes
2       No
Salty snacks in home
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 2       Q132a   7                       _MAKE_
LABEL
MODULE  SUBMODUL
Q132=1
Would it be possible for ^name^ to get any salty snacks
on ^hisher^ own, without your help?

[NOTE TO INTERVIEWER:
- This relates to ACCESS not PERMISSION
- If they can access the snacks, even if they don't have permission,
  answer YES
1       Yes
2       No
Get salty snacks on their own
```

```
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 2       Q133    1                       _MAKE_
LABEL
MODULE  SUBMODUL
Q132a gt . or Q132=2
Do you have any sweet snacks in your home?
1       Yes
2       No
Sweet snacks in home
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 2       Q133a   7                       _MAKE_
LABEL
MODULE  SUBMODUL
Q133=1
Would it be possible for ^name^ to get any sweet snacks on
^hisher^ own, without your help?

[NOTE TO INTERVIEWER:
- This relates to ACCESS not PERMISSION
- If they can access the snacks, even if they don't have permission,
  answer YES
1       Yes
2       No
Get sweet snacks on their own
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 2       Q134    2                       _MAKE_
LABEL
MODULE  SUBMODUL
Q133a gt . or Q133=2
Do you have any confectionary (chocolate or lollies)
in your home?
1       Yes
2       No
Confectionary in home
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 2       Q134a   7                       _MAKE_
LABEL
MODULE  SUBMODUL
Q134=1
Would it be possible for ^name^ to get any confectionary
(chocolate or lollies) on ^hisher^ own without your help?

[NOTE TO INTERVIEWER:
- This relates to ACCESS not PERMISSION
- If they can access the confectionary, even if they don't have
  permission, answer YES
1       Yes
2       No
Get confectionary on their own
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 2       Q135    1                       _MAKE_
LABEL
```

```
MODULE  SUBMODUL
Q134a gt . or Q134=2
Do you have any soft drink in your home?
1       Yes
2       No
Soft drink in home
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 2       Q135a   7                       _MAKE_
LABEL
MODULE  SUBMODUL
Q135=1
Would it be possible for ^name^ to get soft drink on
^hisher^ own, without your help?

[NOTE TO INTERVIEWER:
- This relates to ACCESS not PERMISSION
- If they can access the soft drink, even if they don't have permission,
  answer YES
1       Yes
2       No
Get soft drink on their own
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 4       Q143    8                       _MAKE_
LABEL
MODULE  SUBMODUL
Q135a gt . or Q135=2
Ok, thanks for that.
Now, from the following options, can you please tell me where are
most meals eaten in your home.

[NOTE TO INTERVIEWER:
- If varied or dependent on the meal, ask participants to take into
account meals not eaten at home, and meals eaten during the weekend so
that they can best estimate which place food is most commonly eaten).
1       At the dining or kitchen table or kitchen bench
2       On the sofa or couch
3       At the coffee table
4       Somewhere else
Meals eaten at home
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 8       Q137    8                       _MAKE_
LABEL
MODULE  SUBMODUL
Q143 gt .
How many days a week does your family sit AT A TABLE (or bench)
to eat dinner TOGETHER?  This includes occasions when it is just
^name^ and yourself.

[NOTE TO INTERVIEWER:
- Only include if they are eating at a DINING TABLE or KITCHEN BENCH
- Coffee table / Sofa are NOT included
- Include weekend too (prompt if needed)
1       0
2       1
```

```
3       2
4       3
5       4
6       5
7       6
8       7
Days a week sit at dinner table
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 8       Q140    6                       _MAKE_
LABEL
MODULE  SUBMODUL
Q137 gt .
How often does ^name^ eat dinner in front of TV each week?

[NOTE TO INTERVIEWER:
- If ^name^ sits at a dining table in the kitchen, but there is a TV
  on in the room, this IS included as being in front of the TV
- Include weekends too - prompt if needed]
1       0
2       1
3       2
4       3
5       4
6       5
7       6
8       7
Eat dinner in front of TV
***************** SINGLE CHOICE - CATI VERSION
****************************
INFO  1         INFO3   8
NOLAB
MODULE  SUBMODUL
Q140 gt .
I am now going to read you a list of statements relating to
children and family eating.  Could you please tell me if you:
       Strongly Agree,
       Agree,
       Are neutral,
       Disagree, or
       Strongly Disagree
with each. Again, there are no right or wrong answers.
****************** INFORMATION SCREEN ITEM
******************************
CHCE  1 5       Q25     4                       _MAKE_
LABEL
MODULE  SUBMODUL
Info3=1
^name^ should always eat all of the food on ^hisher^ plate.

[NOTE TO INTERVIEWER:
- prompt as needed "And is that 'Strongly Agree' or just 'Agree'?]
1       Strongly agree
2       Agree
3       Neutral
4       Disagree
5       Strongly disagree
```

```
Eat all the good food on plate
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 5       Q25a    4                       _MAKE_
LABEL
MODULE  SUBMODUL
Q25 gt .
I have to be especially careful to make sure ^name^ eats enough.

[NOTE TO INTERVIEWER:
- prompt as needed "And is that 'Strongly Agree' or just 'Agree'?]
1       Strongly agree
2       Agree
3       Neutral
4       Disagree
5       Strongly disagree
Eat all the good food on plate
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 5       Q26     5                       _MAKE_
LABEL
MODULE  SUBMODUL
Q25a gt .
If ^name^ says 'I'm not hungry', I try to get ^himher^ to
eat anyway.

[NOTE TO INTERVIEWER:
- prompt as needed "And is that 'Strongly Agree' or just 'Agree'?]
1       Strongly agree
2       Agree
3       Neutral
4       Disagree
5       Strongly disagree
Try to get child to eat
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 5       Q27     5                       _MAKE_
LABEL
MODULE  SUBMODUL
Q26 gt .
If I did not guide or regulate ^name^'s eating ^heshe^ would eat much
less than ^heshe^ should.

[NOTE TO INTERVIEWER:
- prompt as needed "And is that 'Strongly Agree' or just 'Agree'?]
1       Strongly agree
2       Agree
3       Neutral
4       Disagree
5       Strongly disagree
Guide or regulate my child's eating
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 5       Q33     5                       _MAKE_
LABEL
MODULE  SUBMODUL
Q27 gt .
```

```
If ^name^ does not like a fruit or vegetable when I offer it
to ^himher^, I will not offer it to ^himher^ again.

[NOTE TO INTERVIEWER:
- prompt as needed "And is that 'Strongly Agree' or just 'Agree'?]
1       Strongly agree
2       Agree
3       Neutral
4       Disagree
5       Strongly disagree
Doesn't like fruit & vegetable
***************** SINGLE CHOICE - CATI VERSION
****************************
INFO  1         NEW_INFO8
NOLAB
MODULE  SUBMODUL
Q33 gt .
The response options are a bit different this time.
Could you please tell me if you:
       Agree,
       Slightly Agree,
       Are neutral,
       Slightly Disagree, or
       Disagree
with each. Again, there are no right or wrong answers.
****************** INFORMATION SCREEN ITEM
*******************************
CHCE  1 5       NEW4    1                       _MAKE_
LABEL
MODULE  SUBMODUL
NEW_INFO=1
I have to be sure that ^name^ does not eat too many high-fat foods
1       Agree
2       Slightly Agree
3       Neutral
4       Slightly Disagree
5       Disagree
Be sure too many high-fat
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 5       NEW5    1                       _MAKE_
LABEL
MODULE  SUBMODUL
NEW4 gt .
I have to be sure that ^name^ does not eat too many sweets
1       Agree
2       Slightly Agree
3       Neutral
4       Slightly Disagree
5       Disagree
Be sure too many sweets
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 5       NEW6    2                       _MAKE_
LABEL
MODULE  SUBMODUL
NEW5 gt .
```

I have to be sure that ^name^ does not eat too much of ^hisher^ favourite foods
1 Agree
2 Slightly Agree
3 Neutral
4 Slightly Disagree
5 Disagree
Be sure too much favourite food
********** SINGLE CHOICE - CATI VERSION
****
CHCE 1 5 NEW7 2 _MAKE_
LABEL
MODULE SUBMODUL
NEW6 gt .
If I did not guide or regulate ^name^'s eating, ^heshe^ would eat too much of ^hisher^ favorite foods
1 Agree
2 Slightly Agree
3 Neutral
4 Slightly Disagree
5 Disagree
Regulate - favourite foods
********** SINGLE CHOICE - CATI VERSION
****
CHCE 1 5 NEW8 2 _MAKE_
LABEL
MODULE SUBMODUL
NEW7 gt .
If I did not guide or regulate ^name^'s eating, ^heshe^ would eat too many junk foods
1 Agree
2 Slightly Agree
3 Neutral
4 Slightly Disagree
5 Disagree
Regulate - junk foods
********** SINGLE CHOICE - CATI VERSION
****
CHCE 1 5 NEW9 1 _MAKE_
LABEL
MODULE SUBMODUL
NEW8 gt .
I intentionally keep some food out of ^name^'s reach
1 Agree
2 Slightly Agree
3 Neutral
4 Slightly Disagree
5 Disagree
Regulate - favourite foods
********** SINGLE CHOICE - CATI VERSION
****
INFO 1 INFO8 5
NOLAB
MODULE SUBMODUL
NEW9 gt .
I am now going to read you a list of statements relating to your child's food & eating practices.

```
For each statement, could you please tell if it applies:
All of the time, Most of the time, Some of the time, Rarely or Never.
****************** INFORMATION SCREEN ITEM
******************************
CHCE  1 5       Q144    7                       _MAKE_
LABEL
MODULE  SUBMODUL
INFO8=1
Do you ask ^name^ to eat everything on ^hisher^ plate at dinner?

[NOTE TO INTERVIEWER:
- This includes participants who make ^name^ eat A MAJORITY OF FOODS
  on ^hisher^ plate.
- It does NOT include participants who ask their child to eat
  certain foods]
1       All the time
2       Most of the time
3       Some of the time
4       Rarely
5       Never
Eat everything on plate
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 5       Q145    7                       _MAKE_
LABEL
MODULE  SUBMODUL
Q144 gt .
Do you restrict dessert if ^name^ does not eat the food on
^hisher^ plate at dinner?

[NOTE TO INTERVIEWER: Include if restriction occurs where:
  - all foods must be finished; OR
  - a majority of foods must be finished; OR
  - certain foods must be finished].
1       All the time
2       Most of the time
3       Some of the time
4       Rarely
5       Never
Restrict dessert
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 5       Q146    7                       _MAKE_
LABEL
MODULE  SUBMODUL
Q145 gt .
Do you reward ^name^ with desserts, snacks or confectionary if
^heshe^ finishes foods from ^hisher^ plate at dinner?

[NOTE TO INTERVIEWER: Include if restriction occurs where:
  - all foods must be finished; OR
  - a majority of foods must be finished; OR
  - certain foods must be finished)
1       All the time
2       Most of the time
3       Some of the time
```

```
4       Rarely
5       Never
Reward dessert
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 5       Q148    6                       _MAKE_
LABEL
MODULE  SUBMODUL
Q146 gt .
Do you generally allow ^name^ to eat only at set meal times?

[NOTE TO INTERVIEWER:
- Include meals AND SNACKS in this question ONLY if snacks are part
  of their regular routine
- i.e. REGULAR morning tea or afternoon tea WOULD be included]
1       All the time
2       Most of the time
3       Some of the time
4       Rarely
5       Never
Eat at set meal times
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 5       Q150    7                       _MAKE_
LABEL
MODULE  SUBMODUL
Q148 gt .
Do you allow ^name^ to help ^himher^self to snacks, including
salty and sweet snacks, or confectionary when ^heshe^ is at home?

[NOTE TO INTERVIEWER: ** DIFFERENT TO PREVIOUS Q **
- This relates to PERMISSION
- Do NOT include if ^name^ has to ask permission first.
- Only include if ^name^ is free to help ^himher^self without asking]
1       All the time
2       Most of the time
3       Some of the time
4       Rarely
5       Never
Help themselves to snacks
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 5       NEW1    1                       _MAKE_
LABEL
MODULE  SUBMODUL
Q150 gt .
How much do you keep track of the snack foods that ^name^ eats?
1       All the time
2       Most of the time
3       Some of the time
4       Rarely
5       Never
Keep track snack food
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 5       NEW2    1                       _MAKE_
LABEL
```

```
MODULE  SUBMODUL
NEW1 gt .
How much do you keep track of the sweets that ^name^ eats?
1       All the time
2       Most of the time
3       Some of the time
4       Rarely
5       Never
Keep track sweets
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 5       NEW3    1                       _MAKE_
LABEL
MODULE  SUBMODUL
NEW2 gt .
How much do you keep track of the high fat foods that ^name^ eats?
1       All the time
2       Most of the time
3       Some of the time
4       Rarely
5       Never
Keep track high fat foods
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 7       PG7     7                       _MAKE_
LABEL
MODULE  SUBMODUL
NEW3 gt .
These next few questions are about the money and time you spend
buying and preparing food.

On average, how often would you shop for groceries for your household?

[NOTE TO INTERVIEWER:
- Don't read out]
1       more than 2 times a week
2       2 times a week
3       once a week
4       3 times a fortnight
5       once a fortnight
6       Less than fortnightly
7       Don't know
Frequency of shopping
***************** SINGLE CHOICE - CATI VERSION
****************************
NUM   1         PG7a    8    MM QINFORM        QFORMAT
LABEL
MODULE  SUBMODUL
PG7 gt .
How many days has it been since you last shopped for food?

[NOTE TO INTERVIEWER:
- This means since ANYONE in their household bought food for the family,
  not just the participant]
0 = shopped earlier today
1 = shopped yesterday
2 = shopped the day before yesterday
```

0 14
0 99
DAYS SINCE LAST SHOPPED
******************** NUMERIC OR DATE ENTRY - CATI VERSION
****
NUM 1 PG7b 7 MM QINFORM QFORMAT
LABEL
MODULE SUBMODUL
PG7a gt .
On average, how much do you spend on food for your household each week? This includes foods you buy from the supermarket AS WELL AS any foods you buy and eat outside the home e.g. takeaway, restaurant meals, lunches.

[NOTE TO INTERVIEWER:
- Record approx. $ spent]
0 200
0 2000
Spend on groceries each week
******************** NUMERIC OR DATE ENTRY - CATI VERSION
****
NUM 1 PG7c 6 MM QINFORM QFORMAT
LABEL
MODULE SUBMODUL
PG7b gt .
On average, How much do you usually spend on takeaway or eat-in restaurant foods for your household each week? this would included fast food and foods you may consume as a family when eating out?

[NOTE TO INTERVIEWER:
- Record approx. $ spent]
0 200
0 2000
Spend on groceries each week
******************** NUMERIC OR DATE ENTRY - CATI VERSION
****
NUM 1 PG8 6 MM QINFORM QFORMAT
LABEL
MODULE SUBMODUL
PG7c gt .
On average, how much time each week would you spend shopping for groceries for you and your family?

[NOTE TO INTERVIEWER:
- record in MINUTES, convert hours to mins
- don't know = 999]
30 180
0 999
Time spent shopping each week
******************** NUMERIC OR DATE ENTRY - CATI VERSION
****
NUM 1 PG9 6 MM QINFORM QFORMAT
LABEL
MODULE SUBMODUL
PG8 gt .
On average, how much time each day would you spend preparing foods for you and your family?

[NOTE TO INTERVIEWER
- record approx. MINUTES, convert hours to mins
- don't know = 999]
30 180
0 999
Time spent preparing foods each day
******************** NUMERIC OR DATE ENTRY - CATI VERSION
****
CHCE 1 2 PG12 3 _MAKE_
LABEL
MODULE SUBMODUL
Pg9 gt .
Are you currently participating in any other program or
receiving dietary support which might improve your or ^name^'s
eating behaviour?
1 Yes (if yes please describe)
2 No
Participating in nutritional program
***************** SINGLE CHOICE - CATI VERSION
****
OPEN 1 400 PG12a 1
LABEL
MODULE SUBMODUL
PG12=1
Please specify the organised program
Description of the program
******************* OPEN ENDED ENTRY ITEM
****
CHCE 1 3 Prefer2 4 _MAKE_
LABEL
MODULE SUBMODUL
PG12a gt '' or PG12=2
And do you GENERALLY prefer to receive health information
via telephone or via written information e.g. booklets?

Please note this doesn't impact the group you're allocated to.
1 Telephone
2 Written information
3 Don't know / no preference
PREFERENCE
***************** SINGLE CHOICE - CATI VERSION
****
INFO 1 PSCS 11
NOLAB
MODULE SUBMODUL
Prefer2 gt .
And just to finish, I'll now read you some statements relating to
how you feel as a parent [OR CARER]. Could you please tell me if you:
Strongly Agree,
Agree,
Somewhat Agree,
Somewhat Disagree,
Disagree or
Strongly Disagree . . . with each.

There are no right or wrong answers, please just answer as best as

you can.
****************** INFORMATION SCREEN ITEM
****
CHCE 1 6   PSCS1   3   _MAKE_
LABEL
MODULE SUBMODUL
PSCS=1
The problems with taking care of a child are easy to solve once you know how your actions affect your child, an understanding I have acquired.
1   Strongly agree
2   Agree
3   Somewhat agree
4   Somewhat disagree
5   Disagree
6   Strongly disagree
Solve child's problems
***************** SINGLE CHOICE - CATI VERSION
****
CHCE 1 6   PSCS6   3   _MAKE_
LABEL
MODULE SUBMODUL
PSCS1 gt .
I would make a fine model for a new mother/father to follow in order to learn what she/he would need to know in order to be a good parent.
1   Strongly agree
2   Agree
3   Somewhat agree
4   Somewhat disagree
5   Disagree
6   Strongly disagree
Fine role model
***************** SINGLE CHOICE - CATI VERSION
****
CHCE 1 6   PSCS7   1   _MAKE_
LABEL
MODULE SUBMODUL
PSCS6 gt .
Being a parent is manageable, and any problems are easily solved.
1   Strongly agree
2   Agree
3   Somewhat agree
4   Somewhat disagree
5   Disagree
6   Strongly disagree
Being parent is manageable
***************** SINGLE CHOICE - CATI VERSION
****
CHCE 1 6   PSCS10 2   _MAKE_
LABEL
MODULE SUBMODUL
PSCS7 gt .
I meet my own personal expectations for expertise in caring for my child.
1   Strongly agree
2   Agree

```
3       Somewhat agree
4       Somewhat disagree
5       Disagree
6       Strongly disagree
Meet own expectations
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 6       PSCS11  2                       _MAKE_
LABEL
MODULE  SUBMODUL
PSCS10 gt .
If anyone can find the answer to what is troubling my child,
I am the one.
1       Strongly agree
2       Agree
3       Somewhat agree
4       Somewhat disagree
5       Disagree
6       Strongly disagree
Find the answer
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 6       PSCS13  2                       _MAKE_
LABEL
MODULE  SUBMODUL
PSCS11 gt .
Considering how long I've been a mother/father, I feel thoroughly
familiar with this role.
1       Strongly agree
2       Agree
3       Somewhat agree
4       Somewhat disagree
5       Disagree
6       Strongly disagree
Feel familiar with role
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 6       PSCS15  2                       _MAKE_
LABEL
MODULE  SUBMODUL
PSCS13 gt .
I honestly believe I have all the skills necessary to be a good
mother/father to my child.
1       Strongly agree
2       Agree
3       Somewhat agree
4       Somewhat disagree
5       Disagree
6       Strongly disagree
Have parent skills
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 6       PSCS_A  1                       _MAKE_
LABEL
MODULE  SUBMODUL
PSCS15 gt .
Providing a healthy diet for children is difficult to manage.
```

```
1       Strongly agree
2       Agree
3       Somewhat agree
4       Somewhat disagree
5       Disagree
6       Strongly disagree
Anxious & tense
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 6       PSCS_B  2                       _MAKE_
LABEL
MODULE  SUBMODUL
PSCS_A gt .
I can solve most problems with my child’s eating habits if
I invest the necessary effort
1       Strongly agree
2       Agree
3       Somewhat agree
4       Somewhat disagree
5       Disagree
6       Strongly disagree
Rewarding
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 6       PSCS_C  2                       _MAKE_
LABEL
MODULE  SUBMODUL
PSCS_B gt .
I honestly believe I have all the skills necessary to provide
healthy foods to my child.
1       Strongly agree
2       Agree
3       Somewhat agree
4       Somewhat disagree
5       Disagree
6       Strongly disagree
Rewarding
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 6       PSCS_D  2                       _MAKE_
LABEL
MODULE  SUBMODUL
PSCS_C gt .
I am able to keep trying to encourage my child to eat healthy foods,
even when I am under a lot of pressure.
1       Strongly agree
2       Agree
3       Somewhat agree
4       Somewhat disagree
5       Disagree
6       Strongly disagree
Rewarding
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 6       PSCS_G  2                       _MAKE_
LABEL
MODULE  SUBMODUL
```

```
PSCS_D gt .
It’s too hard to provide my child with healthy food
when I’m feeling tired
1       Strongly agree
2       Agree
3       Somewhat agree
4       Somewhat disagree
5       Disagree
6       Strongly disagree
Rewarding
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 6       PSCS_E  2                       _MAKE_
LABEL
MODULE  SUBMODUL
PSCS_G gt .
I am able to provide healthy foods to my child,
even when I have other time commitments
1       Strongly agree
2       Agree
3       Somewhat agree
4       Somewhat disagree
5       Disagree
6       Strongly disagree
Rewarding
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 6       PSCS_F  2                       _MAKE_
LABEL
MODULE  SUBMODUL
PSCS_E gt .
Even when faced with more appealing unhealthy foods,
I am able to provide healthy foods to my child
1       Strongly agree
2       Agree
3       Somewhat agree
4       Somewhat disagree
5       Disagree
6       Strongly disagree
Rewarding
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 6       PSCS_H  1                       _MAKE_
LABEL
MODULE  SUBMODUL
PSCS_F gt .
I am certain that I can choose healthy foods when shopping
1       Strongly agree
2       Agree
3       Somewhat agree
4       Somewhat disagree
5       Disagree
6       Strongly disagree
Rewarding
***************** SINGLE CHOICE - CATI VERSION
****************************
```

```
CHCE  1 6       PSCS_I  1                       _MAKE_
LABEL
MODULE  SUBMODUL
PSCS_H gt .
It's very difficult to prepare healthy foods for my child
1       Strongly agree
2       Agree
3       Somewhat agree
4       Somewhat disagree
5       Disagree
6       Strongly disagree
Rewarding
***************** SINGLE CHOICE - CATI VERSION
****************************
CHCE  1 6       PSCS_J  2                       _MAKE_
LABEL
MODULE  SUBMODUL
PSCS_I gt .
I meet my own personal expectations and goals for
the foods I provide to my child
1       Strongly agree
2       Agree
3       Somewhat agree
4       Somewhat disagree
5       Disagree
6       Strongly disagree
Rewarding
***************** SINGLE CHOICE - CATI VERSION
****************************
INFO  1         INFOE   2
NOLAB
MODULE  SUBMODUL
PSCS_J gt .
Ok, that brings us to the end of the questions.
Thanks so much for answering them.
******************* INFORMATION SCREEN ITEM
*******************************
INFO  1         INFOE1  12
NOLAB
MODULE  SUBMODUL
INFOE=1
Now I'll just tell you a little bit about the program.

We're testing two types of support for parents to encourage
healthy eating in preschoolers. One is over the telephone, and
the other is using written materials.

You'll be randomly allocated to receive ONE of these forms of support.
In the next week or so, we'll send you a program pack explaining which
type of support you'll receive and what we'll ask you to do.

Then in about 2 months' time, after you've had a chance to use the
support, we'll call you again and ask some similar questions.
******************* INFORMATION SCREEN ITEM
*******************************
INFO  1         INFO10  5
NOLAB
```

```
MODULE  SUBMODUL
INFOE1=1
Thank you so much for participating in the Healthy Habits program.
I hope you enjoy being a part of it.
Thanks again for taking the time to speak with us today.

Goodbye.
****************** INFORMATION SCREEN ITEM
*******************************
TIME  1         T_END   0
LABEL
end     time
INFO10=1
Recording end time
****************** GET DURATION ITEM
************************************
OPEN  1 600     Q156    2
LABEL
MODULE  SUBMODUL
T_END gt .
Interviewer Comments
[NOTE TO INTERVIEWER: write your comments here - if nothing write NIL]
Interviewer comments
******************** OPEN ENDED ENTRY ITEM
*********************************
STAT  1         STAT_CQ 1
NOLAB
end     stat
Q156 gt ' '
Completed
CQ
**************************************************************************
**
STAT  1         STAT_OS 1
NOLAB
OS      stat
(PreQai=1 or Q155exi2=1 or Q155exi4=1) and t_end=.
Other reason
OS
**************************************************************************
**
STAT  1         STAT_OT 1
NOLAB
OT      stat
(INTROTH gt ' ') and t_end=.
Other reason
OT
**************************************************************************
**
STAT  2         STAT_DR 1
NOLAB
DR      stat
(INTRO1=.R or INTRO7=1 or PreQc=1)
and t_end=.
Refused
DR
```

```
*************************************************************************
**
STAT  1         STAT_CB 1
NOLAB
CB      stat
(Info1=1 or intro6=1 or INFO1a=1 or info1b=1) and t_end=.
Callback
CB
*************************************************************************
**
INFO  2         TERM    2
NOLAB
MODULE  SUBMODUL
Stat_cq = 'CQ' or stat_cb = 'cb' or stat_dr = 'dr'
or stat_ot = 'ot' or stat_os = 'os'
INTERVIEWER TERMINATION INSTRUCTION, PRESS STOP AND
RECORD OUTCOME OF INTERVIEW ON LOG
****************** INFORMATION SCREEN ITEM
*******************************
```

Appendix C

The following are the final PSEC items measured on a six point Likert scale of: 1 = Strongly agree, 2 = Agree, 3 = Somewhat agree, 4 = Somewhat disagree, 5 = Disagree, 6 = Strongly disagree.

Q1 Providing a healthy diet for children is difficult to manage.

Q2 I can solve most problems with my child's eating habits if I invest the necessary effort

Q3 I honestly believe I have all the skills necessary to provide healthy foods to my child.

Q4 I am able to keep trying to encourage my child to eat healthy foods, even when I am under a lot of pressure.

Q5 It's too hard to provide my child with healthy food when I'm feeling tired

Q6 I am able to provide healthy foods to my child, even when I have other time commitments

Q7 Even when faced with more appealing unhealthy foods, I am able to provide healthy foods to my child

Q8 I am certain that I can choose healthy foods when shopping

Q9 It's very difficult to prepare healthy foods for my child

Q10 I meet my own personal expectations and goals for the foods I provide to my child

Appendix D

Parental Sense of Competency Scale (PSOC; Gibaud-Wallston & Wandersman, 1978 and Johnston & Mash, 1989).

The PSOC is a measure of parental self-efficacy and satisfaction that has been examined in both clinical and normative populations in Australia (Rogers & Matthews, 2004; Gilmore & Cuskelly,2009). Each item is rated on a six point Likert scale from 1 = strongly agree to 6 = strongly disagree. Both the self-efficacy and satisfaction sub-scales of this tool have demonstrated adequate internal consistency across a number of studies with Cronbach alpha's ranging from 0.68 to 0.78 (Johnston & Mash, 1989; Rogers & Matthews, 2004; Gilmore & Cuskelly, 2009). The larger RCT and this sub-study only used the parental self-efficacy subscale and not the parenting satisfaction subscale as this was the construct of interest. The efficacy subscale has been consistently derived across multiple studies that have conducted factor analyses of the PSOC items and has been used on its own in published studies (Johnston & Mash, 1989; Rogers & Matthews, 2004; Ngai, Chan & Ip, 2009; Feeley, Gottlieb & Zelkowitz, 2007).

Correlations between the PSOC and PSEC were used as a form of convergent and discriminant validity for the new measure (see Results). That is, the two measures should be related as they are both forms of parental self-efficacy, however, not so highly correltated that they are measuring the exact same concept Of interest, a paired sample's t-test demonstrated that parents confidence for the more specific form of self-efficacy was slightly, but significantly higher than for the more generalised measure ($t = 6.161$, $p < .001$).

Appendix E

Results examining parent and child demographic correlates can be seen in Tables F1 and F2. No relationships were found between parent demographic variables and the CDQ-Non-core Foods index, HHS fruit, vegetable, salty snack, sweet snack, or confectionary accessibility, Restriction or monitoring practices, or parental self-efficacy for managing child diet. Table F1 shows weak significant relationships between parent demographics and dietary, environmental and parental factors. The strongest relationship for these variables was between Parent Highest Education Level and CDQ- Sweetened Beverages Index, which is still a weak correlation overall.

Table E1: *Pearson Correlations between Parent Demographics and Dietary, Environmental and Parental variables.*

	Parent Gender	Parent Age	Parent Indigenous Status	Parent Education Level	Household Income
Fruit & Vegetable Index	.036	-.004	.056	.100	.141*
Fat from Dairy Index	.062	-.076	-.045	-.077	-.139*
Sweetened Beverages Index	-.025	-.049	-.154*	.296**	-.266**
Non-core Foods Index	-.001	.113	-.040	-.017	-.045
Variety of fruit available	.167*	-.027	.023	.024	.100
Variety of vegetables available	.031	.069	.116	.162*	.185**
Fruit accessibility	.055	.040	.046	.132	.059
Vegetable accessibility	-.087	.005	-.085	.048	-.002
Salty snacks accessibility	.076	.020	.035	.056	.082
Sweet snacks accessibility	-.134	.083	.017	.106	-.108
Confectionary accessibility	.023	-.044	-.011	.023	-.018
Soft drink accessibility	.039	.147*	-.038	-.009	.015
Use of pressure	.122	-.032	.028	.197**	.094
Use of restriction	-.013	-.111	.034	.102	.068
Use of monitoring	.098	-.013	-.074	-.027	-.076
Parental self-efficacy for child diet	.001	-.081	.129	.005	.044

*p< .05, ** p< .01.

This pattern of weak relationships was also found to be similar for the relationship between child demographic variables and dietary, environmental (availability & accessibility) and parental (efficacy & feeding strategies) factors, where the strongest relationship found was for Child Indigenous Status and CDQ- Sweetened Beverages Index (see Table F2). No relationships were found between child demographics and CDQ Fruit and Vegetable Index, CDQ Non-core Foods Index, HHS Variety of Fruits Available, HHS vegetable, salty snack, sweet snack and soft drink accessibility, use of restriction, or parental self-efficacy.

Table E2: *Pearson Correlations between Child Demographics and Dietary, Environmental and Parental variables.*

	Child Gender	Child Age	Child Indigenous Status	No of children <16yrs old	No. of children attending preschool
Fruit & Vegetable Index	.095	-.021	.087	.019	.068
Fat from Dairy Index	-.052	-.208**	-.129	.187**	.074
Sweetened Beverages Index	-.037	-.059	-.251**	-.020	.010
Non-core Foods Index	-.045	-.000	-.063	.086	-.119
Variety of fruit available	.052	-.059	.042	.132	.127
Variety of vegetables available	.082	-.086	.149*	.004	.045
Fruit accessibility	0.203**	-.065	.058	-.056	.020
Vegetable accessibility	.063	-.070	-.071	-.103	.031
Salty snacks accessibility	.031	-.123	.103	-.013	-.091
Sweet snacks accessibility	.078	-.021	.034	-.062	-.024
Confectionary accessibility	-.080	-.142*	.012	.156*	-.038
Soft drink accessibility	-.016	-.063	.130	.001	.009
Pressure	.186**	.074	.058	.024	-.078
Restriction	.060	.054	-.025	.015	.039
Monitoring	.000	-.092	-.125	.186**	-.002
Parental self-efficacy for child diet	.037	-.053	.118	-.080	.015

*p< .05, ** p< .01.

Appendix F

Table F1: *Magarey et al.'s (2009) Child Dietary Questionnaire (CDQ) cut off scores for meeting NHMRC dietary guidelines for healthy diet.*

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