‘Healthy Kiwi Programme’: The outcomes and experiences of a brief parental education programme on the introduction of complementary foods to infants and infant feeding cues in New Zealand

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Deirdre Anne Murray

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Abstract

New Zealand infants are being started on complementary foods earlier than is currently recommended by the World Health Organisation (WHO) (Royal New Zealand Plunket Society, 2017; Simons, 1999, World Health Organisation, 2003). The untimely introduction of complementary foods to infants has been associated with a number of possibly preventable health issues (Dell and To, 2001; Gdalevich, Minoumi & Minoumi, 2000; Kemp and Kakakios 2004; Forsyth, Ogslon, Clark, Florey & Howie, 1993; Popkin, Adair, Akin, Black, Briscoe & Flieger, 1990). Parental infant feeding decisions, such as when to introduce complementary foods are complex and influenced by multiple personal, social, environmental and behavioural factors. Many developing and developed countries have found parental education interventions on the introduction of complementary foods to infants beneficial for increasing parental knowledge and adherence to the current WHO recommendations. In New Zealand the no such study or implementation of a similar parental education intervention has been completed.

This study utilised a case study design to explore the perceptions, outcomes and experiences of four first-time parents from New Zealand who participated in a parental education intervention on the introduction of complementary foods to infants. This programme was called the 'Healthy Kiwi Programme' (HKP). The study gathered both qualitative and quantitative data to enable a more holistic and comprehensive exploration of parental perceptions, outcomes and experiences.

The mothers perceived that they were exposed to mixed messages regarding infant feeding from a range of sources and that the current infant feeding supports in New Zealand are inadequate. Three out of the four mothers who participated in this study showed positive outcomes in terms of their knowledge on infant feeding following their participation in the parental education programme. Another key outcome from this study was that all four mothers identified the education they received on identifying and interpreting infant feeding cues as the most valuable thing they learnt. The mothers identified several of aspects of the HKP which facilitated their participation in the programme such as the programme being home-based, the inclusion of practical activities and them developing an effective working relationship with the interventionist. These findings indicate that the current public service being provided to parents to support them with infant feeding is insufficient and further exploration of parental education interventions on this topic in New Zealand is recommended.

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Chapter One- Introduction

Many first-time parents experience a number of dilemmas during the early stages of their infant's life (Walsh, Kearney, & Dennis, 2015). One of these dilemmas is deciding when it is appropriate to introduce complementary foods to their infant's diet. This chapter will introduce the topic of complementary feeding, outline the current World Health Organisation (WHO, 2003) recommendations for the introduction of complementary foods and summarise health conditions that have been associated with the untimely introduction of these to infants as identified in the literature. The role of parental education programmes as a potential solution will also briefly be discussed and explored further in Chapter Two.

1.1. What is complementary feeding?

Complementary feeding refers to the gradual introduction of solid foods alongside breastfeeding or formula feeds to an infant's diet (World Health Organisation [WHO], 2003). The term 'complementary foods' will be used throughout this thesis to refer to "all solid and liquid foods other than breastmilk or infant formula" (Agostoni et al., 2008). The process of introducing complementary foods has been historically and commonly known as 'weaning'. The word 'weaning' is often associated with stopping breast-feeding. Therefore, health professionals have made a shift towards using the term 'complementary foods' as this infers that breast feeding continues while other foods are introduced to complement the infant's nutritional intake provided by breast milk or formula (Ministry of Health [MOH], 2008).

1.2. World Health Organisation (WHO) Recommendations

To ensure infants experience healthy physical and cognitive development the World Health Organisation (WHO, 2003; WHO, 2011) recommends infants be exclusively fed breastmilk or formula until they reach six months of age. Infant formula refers to manufactured food designed as a substitute for breastmilk for infants who cannot be breastfed (Koletzko et al., 2005). The New Zealand Ministry of Health (MOH, 2008) follows the current WHO recommendation regarding the introduction of complementary foods to infants. They

recommend that exclusive breastfeeding continue until infants reach six months of age. Once an infant reaches six months old their daily nutritional requirements begin to exceed what breastmilk alone can provide. Therefore, current recommendations advise the introduction of complementary foods to meet these changes in infants nutritional and energy requirements at this time. This infant feeding recommendation is based on the growing body of evidence that shows that the introduction of complementary foods at six months is vital to ensure growth, development, as well as minimising the development of long term health problems (American Dietetics Association, 2005; Fisher, Birch, Smicilkas-Wright & Picciano, 2000; Smith, Durkin, Hinton, Bellinger & Kuhn, 2003).

1.3. Risks associated with the untimely introduction of complementary feeding

The inappropriate timing of introducing complementary foods to infants (either early or delayed) has been associated with the development of a number of health problems including asthma (Gdalevich, Minoumi & Minoumi, 2001; Kemp & Kakakios, 2004), eczema (Forsyth, Ogslon, Clark, Florey & Howie, 1993), allergies (Hampton, 1999), diabetes (Ziegler, Schmid, Huber, Hummel & Bonifacio, 2003) and later obesity (Baker, Michaelsen, Rasmussen & Sorenson, 2004; Dennison, Edmunds, Stratton & Pruzek, 2006; Ong et al., 2000). These health problems and the ongoing medical costs related to their management make the inappropriate timing of the introduction of complementary foods an issue of concern.

1.4. Current parental practices

Despite the WHO's recommendation to introduce complementary foods to infants once they reach six months of age (WHO, 2004) and the growing body of evidence for correlations between the untimely introduction of complementary foods and adverse health conditions (Dell & To, 2001; Forsyth et al., 1993; Gdalevich, Minoumi & Minoumi, 2000; Kemp & Kakakios, 2004; & Popkin et al., 1990), the early introduction of complementary foods continues across both developed and developing countries (Alzaheb, 2016). The early introduction of complementary foods occurs when infants are exposed to complementary foods before they are four months old. Results from several studies completed across a range of countries

including Australia, New Zealand, Canada and England showed that between 43 and 85% of infants who participated, were introduced to complementary foods before four months of age (Alder, Williams, Anderson, Forsyth & Florey, 2004; Alzaheb, 2016; Erkkola et al., 2005; Foote & Marriott, 2003; Haick, Gauthier, Brosseau & Rocheleau, 2007; Heath, Reeves-Tuttle, Simons, Cleghorn, & Parnell, 2002; National Health Medical Research Council, 2003). The results from these studies demonstrate that significant numbers of infants both worldwide and in New Zealand continue to be introduced to complementary foods before they reach the recommended six months of age and are therefore at increased risk of developing medical conditions.

1.5. Parental education

Parental education is the process of teaching or providing parents with specific knowledge or skills, which aim to change their perceptions or behaviours regarding a specific topic (Mahoney et al., 1999). The premise of a parental education intervention is that the modification of parental beliefs, behaviours and actions will result in long lasting positive changes for both the infant and their parents (Lundahl, Risser & Lovejoy, 2006). For example, if an intervention successfully alters parents thinking from believing that their infant is ready for complementary foods at three months old to thinking that when their infant demonstrates sufficient head control and oro-motor skills including munching and improved tongue control they are ready to safely manage this transition. This new belief may result in a shift in the parents' behaviours resulting in a delay in the introduction of complementary foods which may mean their infant is closer to six months old. Results from previous studies suggest that parental infant feeding beliefs and behaviours can be successfully modified through parental education interventions (Sanders & Woolley, 2005); this evidence will be explored further in Chapter Two. These studies suggest that a parent education intervention approach maybe an effective approach to utilise when trying to encourage shifts in parental beliefs, perceptions or behaviours regarding the introduction of commentary foods to infants.

1.6. Speech language therapist role in infant feeding

Speech and language therapists have a wide scope of practice within the paediatric population, including providing support for infant feeding difficulties (American Speech-Language Hearing Association [ASHA], 2016). The researcher has trained and worked as a Speech Language Therapist within the field of paediatrics for the last eight years. The last three years have been exclusively in the specialist areas of infant feeding and paediatric dysphagia. One of the factors she has observed to be associated with infant feeding difficulties while in this role is the untimely introduction of complementary foods.

Speech and language therapists are encouraged to provide education or training to parents and caregivers. This education aims to increase awareness of the issue and hopes to positively change parental behaviours or attitudes in relation to the issue (ASHA, 2016). In the researcher's career she has received training on several parent education programmes that aim to educate and provide strategies to support children's communication development (Frost & Bondy, 1994; Pepper & Weitzman, 2004). The researcher acknowledges that there are few parent education programmes on infant feeding. The development of such a programme may enable speech language therapists to reduce the incidence of preventable infant feeding difficulties.

1.7. Current study

Studies on parental education programmes completed across a range of countries including Australia, China, India, England and America (Aggarwal, Verma, Faridi & Dayachand, 2008; Guldan, Fan, Ma, Ni, Xiang & Tang, 1999; Horodynski, Olson, Brophy-Herb, Silk & Shirer, 2008; Walsh et al., 2015; Wen, Baur, Simpson, Rissel & Flood, 2011) have demonstrated that parental education programmes are an effective way to increase parental knowledge about complementary feeding and improve infant feeding practices. However, despite this evidence no such study has been completed in New Zealand to date. Therefore, the aim of the research project reported in this thesis is to explore parental outcomes and experiences of participating

in a brief parental education intervention,' Healthy Kiwi Programme' about the introduction of complementary foods to infants and infant feeding cues with in the New Zealand context.

1.8. Thesis Overview

Chapter One has provided an overview of the key constructs and aim of this study. Chapter Two begins with a synopsis of findings in the literature that relate to parental education, the development and findings of previously completed parental education programmes on complementary feedings. This is followed by an exploration of how Social Cognitive Theory can be utilised to identify potential factors that may facilitate or prevent parental participation in an education programme. Chapter Three outlines the case study design and methodology underpinning the research, alongside the methods for data collection and analysis. Chapter Four presents the findings from both the quantitative and qualitative data gathered in this study. In Chapter Five the data analyses are interpreted and discussed in relation to the literature. The trustworthiness of the study along with the conclusions and possible directions for future research are also outlined in this chapter.

Chapter Two- Literature Review

2.1. Introduction

This literature review provides the empirical support for the pilot of a brief parental education programme on the introduction of complementary foods within the New Zealand context. It reviews literature related to current parental infant feeding practices, infant feeding support services within New Zealand, parental education programmes and details infant parental education interventions. It progresses to focus specifically on the theories and evidence base for the Healthy Babies Curriculum (Horodynski, Baker, Auld, Van Egeren, Olson & Brophy-Herb, 2013) as the Healthy Kiwi Programme, the focus for the current study, has been founded on this intervention. There is little published literature in the speech and language therapy field on this topic, so relevant literature from other professional fields has been examined in this literature review.

2.2. Rationale for global infant feeding recommendations

The introduction of complementary foods before infants reach four months of age is considered early and has been linked to adverse health problems (Clayton, Li, Perrine & Scanlon, 2013). These may include mild medical problems such as asthma (Gdalevich et al., 2000; Kemp & Kakakios, 2004), eczema (Forsyth et al., 1993), or allergies (Hampton, 1999). More severe conditions such as diabetes (Ziegler et al., 2003) or later obesity (Baker et al., 2004; Dennison, Edmunds, Stratton & Pruzek, 2006; Ong et al., 2000) have also been associated. The association between the early introduction of complementary foods and these health problems as well as the ongoing medical costs related to their management make the early introduction of complementary foods an issue of concern.

Conversely, if there is a significant delay in the introduction of complementary foods adverse health problems may occur. The introduction of complementary food after eight months of age is considered a significantly delay. Feeding difficulties may occur in infants where

the introduction of complementary foods was delayed. These feeding difficulties may include problems progressing through different food textures, feeding aversion or delayed oro-motor skills (Aggarwal et al., 2008). A delay in the introduction of complementary foods can increase the risk of malnutrition in infants. This delay may result in deficiencies in micronutrients particularly iron, zinc and calcium (Bhandari, Mazumder, Bahl, Martines, Black & Bhan, 2004; Kuo, Inkelas, Slusser, Maidenberg & Halfton, 2011). Long term deficiencies in these nutrients can lead to the development of rickets, cognitive or motor developmental delays (Belachew, Nida, Getaneh, Woldemariam & Getinet, 2005; Black, 1998; Lozoff, Jimenez & Wolf, 1991). The effect of these health problems on infant growth and development highlights the importance of a timely introduction to complementary foods.

2.3. Current infant feeding practices

Although there are clear recommendations from the WHO regarding the introduction of complementary foods, infant feeding practises continue to vary (Alzaheb, 2016). Results from several studies completed in the early to mid 2000s across a range of developed and developing countries including Saudi Arabia, Scotland, Australia, New Zealand, Canada and England showed that between 40% and 85% of infants who participated were introduced to complementary foods before four months of age (Alder et al., 2004; Alzaheb, 2016; Erkkola et al., 2005; Foote & Marriott, 2003; Haick et al., 2007; National Health Medical Research Council, 2003; Scott, Binns, Graham & Oddy, 2009). Some of these studies were carried out in countries consisting of significantly different ethnic demographics than New Zealand. Such as Alzaheb's (2016) study conducted in Saudi Arabia, where 89% of study participants in identified as being Saudi (Arabic). There are only 12,000 people who identify as being Arabic in the total population of New Zealand (Statistics New Zealand, 2013). Therefore, it is important to consider that the outcomes of a similar study may differ if it was carried out within New Zealand due to the different ethnic makeup and cultural practices of the major ethnic groups.

There is little up to date research on the percentage of New Zealand infants who are exposed to complementary foods before they reach six months of age. However, the research that is available shows similar results to the international evidence. New Zealand researchers

have found that around 45% of infants are introduced to complementary foods before reaching four months of age (Heath et al., 2002). Several studies mention that infants in New Zealand are often not breastfed for the recommended length of time and complementary foods are often introduced too early (Butler, Williams, Tukuitonga, & Paterson, 2004; Food standards Australia New Zealand, 2004; Heath et al., 2002; Royal New Zealand Plunket Society, 2017). The current availability of information about the introduction of complementary foods for parents and possible changes in the cultural makeup of the New Zealand population since these studies were completed needs to be considered when interpreting this finding. However, the results from these studies suggest that parents' perceptions may need to be altered to avoid possible health problems for New Zealand infants later in life.

2.3.1. Factors influencing current infant feeding practices

One potential factor that could affect a parent's decision about when to introduce complementary foods to their infant is their culture. The 2013 New Zealand census showed that 14.9% of the population identified as Māori, 11.8% Asian and 7.4% as Pacific peoples. Each of these cultures have their own unique views about food. However, a short duration of breast-feeding and the early introduction of complementary foods is common across these ethnic groups (Soh, Ferguson & Wong, 2000; Tuohy, Griffiths & Brooke, 1997). Tuohy, Griffiths and Brooke (1997) found that young Māori mothers breastfed their infants for two to three months before introducing complementary foods. Pasifika parents exclusively breast fed their infants for six to eight weeks before offering solid foods. Only 55% of six-week-old Asian infants were breastfed exclusively (Soh et al., 2000). There are few New Zealand specific studies on the introduction of complementary foods and limited current evidence on early introduction rates for specific cultures within New Zealand. Therefore, these findings need to be interpreted with caution as these rates may have changed over the last ten years. Understanding the reasons parents decide to introduce complementary foods to their infants earlier than recommended may help researchers develop more effective interventions that result in a timelier introduction of complementary foods to New Zealand infants.

There are a number of different personal, environmental and social factors identified within the literature which can influence a mother's decision to introduce complementary foods in a manner that does not align with the current infant feeding recommendation. A number of researchers have explored maternal rationales for the early or delayed introduction of complementary foods to their infants. A study completed by Clayton and colleagues (2013) explored the age of introduction of complementary foods and the reasons mothers introduced complementary foods to their infants at less than four months of age. They found six main reasons, of which included maternal perception of infant readiness; perceived infant hunger; wanting to feed their infant something in addition to formula; the perception of infant interest in solids; receiving advice from a clinician and to improve their infants sleep. Similar findings were reported by Scott, Binns, Graham and Oddy in 2009. O'Donovan and colleagues (2015) also found that mothers felt that the early introduction of complementary foods would assist their infants to sleep through the night. Other rationales provided by mothers who decided to progress their infant onto complementary foods before they reached three months old include questioning the nutritional adequacy of infant formula and perceiving that the progression to solid foods early would not cause any more harm as they were already not breast feeding their infant (Alzaheb, 2016; Jonsdottir et al, 2014; Walsh et al., 2015). Several studies have reported that personal factors such as maternal perceptions, culture and beliefs can result in infants being introduced to complementary foods earlier than recommended.

On the contrary, a study by Aggaarwal, Verma, Faridi and Dayachand (2008) in India found that the most common reason given by mothers in their study for delaying the introduction of complementary foods was having a negative experience when it was first introduced. Over half of the mothers (52%) in their study reported their children had vomited or spat out the food. These behaviours resulted in the mothers delaying the introduction of complementary foods to their infants. Aggaarwal and colleagues (2008) also found that mothers reported they felt they did not know when to start introducing complementary foods to their children and this resulted in a delayed introduction. Only 17.5% of mothers in their study introduced complementary foods to their children at six months of age. This study was conducted with mothers from a lower socio-economic area of India. There could be several

reasons for the difference in findings between this study and those discussed above including a lower level of maternal education, reduced access to evidence-based information on infant feeding and cultural differences. An education intervention about transitioning infants onto solid food could bridge this knowledge gap and result in mothers feeling confident to introduce complementary foods to their children within the recommended timeframe.

2.4. Infant feeding support services

Currently within New Zealand parental support on infant feeding for typically developing infants is provided through the Ministry of Health's Well Child Tamariki Ora programme (WCTO) (Royal New Zealand Plunket Society, 2017). The WCTO programme covers a broad range of topics including general health, development, growth, hearing, vision, oral healthcare, infant feeding, immunisation, parenting skills and parental mental health (Royal New Zealand Plunket Society, 2017). It also provides some resources such as the Well Child Tamariki Ora Book to supplement these visits. Each child receives five visits in the first year of their life and three subsequent visits between the ages of one and four years old. These visits are usually carried out by a Plunket nurse.

This programme provides a series of eight publicly funded health visits either at home or in a clinic setting across the first five years of a child's life. The programme has three core purposes. The first is to provide health and development assessments for a child to reassure the family they are growing normally and inform them about other services that may help to keep their child healthy. Secondly, it aims to care and support the child's family by identifying needs and linking families with other community supports. Finally, it aims to help families to learn relevant knowledge and skills that enable them to respond to their child's needs at different developmental stages.

2.4.1. Speech-Language therapy role in infant feeding

Speech and language therapists (SLT's) often have a fundamental role within the multidisciplinary team supporting infants with feeding or swallowing difficulties (Arvedson & Brodsky, 2002). The New Zealand Speech Language Therapists' Association (NZSTA) position

paper on the scope of practice of SLTs identifies that SLTs have a role in assessing, treating and managing infant feeding skills in infants who have feeding or swallowing problems (NZSTA, 2012). SLT involvement within this population includes identifying the feeding problem through assessment, educating parents about their infants feeding difficulty and teaching them strategies to help manage the feeding problem (Arvedson & Brodsky, 2002).

2.4.2. Evidence-based practice

Over the last thirty years the field of speech and language therapy (SLT) has made a shift towards encouraging the use of evidence to increase the efficacy of clinical practice and improve clinical reasoning skills (NZSTA, 2012; ASHA, 2016). Evidence based practice (EBP) is defined as being 'the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients…. [by] integrating individual clinical expertise with the best available external clinical evidence from systematic research" (Sackett, Rosenberg, Muir Gray, Haynes & Richardson, 1996, p.71). EBP is broader than research alone. It synthesises knowledge from three core areas; clinical experience, evidence-based research and client preference or service limitations (Roddam & Skeat, 2010). EBP includes high quality research that has direct application to clinical practice within the SLT field.

Historically the SLT field initially developed interventions based on clinician's opinion or intuition which was often unsubstantiated (Roddam & Skeat, 2010). Over time SLT practice shifted to using previous experience of what had worked in the past to form the basis for clinical decisions and the development of new interventions. In the 1990's the field of SLT shadowed the growing pattern internationally in western healthcare and shifted towards using high quality evidence in combination with experience to guide practice (Enderby, John & Petheram, 2006; Roddam & Skeat, 2010). This shift towards what is known as evidence-based practice (EBP) has resulted in the utilization of empirical theories to support the foundation underlying novel intervention programmes in the field of SLT.

Researchers have highlighted the importance of using theories to aid understanding and interpretation of human learning and behaviour change (May et al., 2009). Researchers within the SLT field have applied theories from relevant human research fields such as

psychology, cognition and behaviour. These theories while not developed specifically for the SLT field, have been identified as being appropriate to be utilised as they address the fundamental constructs of working with humans and supporting them to make behavioural changes (Davis, Campbell, Hildon, Hobbs, & Michie, 2015).

2.4.3. Parental support

Several theories underpinning SLT services can be used to ensure these services effectively support parents. Improving an adult's knowledge and skills through education has been shown to be effective in helping adults to make better health decisions (Arikpo, Edet, Chibuzor, Odey & Caldwell, 2018; Brunello, Fort, Schneeweis & Winter-Ebmer 2012). Since infants themselves do not have the knowledge or skills to modify their own behaviour, interventions tend to focus on modifying aspects of the infant's social environment, for example the knowledge, skills and behaviours of the infant's parents (National Academies of Sciences, Engineering, and Medicine; 2015). Thus, supporting an infant's parent to increase their knowledge and learn new skills about infant feeding may support safe infant feeding practices.

2.5. Parental Education programmes

An approach that is frequently used in SLT to alter the knowledge, skills and behaviours of parents is through parental education intervention. Parental education programmes refer to the process of supporting parents to engage with a course that aims to increase their awareness, help them gain knowledge and teaches them skills relating to a specific topic (Mahoney et al., 1999). The use of a parental education programme that focuses on teaching parents about the timely introduction of complementary foods may reduce the number of infants being exposed to complementary foods too early; thus the modification of parental beliefs, behaviours and actions could result in long lasting positive changes for both the infant and their parents (Lundahl et al., 2006).

2.5.1. Adult learning principles

Addae (2016) suggested that adult learning is more effective if it promotes associations between new information and its practical application to real life situations. Addae stated that two core principles are necessary for effective learning. The first of these is subject matter comprehension or having an in depth understanding of the content being taught. Subject matter comprehension enables the learner to understand what is trying to be taught. Both reading and listening are processes that require the learner to comprehend the information being delivered (Kintsch & Van Djik, 1978). Printed health materials are often written at a reading level too high for patients with low literacy levels to understand (Safeer & Keenan, 2005). The consideration of subject matter comprehension is particularly relevant in New Zealand where the population is culturally and linguistically diverse. The 2013 census showed that 41% of the population identified as not being of New Zealand European descent and over 1 million people reported speaking more than one language. This indicates that for over a quarter of the New Zealand population English is not their first language, which may negatively impact their understanding of the English language especially within the health context. The 2013 census also showed that 22.4% of the population did not have a formal educational qualification. Individuals who have not completed high school may have a lower level of language comprehension despite English being their first language. Statistics on adult reading levels in New Zealand from the Organisation for Economic Co-operation and Development (2015) show that 20.7% of the New Zealand adult population have literacy skills below the upper secondary school level. Therefore, researchers need to consider the literacy level of the intended audience. Both the language used to deliver course content and written resources need to be developed at an appropriate level that enables learner comprehension and facilitates their learning.

The second principle of effective learning as suggested by Addae (2016) is active participation of the learner. Active participation provides opportunities for new information to be transferred and applied to 'real life' situations. The use of practical activities such as making appropriate complementary foods, role plays and mealtime observations can enable participants to retain new learning. Edgar Dale (1969) developed the Cone of Experience to

visually demonstrate how much learners can remember and utilise new information when it is taught through different methods. The Cone of Experience suggests that 10% of information is remembered through reading and 20% of information is retained through listening. This suggests that delivering new information to learners via traditional teaching methods such as lecturing, or handouts alone is likely to be ineffective. The Cone of Experience also proposes that 70% of information is remembered when paired with a workshop exercise and 90% is remembered when paired with an activity which allows learners to do actively participate and reflect on a real life situation. This suggests that the more actively a learner participates in their own learning the more likely they are to learn and retain the new material. For an adult education intervention to be effective it needs to provide opportunities for learners to actively participate in the utilisation of new learning within activities that simulate 'real life' situations.

2.5.2. Connections with previous knowledge

Addae's principle of active participation within adult learning emphasises creating links between new information and the learner's existing knowledge. Norris (2003) suggested that adults learn best when they can connect new information to what they already know. This is because previous knowledge provides a contextual foundation on which new learning can be attached to or augmented (Morgan, Ponticell & Gordon, 1998). It is easier for a learner to learn something when they have some existing background knowledge than when all of the information is unfamiliar (Cross, 1999). Incorporating practical activities in adult education interventions provides learners with opportunities to anchor and apply new information to previous knowledge thus making learning and retaining new information easier.

2.6. Engaging parents

The development of an effective working relationship between the professional delivering the education programme, and the family receiving the programme is essential. An effective working relationship has been shown to encourage familial engagement with a programme as well as lead to more successful outcomes (Allen, 2007; Shanti, 2017). Establishing this relationship involves the professional learning about the family's parenting

style, approach to parenting and culture (Shanti, 2017). To do this the professional needs to build trust, find common ground and utilise effective, respectful communication skills (Shanti, 2017). Professionals can build trust by maintaining confidentiality, showing a genuine interest and following through on their word (Shanti, 2017). Professionals can utilise shared links between family, culture or the child to foster the development of common ground. Professionals need to maintain open communication, learn what works for individual families and be in tune to when families are feeling uncomfortable in order to develop and maintain effective communication (Psaila, Schmeid, Fowler & Kruske, 2014). The development of an effective working relationship between the educator and participants is imperative to the success of a parental intervention programme (Jeyendra et al., 2013). A robust working relationship has been identified as being central to facilitating parental engagement in an education programme and may lead to better outcomes for the family.

2.7. Overview of parent education intervention research

Research on parental education interventions on infant feeding have evaluated a range of intervention designs, settings and durations. Interventions can be delivered in a group design of two or more people (Coren, Barlow & Stewart-Brown, 2003) or individually (Bhandari, et al., 2004; Black, Siegel, Abel & Bentley, 2001; Horodynski et al., 2008; Silk, Hyrodynski, Rienzo, Mercer, Olson & Aldrick, 2010). A group-based programme can provide benefits such as providing opportunities for participants to share ideas or similar experiences (Jackson, Liang, Frydenberg, Higgins & Murphy, 2016) and create support networks (Coren et al., 2003). Individual intervention programmes allow flexibility for individualisation and tailoring to suit the needs of a particular family. Currently, there is no clear evidence that one model of delivery is better than the other (Chacko et al., 2016).

Previous studies have conducted their parent education intervention programmes across a range of settings including schools (Lagges & Gordon, 1999), the participant's home (Bhandari et al., 2004; Black, Siegel, Abel & Bentley, 2001; Horodynski et al., 2013; Horodynski, Olson, Brophy-Herb, Silk & Shirer, 2008), and community centres (Mahoney et al., 1999). Each setting has factors that may facilitate or form a barrier to parental attendance and affect their ability to learn in that environment. For example, if a participant does not have access to

transport this may form a barrier that prevents them from attending a programme in a community setting. Conversely, if the participant has multiple children at home, they may find it hard to attend to a programme in this setting. Recent parental education studies have been carried out within the home setting due to the perception that it is more convenient for new parents (Horodynski et al., 2008; Horodynski et al., 2013).

The duration of previously researched parental education programmes has been diverse, ranging from single, one off workshops (Black & Teti, 1997) to twelve-week programmes (Fulton, Murphy & Anderson, 1991). The majority of previously completed parental education studies on infant feeding have had two to twelve sessions. An older study by Black and Teti (1997) demonstrated that a brief one or two session intervention could result in positive changes in a range of parent and infant outcomes. Black and Teti (1997) provided parental education on communication and infant feeding through a brief culturally sensitive video. The video was developed by six adolescent African-American mothers for a similar demographic of mothers. The results showed changes in maternal behaviour and attitudes, that were maintained at follow up. Researchers need to consider that longer programmes require significant commitment from families and, depending on what other socio-environmental issues are occurring, parents may be unable to consistently attend longer interventions (Coren et al., 2003). Conversely, brief interventions may not be as effective if they do not have sufficient follow-up as new skills may not be maintained.

Parental education programmes can be delivered through a variety of methods. They can be delivered directly through workshops or home visits or indirectly via telephone, social media or videos (Bhandari et al., 2004; Coren et al., 2003; Mahoney et al., 1999). A number of studies have had more success when they combine direct and indirect methods (Black et al., 2001; Horodynski et al., 2008; Horodynski et al., 2013). This allows the intervention to appeal to all types of adult learning preferences whether they be visual, auditory or kinaesthetic learners. Horodynski and colleagues (2008) found that in their multi-method study mothers reported that they particularly enjoyed the hands-on activities, doing the workbook and watching the DVD. This supports the theoretical principles and model suggested by Addae (2010), Norris (2003) and Edgar (1969) which posit adult learning is more effective when participants can

'actively participate' allowing opportunities for them to transfer and apply new learning to 'real life' situations thus making the new learning easier to retain.

However, there are three limitations that are frequently identified in parental education intervention studies. Firstly, most parental education intervention studies recruit participants on a voluntary basis (Bhandari et al., 2004; Black et al., 2001; Coren et al., 2003; Horodynski et al., 2008; Horodynski et al., 2013). Participants who volunteer are often more motivated than those who do not self-refer (Coren et al., 2003). Secondly, a susceptibility to data bias due to the use of self-reported data collection methods is a limitation (Watt et al., 2009; Wen et al). Self-reported data can lend itself to social desirability bias where participants over report 'good' behaviours and under report 'bad' behaviours or recall bias where participants have a distorted memory of their infant feeding practices and either over or under estimate what occurred in the past. The final common limitation is participant attrition, which occurs when participant data is missing due to incomplete data or participants dropping out (Hewwitt, Kumaravel, Dumville & Torgerson, 2010). Attrition has been identified as one of the major methodological shortcomings of longitudinal studies (Gustavson, von Soest, Karevold & Roysamb, 2012). All of the reviewed parental education studies experienced some degree of participant attrition. These limitations mean that the results of previously completed studies need to be viewed with caution as their results may not be able to be generalised to the wider population or maybe influenced by bias.

2.8. Infant feeding parent education interventions

Several studies outside of New Zealand have investigated a variety of different parental educational interventions, which aimed to promote changes in parental infant feeding behaviours (De Oliveira, Giugliani, Santo & Nunes, 2012; Edwards et al., 2013; Wen et al., 2011; Vitolo, Bortolini, Feldens, & Drachler, 2005). These studies compared the age at which mothers who received an intervention programme introduced complementary foods to their infants and to identical data gathered from a control group. The data from these studies demonstrated significant effect sizes ranging from 0.83 to 0.94 indicating that that infants of mothers who

received the intervention programme were more likely to be introduced to complementary foods at 6 months of age as compared to the control group.

Most international studies have completed either a randomised control trial or cluster control trial to explore shifts in maternal knowledge about complementary feeding for infants following maternal participation in an intervention programme (Bentley et al., 2013; Penny et al., 2005; Shi, Zhang, Wang, Caulfield & Guyer, 2010, Yin et al., 2009). Data on maternal knowledge regarding this topic were gathered before and after mothers received an intervention programme and then compared to mothers in a control group. There was a wide range of effect sizes reported by the studies ranging from 0.33 to 2.25 (Bentley et al., 2013; Penny et al., 2005; Shi et al., 2010; Yin et al., 2009). Collectively, these studies were reported to have a mean effect size of 1.29 (Arikpo et al., 2018). The findings from these studies demonstrated that mothers who received an intervention programme experienced a significant increase in their knowledge on complementary feeding for infants after receiving the intervention when compared to mothers who did not.

Further studies have explored the benefits of using parental education programmes to promote responsive infant feeding practices (Black et al., 2001; Redsell et al., 2016). Responsive feeding is considered to be a derivative of responsive parenting and refers to the reciprocity between a parent and their child specifically during mealtimes (Black, Makrides & Ong, 2017). Responsive parenting in relation to feeding is established by considering the degree to which the parent follows, acknowledges and responds to their infant's hunger and fullness cues. Redsell and colleagues (2017) reported that parental education interventions that included education on responsive feeding such as recognising and responding to infant feeding cues, were found to demonstrate more beneficial results compared with those who did not provide education on this topic. The outcomes they reported from four studies (Black et al., 2001; Daniels et al., 2015; Kavanagh, Cohen, Heinig et al., 2009; Paul et al., 2011) whose interventions contained specific education on responsive feeding practices included increased maternal knowledge on complementary feeding, improved adherence to current infant feeding recommendations and increased infant growth when compared to those of the control groups.

The results from these parental education intervention study results outlined above, suggest that parental infant feeding knowledge, beliefs and behaviours can be successfully modified through parental education interventions. Thus, providing evidence to support the trial of a similar parental education intervention as an effective approach to shift parental knowledge, beliefs or behaviours regarding the introduction of complementary foods to infants in New Zealand.

2.9. Selection of a parental education programme

Some of the parental education programmes on infant feeding demonstrate limitations, which prevented these programmes from being considered and utilised in the current study. It is expected that most intervention studies will experience a degree of participant of attrition. However, a number of studies on parental education intervention about infant feeding experienced high rates of participant attrition. Studies completed by Bentley (2013), Bhandari (2001) and Kang (2013) had participant attrition rates ranging from 12 to 18%. One possible reason for these increased participant attrition rates may have been the duration of these studies, which lasted between eight to fifteen months. These high rates of attrition need to be considered when interpreting the results of these studies as their findings are at risk of attrition bias.

Three studies (Bhandari et al., 2001; Shi et al., 2010; Yin et al; 2009) provided vague descriptions of the parental education programmes they used, and content covered by these programmes. Due to the lack of information provided, the educational approaches utilised in the development of these programmes was unable to be established. This negatively influenced the ability to determine if any principles from pedagogy were used to facilitate adult learning through these programmes. The lack of detailed programme descriptions in these studies forms a barrier to other researchers being able to replicate these programmes.

The content of several internationally completed studies exploring parental education programmes did not focus exclusively on complementary foods and infant feeding (Cameron et al., 2013; Kang, Kim, Sinamo & Christian, 2017; Saleem, Mahmud, Baig-Ansari & Zaidi 2014; Schroeder et al., 2015). These intervention programmes covered a range of parenting

topics such as caring for an infant, play, stimulation and hygiene as well as complementary feeding. Due to these studies covering a broad range of topics, they were unable to educate parents on some important specific topics relating to complementary feeding specifically texture progression and infant feeding cues. The intervention programmes utilised in these studies were found to be similar to the current WCTO programme, which is already used in New Zealand. Therefore, these intervention programmes were not suitable to be used in the current study.

Several studies have insufficient evidence regarding the robustness of their parental education programme, its generalisability to new populations and the reliability of their findings (Bentley et al., 2013; Black et al., 2001; Cameron et al., 2013; Kang et al., 2017; Saleem et al., 2014; Sanders & Woolley, 2005; Schroeder et al., 2015; Wen et al., 2011 & Watt et al., 2009). The findings from these studies showed promising results when used once in one location. However, the strength of these findings across settings and consistency of these findings across programme replications has not yet been established. Due to this reason the researcher was unable to evaluate the robustness of these parental education programmes. Therefore, these intervention programmes were not utilised in the current study.

2.10. The Healthy Baby Curriculum

The Healthy Babies Curriculum (Horodynski et al., 2013) was the parental education programme that was selected by the researcher for this study. In 2008 Horodynski and her colleagues developed a pilot programme on infant feeding practices called the 'The Infant Feeding Series (TIFS). The programme consisted of six one to one sessions carried out in the participant's home. The content covered in each session was developed by six focus groups conducted with mothers from a similar socio-economic background as the target population and is summarised in Table 1 below (Horodynski et al., 2011). The programme was piloted in Michigan America where 25 mothers from disadvantaged backgrounds completed the TIFS programme and a six-month follow up evaluation. All but one mother delayed the introduction of complementary foods until their infant was older than four months. The TIFS programme was specifically developed for women from a lower socio-economic background as they were

found to be at increased risk of not adhering to infant feeding recommendations on introducing complementary foods to infants. The resources for this programme were developed to be culturally appropriate for women from differing ethnic backgrounds. Programme resources were reviewed and amended following feedback from a multicultural panel of mothers. The literacy level of the written resources utilised in the programme was assessed to ensure the material would be able to be understood by participants. The programme also used principles from adult learning to improve the efficacy of the programme (Addae, 2016). In the programme, videos and practical activities were employed to increase active participant involvement and support generalisation of newly acquired knowledge.

In 2011, Horodynski and her colleagues further refined the TIFS programme and re-named it the Healthy Babies Curriculum (HBC) (Horodynski et al., 2013). They tested with 182 low income mothers who were over the age of 18 and had an infant under the age of four months old. These mothers were from two American states, Michigan and Colorado. The outcomes of this study showed improvement from 77% to 88% in maternal knowledge appropriate to infant feeding after they had received the HBC. These results were found to be sustained at 86% from the six-month follow up. The TIFS and HBC programmes were founded using the Theory of Planned Behaviour (TPB) (Ajzen, 1985) as a guide to support the researchers understanding of maternal behaviours in parent-infant feeding interactions and decisions. The organising principles of the TPB provided the basis for the development of the sessions. The application of the TPB within the development of the HBC will be explored in further detail later in the section below.

Table 1. The content covered in the sessions of The Infant Feeding Series and Healthy Babies Curriculum (Horodynski et al., 2008, pg. 188; Horodynski et al., 2013).

Session Number	TIFS	HBC
1	*"How do I feed my baby?"* – develop mother's ability to determine their baby's readiness for solids	*"My babies first foods"*- current WHO recommendations and the rationales for these recommendations, definition of what solid foods are for a baby and infant readiness signs for starting solids
2	*"How can I help my baby develop into a healthy eater?"* – Increase mother's understanding of baby's development as it relates to feeding	*"Feeding my older baby*" – texture progression for infants, how to avoid choking and managing distractions at mealtimes
3	*"What is my baby telling me about eating?"* – increase mother's understanding of baby cues and how to use these cues to help feed her baby	*"What is my baby telling me?"* – recognising and responding to infant feeding cues (hunger and fullness)
4	*"How does temperament affect how my baby eats?"* – increase mother's understanding of baby's temperament and how this understanding can help her feed her baby	*"Is your baby flexible, shy or feisty*?"- temperament characteristics for infant and mother, difference and similarities between mother and infant temperament in relation to feeding
5	*"How do I talk to others about my baby's feeding needs?"* – increase mother's information seeking skills and verbal strategies for delaying the introduction of complementary foods	*"Parent provides, baby decides*"- parent responsibilities and infant responsibilities at mealtimes, nutritious foods, importance of mealtimes and mealtime interactions
6	*"What is my plan for feeding my baby*?" – Help the mother develop a plan for how she would like to feed her baby	*"My plan for feeding my baby"*- review of key concepts, developing at 12 month feeding plan, how to know when to progress

2.11. Theoretical frameworks for interventions

Various theoretical models have been used by researchers in an attempt to improve the methodological rigour and the effectiveness of novel parental education interventions on infant feeding (Arikpo et al., 2018; Black et al., 2001; Horodynski et al., 2008; Watt et al., 2009). Consideration of these theoretical frameworks is required as there is insufficient clinical evidence on parental education interventions on infant feeding at this stage. Therefore, the theory underlying parent education interventions needs to be considered.

2.11.1. Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) was the core theory underlying the foundations for the Healthy Baby Study (Hyrodynski et al., 2014). The TPB was utilised to guide the researchers' understanding of which factors could influence the participants' decision to attend the Healthy Babies Project intervention and shape their decisions regarding the timing of introducing complementary foods to their infant (Arikpo et al., 2018; Horodynski et al., 2008;). The TPB posits that an individual's 'intention' to perform a new behaviour affects the likelihood of them adopting a new behaviour. An individual's intention to perform a behaviour is guided by the individual's attitude, their perception of subjective norm and self-perceived behavioural control relating to the behaviour (Ajzen, 1985). The TPB focuses on a participant's perspective of their own self efficacy and societal norms as key factors affecting engagement in behaviour change (Godin & Kok, 1996).

The TPB is relevant to the field of infant feeding. The results of a number of studies confirm that a combination of attitudes, social norms and perceived behavioural controls influence the complementary feeding practices of parents (Hamilton, Daniels, White, Murray & Walsh, 2011; Zhang, Shi, Chen, Wang & Wang, 2009). However, it fails to consider the sustained effect of these factors on the continued use and maintenance of a new behaviour pattern. This

is vital when considering the purpose of parental education interventions to create sustainable long term healthy changes for both the parent and their infant. Therefore, behaviour changes need not only be initiated but also maintained in order for an intervention to be viewed as being successful.

The TPB has other limitations such as not considering the potential influence of interpersonal and environmental factors on an individual's ability to initiate or maintain a novel behaviour (Glanz, Rimmer & Viswanath, 2015). These socio-environmental factors could include access to transportation to the venue or availability of a babysitter to care for children while the parent attends an intervention. Researchers have realised that parental education interventions need to consider not only addressing intrapersonal factors such as the participant's personal knowledge, attitudes and the beliefs but also appreciate the influence of interpersonal and environmental factors. These interpersonal and environmental factors can either present barriers or facilitate a participant's ability to successfully engage in an intervention and consequently lead to behaviour change (Glanz, 2014).

2.11.2. Social Cognitive Theory

One psychological theory that has not yet been explored in relation to the field of parent education interventions on infant feeding is the Social Cognitive Theory (SCT; Bandura, 1986). The SCT (Bandura, 1986) suggests that an individual's learning, behaviour and decisions are a result of the interactions between various personal, socio-environmental and behavioural influences (Bandura, 1986). The SCT emphasises that families are influenced by both internal personal factors and their social environment (Bandura, 2004). Personal factors include an individual's beliefs, expectations, thoughts and feelings (Williams, Innis, Vogel & Stephen, 1999; Bandura; 1986). While socio-environmental factors include the physical surroundings and social supports of a family (Bandura, 1997). Behavioural factors include the actions people make and a person's ability to successfully complete a certain action (Bandura, 1986). Socio-environmental, personal and behavioural factors have the ability to influence a parent's ability to attend, learn from and transition new skills learnt during an intervention programme into their daily lives.

The SCT was originally used to find out why and when children display aggressive behaviours (Bandura, Ross & Ross, 1961). Since this, SCT has been applied across many areas of human functioning. Recently SCT has been successfully utilised within the healthcare field when applied to behavioural change studies looking at increasing fruit and vegetable intake and increasing exercise (Anderson, Winett & Wojick, 2007; Bandura, 2001; Wallace, Buckworth, Kirby & Sherman; 2000). This success indicates that SCT could be used as part of an intervention plan to modify parents' infant feeding decisions or behaviours therefore improving health outcomes for New Zealand infants.

The SCT is explained through the Model of Triadic Reciprocal Determinism (Wood & Bandura, 1989); see Figure 1 below. The Model of Triadic Reciprocal Determinism shows how behavioural, environmental and personal factors interact (Bandura, 1986). Reciprocal determinism is the central tenet of the SCT. This describes the dynamic interactions between personal, behavioral, and environmental factors. The bidirectional arrows show the possible relationships between each of these three factors and are represented in Figure 1 below . Therefore, if there is a change, either positive or negative in one factor it will affect the other two factors. It is the continual interactions between these three factors that result in the relationship of dynamic triadic reciprocity. Reciprocal causation does not mean that different sources of influence (personal, environmental and behaviour) are of equal strength (Glanz et al., 2015). Some factors will have a stronger influence than others. This will differ between families and the influence of some factors may change over time.

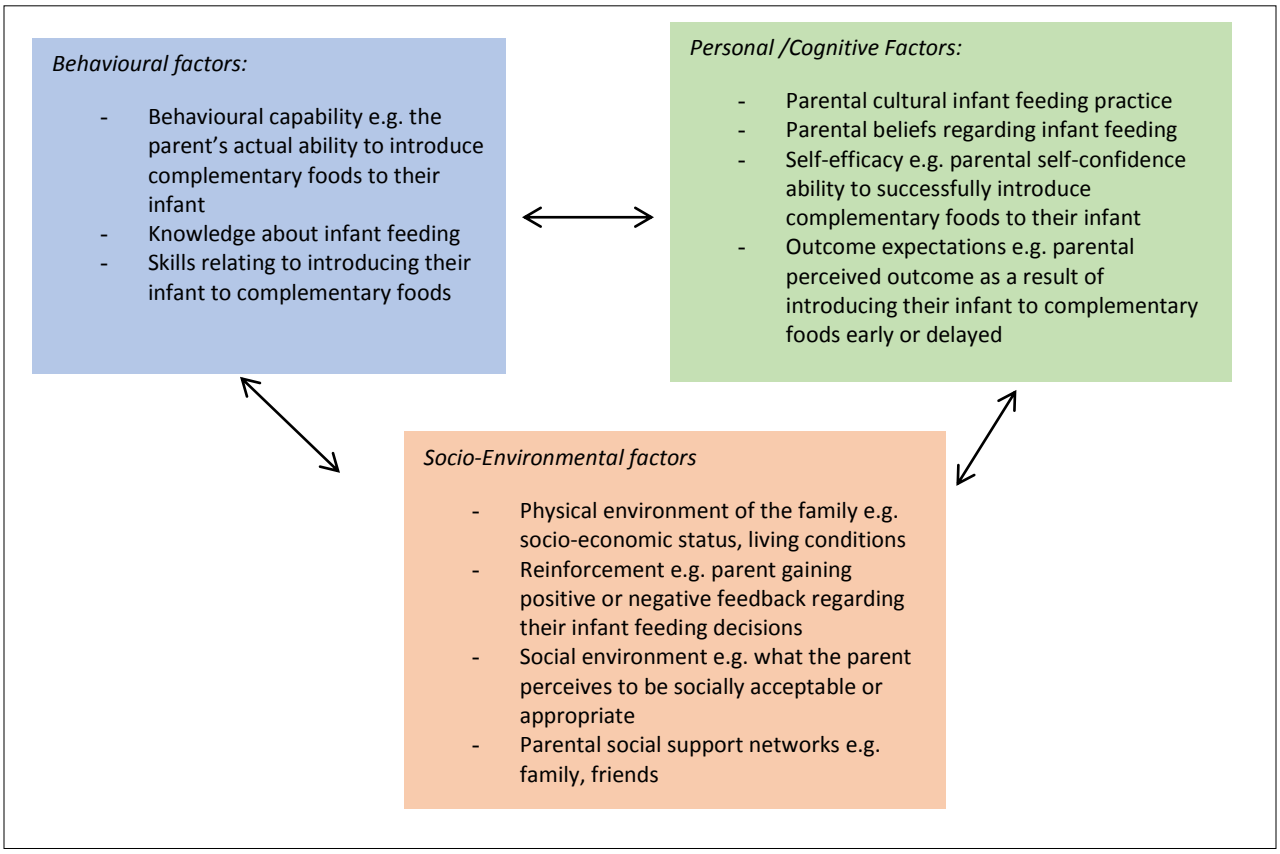

Figure 1. Examples of potential behavioural, personal and socio-environmental factors that could affect a parent's infant feeding decisions and behaviours.

Another advantage of SCT is that it aligns with the core components used in the International Classification of Functioning, Disability and Health Model (ICF; WHO, 2002). The ICF is a model is regularly used within the health field to guide the clinical decision making of professionals when they are goal setting or planning intervention for their patients. Both the ICF and SCT consider the potential impact of personal and environmental factors on an individual's ability to successfully complete an activity or action. This close alignment of the

principles underpinning these two models suggests that SCT may be successfully utilized in the field of parent education interventions for infant feeding.

2.11.3. Personal factors

A number of personal factors can contribute to an individual's capacity to effectively engage and learn from an intervention programme. Personal factors can include an individual's cognition, outcome expectations, self-efficacy, biological influences and psychosocial issues including an individual's thoughts, feelings and beliefs (Williams et al, 1999; Bandura; 1986). A parent's personal characteristics can affect their ability to engage, learn from and experience success through parent education programmes. Several studies have found certain parental characteristics including maternal smoking (Fegan, Bassett, Peng & O'Connor, 2015; Fewtrell et al, 2003), non-breastfeeding (Alzaheb, 2016; Fegan et al; 2015; Fewtrell et al, 2003) and younger maternal age (Alzaheb, 2016; Doub et al, 2015; Fewtrell et al, 2003; Hendricks, Briefel, Novak & Ziegler, 2006) are associated with the early introduction of complementary foods. Mothers with these characteristics have been included with the participants of previously completed intervention studies. Some studies have found that young mothers are more likely to drop out of intervention programmes when compared to older mothers (Black, 2001; Edwards et al., 2013; Wen et al., 2011). The early introduction of complementary foods to infants has been associated with certain parental characteristics. These same personal characteristics may influence a parent's ability to successfully engage and learn from an intervention.

Self-efficacy

Self-efficacy refers to the level of a person's self-confidence or belief in their ability to successfully perform a behavior (Schunk & Usher, 2012). Self-efficacy is task-specific, meaning that self-efficacy can increase or decrease based on the task at hand. An individual's performance of doing a task in real life founds the most reliable information on their self-efficacy as it is a concrete indicator of their capability (Schunk & Pajares, 2009). Successful performances raise self-efficacy and failures may lower it. Individuals with high self-efficacy are

more likely to believe they can master challenging problems and they can recover quickly from setbacks and disappointments. Individuals with low self-efficacy tend to be less confident and do not believe they can perform well, which leads to the avoidance of challenging tasks. Therefore, self-efficacy plays a central role in behaviour performance. If a mother has had past success transitioning her first child onto solids it increases her self-efficacy. It is likely that she will do the same for her second child. If on the first attempt she was unsuccessful she is less likely to change her behaviour for the second as she will remain doubtful due to reduced self-efficacy. Healthcare professionals need to be aware that parents may ignore or be less willing to accept advice if it differs greatly from what they have previously done. Baughcum, Burklow, Deeks, Powers and Whitaker (1998) reported that women from their focus groups ignored advice from physicians and relied on their own mothers for feeding information. This may mean that parents choose not to follow evidence-based guidelines for feeding infants which may put their infants at risk for developing the health risks discussed earlier.

Parent medical histories

Parental medical histories can also influence parents' ability to successfully learn from an intervention. Physical illness or disability, depression (Field, 1998), mental illness (Weinberg & Tronick, 1998), attention deficit disorders (Daly & Fritsch, 1995) and medication can influence how the parent relates to their infant at mealtimes. Postnatal depression affects around 13% of mothers within the first year of their infant's life (Royal New Zealand Plunket Society, 2017). This can affect the way a mother cares for her child. Depressed mothers have been found to be less sensitively attuned to their infants and were less affirming and more negating of infant experience (Field, 1998; Murray, Fiori-Cowley, Hooper & Cooper, 1996). This may negatively affect the parent's capability to learn and read their infants feeding cues or change their meal time behaviours despite attending an intervention programme.

Maternal mental health

Maternal affect can influence a mother's awareness and responsivity to her infant's feeding cues. Postpartum depression occurs for approximately 19.2% of mothers in the first

year postpartum (Gaynes et al., 2005). Researchers have found that depressed mothers are less sensitively attuned to their infant's needs and this impacts their ability to read and respond to their infant's hunger or fullness feeding cues (Dennis & McQueen, 2009; Murray, Fiori-Cowley, Hooper and Cooper, 1996). Mothers with anxiety or depressive symptomatology have been found to be significantly more likely to discontinue breastfeeding earlier than nondepressed mothers (Fallon, Groves, Grovenor, Bennett & Harrold, 2016; Mclearn, Minkovitz, Edwards, Strobino, Marks & Hou, 2006; Papinzak & Turner, 2000). There is a growing body of evidence that associates postpartum anxiety and depression with a range of negative infant feeding outcomes.

Parental culture and beliefs

Maternal beliefs have been shown to significantly influence when complementary foods are introduced to infants (Walsh et al., 2015; Alzaheb, 2016; Flower et al., 2007; Arden, 2010). A maternal belief in relation to infant feeding refers to a firmly held opinion that something is true despite empirical evidence that it is not (Oxford University Press, 2016). Alzaheb (2016) reported that mothers who introduced complementary foods to their infants before they reached four months of age held the beliefs that their infant was hungry and thought that their infant was old enough to receive solid food. Walsh, Kearney and Dennis (2015) reported mothers believed their infant was 'falling behind' if they were not conforming to the group norm. Therefore, these mothers introduced complementary foods in response to other mothers in the group initiating this change rather than responding to their infant's readiness cues. Mothers can hold or develop a number of beliefs which may influence their ability to learn from and alter their behaviours regarding the timing of introducing complementary foods to their infant.

Culture incorporates a collection of beliefs and traditions associated with a specific group of people (Evans Morris & Dunn Klein, 2000). Culture can guide the types of food a family eats, mealtime routines and infant feeding practices. New Zealand has a diverse ethnic composition. As discussed earlier in this chapter different cultures have their own unique views on food. Some of the ethnic groups such as Asian and Pasifika which are growing rapidly in New

Zealand have been shown to have a predisposition towards the early introduction of complementary foods to their infants due to their cultural beliefs (Soh, Ferguson & Wong, 2000; Tuohy, Griffiths & Brooke, 1997). A family's culture can influence their perceptions about the appropriate timing and types of foods to introduce to an infant. A family's cultural background may impact their openness to engage with an education programme and affect their desire to utilise the strategies recommended. For example, Pasifika families may feel that the WHO recommendations have been developed to suit Pakeha babies rather than those from Pacific backgrounds and as a result may be less likely to consider these recommendations as being applicable to their family.

2.11.4. Socio-environmental factors

According to Bandura (1997), socio-environmental factors include the family's physical surroundings, social supports and other people they encounter. Physical environment factors include family living conditions, socio-economic status and availability of foods (Williams et al., 1999). Parental access to transportation and food budgets can be affected by low household incomes. This may mean that parents are less likely to attend interventions based at community centres and more likely to purchase inexpensive, processed foods such as takeaways (Bailey, 2012). This may leave their infant deficient in some nutrients provided through more costly foods like meat, vegetables or fruit (Tuohy et al, 1997). Socio-environmental factors such as socio-economic status and physical environment can impact parental ability to attend and learn from interventions regarding appropriate infant feeding practises.

The environment not only includes the physical environment of the child and their family but also the social environment or supports. The social environment is complex; mothers often receive mixed messages regarding infant feeding. The term social environment refers to the different groups of people a parent is exposed to across a range of settings who may influence a parent's thoughts, feelings or beliefs. These social supports could include close or

extended family members, friends, colleagues and other social networks such as religious groups (Kristonis, 2004). Mothers are often subject to multiple and competing or contradicting pieces of information. Ashida, Lynn, Williams and Schafer (2015) reported that 84% of the mothers in their study were exposed to at least two pieces of advice from differing sources. These mothers reported that they received advice that both supported and undermined the current WHO recommendations. The mixed messages mothers receive from their social environment has the potential to influence the success of a parental education intervention on infant feeding practices.

2.11.5. Parental behavioural factors

Behavioural influences refer to the actions or decision individuals make. These actions and decisions are influenced by the individual's knowledge, skills and behavioural capability to successfully complete the task (Bandura, 1886). An individual's ability to perform a certain behaviour is determined by their behavioural capability, which is whether they know what the behaviour is and have the skills to perform it (Glanz et al., 2015). Parents are not taught to be parents and therefore only know what has been learnt through experience; advice from others in their social networks; or from what they read on social media. Kane, Wood and Barlow (2007) reported many of the parents in their study experienced feeling they had inadequate knowledge in relation to their child's behaviour. Arden (2010) reported that mothers in his study found it challenging to distinguish between their infant having a growth spurt and the infant showing signs of readiness for complementary foods. Thus, a mother's self-perceived behavioural capability to successfully introduce complementary foods to their infant could affect her ability to successfully engage, learn from and utilise skills learnt through a parental education intervention on appropriate infant feeding practises.

2.12. Summary of the applicability of SCT

Socio-environmental, personal and behavioural factors have the ability to influence a parent's ability to attend, learn from and transition new skills learnt during an intervention programme into their daily lives. Therefore, a researcher needs to consider these aspects when

developing a parental education intervention on infant feeding. They could also use SCT to support post-intervention reflections on the effectiveness of the programme and consider any of the factors that were not managed as areas for potential improvement.

2.13. New Zealand parent infant feeding research

There is international research on the effectiveness of parental education interventions on infant feeding (Bentley et al., 2013; Bhandari et al., 2001; Black et al., 2001; Cameron et al., 2013; Horodynski et al., 2008; Kang et al., 2017; Saleem et al., 2014; Sanders & Woolley, 2005; Schroeder et al., 2015) but nothing specific to the New Zealand context at this stage. The results of several international studies suggest a parental education intervention on infant feeding could reduce the number of New Zealand infants who are introduced to complementary foods at an inappropriate time, either early or delayed. Hence, the current study hopes to fill this gap in the literature by exploring parental outcomes and experiences of participating in a parental education intervention on infant feeding within the New Zealand context. This review of the relevant literature has provided the theoretical and empirical evidence to support the need for this study.

The HBC (Horodynski et al., 2011) was selected as the intervention programme that would be utilised in this study. It was chosen as the intervention programme demonstrated a strong theoretical foundation and embedded principles of adult learning into its structure. The resources had been developed to be culturally sensitive and appropriate for use with families from range of ethnicities. Resources were aimed at a literacy level identified as being comprehendible by most of the adult population within the lower-socio economic areas where the intervention was used. The HBC was also shown to effectively increase parental adherence to the WHO recommendations on the introduction of complementary foods to infants and be well received by the families who participated in the programme. This combination of factors contributed to the researcher's selection of the HBC to be utilised as the basis of the "Healthy Kiwi Programme" (HKP), the intervention used in the current study. The HKP is a newly developed parental education programme which consisted of the same programme format and similar content to that of the Healthy Babies Curriculum. However, some adaptations were

made to ensure the content was up to date with recent changes to recommendations and culturally appropriate for the New Zealand population. The specific adaptions made for the Healthy Kiwi Programme will be described in further detail in the following Chapter. The HKP had not been used in New Zealand prior to this study.

Previous studies have suggested that parental education trainings can have a positive effect on the timing of the introduction of solids to infants. Therefore, the hypothesis of this study is that parents who attend the parent education training will demonstrate better adherence to the current WHO recommendations regarding the introduction of complementary foods to their infants and experience an increase in their perceived self-efficacy regarding the transition of their infant onto complementary foods.

Thus, the primary aim of the present study is to determine the parental outcomes of participating in the 'Healthy Kiwi Programme'. A secondary objective is to explore the perceptions and experiences of the parents participating in the 'Healthy Kiwi Programme'. A final objective is to consider how these parental perceptions and experiences influence parental participation and engagement in the, 'Healthy Kiwi Programme' education programme.

The following chapter describes the current study in more depth providing details regarding the participants, method and ethical considerations.

Chapter Three - Method

This chapter outlines the method used for this research project beginning with the research questions underpinning it, the rationale for the use of the multiple case study research design, participant selection and recruitment process. The procedures used, including phases of the study and their timeframes are then explained. A detailed description of the data collection methods and analysis framework used is provided. Finally, this chapter concludes with a summary of the ethical considerations applicable to this research project.

3.1. Research Questions:

The purpose of this research project was to explore parent outcomes and experiences related to participating in a brief parental education intervention, 'Healthy Kiwi Programme' which is about the introduction of complementary foods to infants and infant feeding cues.

The research questions guiding this study were as follows:

1) What are the parental outcomes from participating in the 'Healthy Kiwi Programme'?
2) What are the parental perceptions and experiences of their participation in the 'Healthy Kiwi Programme'?
3) How do these parental perceptions and experiences influence parental participation and engagement in the, 'Healthy Kiwi Programme' education programme?

3.2. Study Design:

The aim of this study was to explore the outcomes, parental experiences and perceptions of a brief parental education programme on the introduction of complementary foods to infants. This required an in-depth exploration of parental acquisition of new skills and knowledge via the programme; their personal experience of participating in the programme; their current infant feeding practices and socio-environmental factors which affected their engagement with the Programme. Baxter and Jack (2008) have reported that evidence created

through a multiple case study is considered to be strong and reliable. This is because having multiple cases can strengthen the study's results by having replicated patterns among participants, thereby increasing the robustness of the findings (Yin, 1994).

A case study is an empirical inquiry that investigates a contemporary phenomenon in an in-depth manner (Yin, 2014). It explores phenomena holistically within its real-world context which allows the consideration of why this phenomenon occurs (Denscombe, 2014; Yin, 2014). Therefore, adopting a multiple case-study research design was most appropriate for this research project as this design could establish an understanding of how environmental and social factors may impact a family's ability to participate and engage with an intervention through provision of data on the outcomes of an education programme. The individual experiences of the participants allows any common themes across the participants can be identified (Punch & Oancea, 2014). Consequently, leading to the researcher gaining a more in depth understanding of the real-life experiences of families and the suitability of the Healthy Kiwi Programme (HKP) for the New Zealand environment.

Literature shows that case study designs have a number of strengths. The first is that case study designs promote the utilisation of numerous sources through which data maybe collected to provide evidence. Case study research enables both qualitative and quantitative data to be gathered and analysed when the data sources focus on the same phenomenon. This provides opportunities for the exploration of the presence or absence of the specific behaviours as well as personal experiences to be applied to provide a more in depth understanding of the phenomenon (Yin,2004).

Vance and Clegg (2012) found that case studies could be a useful design particularly in the study of novel interventions. This is because case studies provide an achievable means by which researchers can evaluate their interventions without having to recruit large groups of participants to intervention and control groups. Thus, acknowledging that gaining appropriate ethical approval and recruitment for large scale randomised control trials can be challenging within everyday working contexts (Vance & Clegg, 2012). Ethical approval for a randomised control trial may be withheld if an ethics committee feel that the intervention may benefit all participants and that withholding the intervention could disadvantage those allocated to the

control group. This is particularly important in the infant population where early feeding interventions have been shown to mitigate the risk of developing health problems such as obesity later in life (Redsell et al., 2015). Furthermore, large group designs can conceal findings at the level of the individual family unit. This can result in a lack of specific information on the uptake of programme strategies by individual parents and the impact of the use of these strategies on their infant (Girolametto, Sussman & Weitzman, 2007).

Case study designs have been criticised by many researchers due to three limitations that have been commonly associated with this method. These limitations include a lack of perceived systematic rigor; unmanageable quantities of data and limited generalisability of findings (Simons, 2009; Yin, 2014). Despite some perceptions about limitations, case study designs are gathering recognition in empirical research and are being increasingly utilised across a wide range of research fields. While case study designs often have substantial quantities of data as they utilise several measures to gather data, this approach can facilitate further analysis and understanding of results through data triangulation. This cross-checking of data through triangulation can therefore improve the credibility of the results (Mills, 2014; Guba, 1981). A case study design also enables the social validity of an intervention to be explored in terms of its feasibility as well as providing insight into participant perspectives (Creswell & Poth, 2018). To manage these limitations and ensure the benefits of this design were captured, this research project has used a thorough systematic procedure and robust data analysis frameworks as outline below.

It is important to note that the results of case study designs cannot be used to conclude that there is a causal relationship between the intervention and the outcomes due to the small sample size and lack of experimental control to account for maturation effects. However, case study methods are very useful for examining the theoretical links between an intervention and hypothesized outcomes (Yin, 2014). The results from this research project may be used to provide justification for future research and propose methods of measurement that are sensitive to change.

The purpose of studying multiple cases is to understand the differences and similarities in the perceptions and experiences of participants (Baxter & Jack, 2008; Stake, 1995). Having

multiple cases allows the researcher to analyse patterns of difference and similarities both in individual participants as well as between different participants (Yin, 2004; Vannoni, 2015). This allows the researcher to gain insight around important personal and socio-environmental influences.

3.3. Participants:

There is little evidence around an appropriate sample size within multiple case study designs. This is because this style of design focuses on how much is known and how much new information each case study can contribute to the study (Eisenhardt, 1991).

"The validity, meaningfulness, and insights generated from qualitative inquiry have more to do with the information richness of the cases selected and the observation/analytical capabilities of the researcher than with sample size" (Patton, 2002, p.245).

Thus, a convenience sample of four mother-infant dyads were used as participants in this research project. The number of participants in the project was also limited to provide feasible parameters for data collection.

Participants were gathered from four suburbs within the Auckland Region of New Zealand. These participants were recruited from within these areas as these were considered to be within a manageable driving distance of the researcher.

3.4. Inclusionary criteria:

In order to participate in this study mothers needed to have given birth between November 2017 and April 2018. This timeframe was selected because it allowed time for the participants to receive the intervention before their infant reached six months old, the WHO's (2003, 2008) recommended age for introducing complementary foods. Participants were required to be over the age of 18 years old so they could legally consent to being a part of the research project. As the intervention was delivered in English participants were required to either have English as a first language or have studied to a high school level in English. This was because the participants needed to understand the content of what was being taught in the

intervention in order to successfully learn from it. Participants were required to be first time parents because parents who have already successfully transitioned an infant to eating complementary foods may already have a high self-efficacy about this process and therefore less likely to value engaging with the intervention (Arden, 2010). The main participant needed to be the primary carer of the infant.

The inclusionary criteria for infants also included being born after 34 weeks gestation. As premature infants tend to develop at a different pace to those born at term (Ludwig, 2007; Wolf & Glass, 1992) and may not be physically or physiologically ready to receive complementary foods at the recommended six months of age, they were not considered suitable participants for this research project. Finally, the infant needed to not have been offered complementary foods prior to commencing the HKP intervention.

3.5. Exclusionary criteria:

Mother-infant dyads were excluded from the study if either mother or infant had complex health issues, physical issues or feeding issues. These issues may mean that the infant may not be suitable for the introduction of complementary foods at the recommended age of six months old.

3.6. Participant recruitment:

Study flyers with information and contact details for the research team were displayed at ten General Practitioner's offices within the Counties Manukau catchment area. There was no response to these advertisements. Therefore, a second method of recruitment was utilised, and flyers were also distributed through speech and language therapy meetings within the Auckland region. Participants were also sought out through word of mouth. The researcher shared the study flyers with information and contact details for the research team with colleagues who then passed on the study details to friends who expressed interest in participating in the study. Mothers who were interested in participating in the study were provided with a copy of the study information sheet (Appendix A) and asked to directly contact

the researchers via phone, text or email. Potential participants were invited to contact the research team in order to discuss the study further if they had any questions.

3.7. Participant characteristics

Table 2 displays the characteristics of the participants who participated in the HKP. This information was collected at the pre-intervention assessment session, where participants completed a brief questionnaire. The results showed that all of the participants met the eligibility criteria detailed above. The mothers who participated in the programme had completed tertiary level qualifications and were working as professionals within either the education or health sectors prior to taking maternity leave. The infants who participated in the programme were born at or after 34 weeks gestation.

Table 2. Showing the characteristics of the participants

Participant Number	Main carer who participated in HKP	Infant gender	Age of infant at start of the HKP
1	Mother	Male	5 months
2	Mother	Female	3 months
3	Mother	Male	4 months
4	Mother	Female	4 months

3.8. Researcher:

The researcher graduated with a Bachelor in Speech and Language Therapy in 2010. She has worked within paediatrics in both the public education and health sectors for the last eight years. The researcher was the main contact for the participants throughout the study. She was the interventionist who delivered the intervention programme to the participants. The researcher followed an adapted version of the structure, lessons and guidelines from the Healthy Babies Curriculum (Horodynski, et al., 2008) as outlined in detail below. The researcher delivered and collected the completed questionnaire forms from the participants before and after they had received the intervention. She also recorded the infant feeding cue video observations. The semi-structured interviews post intervention were collected by a research assistant.

3.9. The intervention programme:

The Healthy Kiwi Programme is an adaptation of a programme called 'The Healthy Babies Curriculum' (HBC; Horodynski et al.,2008). Permission was obtained from the developer of the Healthy Baby Curriculum, Millie Horodynski to adapt this education programme for this research project. Refer to Appendix J for written consent from the developer of the Healthy Babies Curriculum.

The Healthy Kiwi Programme (HKP) consisted of six individual home-based lessons. These home-based lessons were approximately 60 minutes in length. Table 3 shows the HKP lesson names; provides an overview of the main content covered in each lesson; and lists the activities used to encourage active learning from the programme. The lessons followed the format and topics outlined in the Healthy Baby Curriculum (Horodynski et al., 2010).

Table 3. Healthy Kiwi Programme lesson overview (See Appendix F for an examples of the programme resources adapted for the New Zealand context).

Lesson Name:	Main topics covered	Activities
"My babies first foods"	- current WHO recommendations for the introduction of complementary foods to infants - rationale for these recommendations - definition of solids food for a baby - infant cues indicating readiness for solids	Role play Practical activity – baby rice Interactive worksheet
"Feeding my older baby"	- texture progression for infants - how to avoid choking e.g. foods to avoid and positioning while eating - managing distractions at mealtimes	Practical activity, food consistencies - banana Interactive worksheet Role play
"What is my baby telling me ?"	- recognising and responding to infant feeding cues- hunger and full	Videos – different examples of infant temperaments Picture cards Food recipes Role play Interactive worksheet
"Is your baby flexible, shy or feisty?"	- temperament characteristics for infant and mother - differences/similarities between their temperaments - adapting mealtimes to suit their baby - how temperament can affect feeding behaviour	Role play Pictures Activity – puzzle Interactive worksheet
"Parent provides, baby decides"	- parent responsibilities (meal times, what foods are offered) versus infant responsibilities (whether or not to eat, how much to eat) - offering nutritious foods - the importance of mealtime and mealtime interactions	Pictures Interactive worksheet
"My plan for feeding my baby"	- review of key concepts - goals regarding a 12-month feeding plan - knowing when to progress e.g. textures/ family foods	Interactive worksheet Planning worksheet Activity food texture progression

3.9.1. Underlying principles

Horoydynski and her colleagues attempted to increase the efficacy of their adult education programme by embedding principles from adult learning into the development of the Healthy Baby Curriculum. These principles included establishing connections between newly learnt information and the participants' previous knowledge, enabling the participants to practise using newly learnt information in role play scenarios (Norris, 2003). Each session in both the HBC and HKP included a variety of learning opportunities catering to learners with different learning preferences. These learning opportunities included handouts with recipes; as well as practical activities and discussions designed to aid learners in the application of lesson content. These practical activities were supported by Addae's (2016) principle of active participation and Dale's (1969) Cone of Experience (Addae, 2016; Dale, 1969). Both of these suggest that the inclusion of practical activities in an intervention facilitates retention, generalisation and application of new learning into real life situations. Intervention strategies focussing on infant feeding practices included modifications to the infants feeding environment, for example, reducing distractions by turning off the television. Intervention strategies also focused on parental infant feeding behaviours, for example, the parent deciding what foods to offer the infant and the infant decides how much they eat. It was hoped that these activities would enable all types of adult learners to successfully engage in the intervention.

3.9.2. Adaptations for the New Zealand context:

The adaptation and use of the HBC in the New Zealand context may contribute to the efficacy of the HBC by strengthening its external validity and transferability to a new setting and population. Transferability refers to the ability of the findings of one study to be generalised to other situations, contexts or populations (Tappen, 2011). This can add to the evidence base for both the theory underpinning the intervention and the intervention itself.

The Healthy Kiwi Programme used the structure and resources from the HBC programme. These resources were adapted to include New Zealand infant food brands such as

Farex®, Watties® and Natureland®. The programme pictures were edited to include photos of infants and their mothers from the major ethnic groups in the Auckland region such as Maori, Indian, Asian and Pasifika. One of the characters in the role play activities was changed from 'Abuela' the Spanish term for grandmother to provide the options of grandma in Manadrin 'Nainai', Hindi 'Daadee' or Maori 'Kuia'. The stimuli were made appropriate for the family receiving the service. The resources were also updated to include the latest recommendations from the WHO on the introduction of potential allergens such as egg and peanuts. These recommendations suggest that infants should be exposed to small amounts of egg and smooth peanut butter when they are being introduced to complementary foods at six months old as studies show this reduces their risk of developing lifelong allergies (American Academy of Pediatrics, 2017).

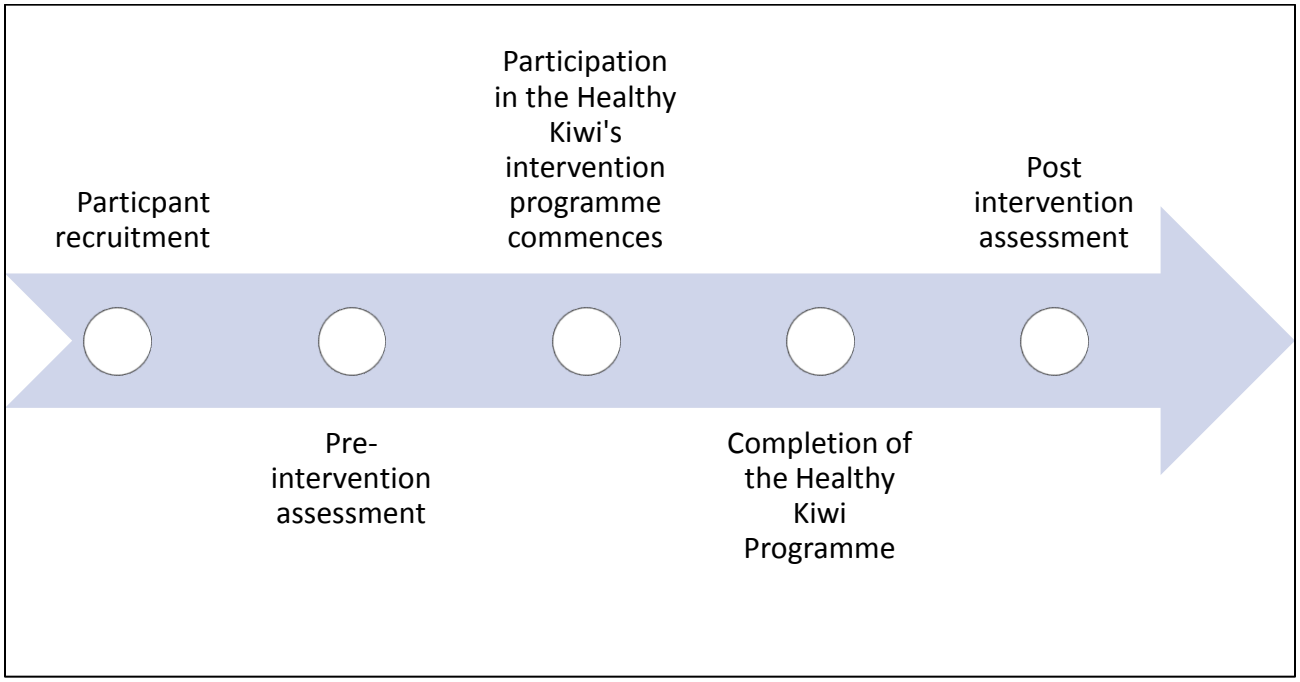

Figure 2: Timeline showing the procedures for this study.

3.10. Data Collection:

This study utilised a multiple case study design with qualitative and quantitative data (Creswell & Plano Clark; 2011). Quantitative research is thought to lead to greater objectivity and generalizability, while qualitative research lends itself to greater depth of understanding

and contextualisation of the research data (Lund, 2012; Patton, 2002). The combining of research techniques can allow researchers to utilise the strengths and compensate for the limitations of each individual approach (Patton, 2002). These differing approaches and strategies are likely to result in complementary strengths and non-overlapping weaknesses of methods (Johnson & Onwuegbuzie, 2004). This research project employed five sources of data collection, including a mealtime video observation scale, field notes, a semi structured interview and two self-report questionnaires. This number of data sources aligns with the number of sources recommended by Yin (2014). It was anticipated that the integration of both quantitative and qualitative measures would provide more holistic findings including information regarding the participant's perspective and experiences as well as the outcomes of the Healthy Kiwi Programme.

Table 4. showing the type of data collection measures utilised in this study.

Qualitative data	Quantitative data
- Semi-structured interview - Field notes	- Maternal Knowledge Scale - Infant Feeding Styles Questionnaire - Infant feeding cue video observation

Tashakkori and Teddlie(1998) suggest that all qualitative and quantitative designs use triangulation techniques. Denzin's (1978) concept of triangulation involved combining data sources to study the same social phenomenon. He discussed four basic types of triangulation: data triangulation (the use of a variety of data sources in a study), investigator triangulation (the use of multiple researchers), theory triangulation (the use of a multiple perspectives to interpret the results of a study), and methodological triangulation (the use of multiple methods to study a research problem). Data, investigator and methodological triangulation were used in this study.

3.10.1. Data collection procedures:

The researcher gathered data through two main assessment periods (see Figure 2). The first data collection occurred after participants had been recruited to the research project. This initial assessment data formed the pre-intervention data for this research project. Participants were asked to complete two self-reported questionnaires before participating in the HKP and a video observation of the infant being fed by the caregiver was obtained. The same measures were repeated in the post-intervention data collection period for this study. During the delivery of the intervention sessions the researcher took field notes. In addition to these measures a semi structured was conducted with the participants following their involvement in the HKP. The types of data collection measures utilised in this study can be seen above in Table 4.

3.11. Measures

3.11.1 Infant Feeding Style Questionnaire

Feeding style represents the mother's beliefs about, and their approach to, controlling her infant's feeding behaviours. A mother's feeding style provides insight to the demands they place on their infant during feeding and responsiveness to their infants needs during feeding (Hughes, Power, O'Connor, Fisher & Chen, 2016; Kroller & Warschburger, 2008). The Infant Feeding Styles Questionnaire (IFSQ) (Thompson et al., 2009) is a maternal self-report instrument. It provides data on maternal beliefs and behaviours relating to infant feeding practises. The IFSQ is a self-reported questionnaire that asked mothers to rate how strongly they agreed or disagreed with a statement. Examples of these statements include *My child watches TV while eating* and *I gave my child cereal in his/her bottle*. Participants were asked to complete this tool before and after receiving the HKP. Their responses to a statement about infant feeding were recorded on a five-point Likert scale (Likert, 1932). This type of scale shows how much participants agree or disagree with a statement. Likert scales are designed to measure the attitudes and opinions of respondents in a manner through which this data can then be rated or ranked. The Infant feeding scale consisted of 80 statements. This tool was

used in this project to measure any changes in maternal beliefs and feeding style behaviours before and after receiving the education programme.

3.11.2. Maternal Knowledge Scale

Maternal knowledge was assessed using an adapted version of the Maternal Knowledge and Self-Efficacy scale developed by Horodynski and colleagues (2013). The seven self-efficacy items that were included in the original survey were taken out as they did not relate to the research questions of this study. The quantitative scale used in the Healthy Kiwi Programme consisted of 13 knowledge items for example *Solid foods are not breast milk or formula.* Please refer to Appendix D for a copy of the adapted questionnaire. Likert scales were used to gather a fixed choice response measuring the attitudes or opinions of participants (Burns & Grove, 2005). The participants were asked to plot how strongly they agreed or disagreed with a statement. This tool was used in this research project to measure any changes in maternal knowledge about current infant feeding recommendations before and after participants received the education programme.

3.11.3. Responsiveness to infant feeding cue-video observations

Maternal responsiveness is defined as a mother's sensitivity to and acceptance of their infant's behaviours (Hodges, Hughes, Hopkinson & Fisher., 2008). An example of this is a mother interpreting their infant turning away from the spoon as the infant's way of telling their mother they don't want any more food. The Responsiveness to Child Feeding Cues Scale (RCFCS) (Hodges, Johnson, Hughes, Hopkinson, Butte & Fisher, 2013) was used to measure maternal responsiveness to infant hunger and fullness cues (Hodges et al., 2013). This assessment tool involved analysing a short video recording of the interactions between a mother and her infant during a mealtime.

The RCFCS utilises a subjective rating scale to identify which infant hunger and fullness cues were present or absent in the infant's behaviour and their mother's responsiveness to these cues. The inter-rater reliability estimates for all the RCFCS child variables based on the intra-class correlation coefficient were excellent (ICC>0.80) except for relaxed physical

disposition which was acceptable but fair (ICC= 0.60) (Hodges et al., 2013). The inter-rater agreement for all RCFCS maternal variables was also excellent (ICC>0.80) except for relaxed physical disposition which was acceptable but fair (ICC= 0.51) (Hodges et al., 2013).

The RCFCS was used to measure any changes in maternal responsivity to infant feeding cues before and after participant's received the Healthy Kiwi Programme. The mealtime videos were coded by the researcher. The videos were coded not in chronological order to attempt to mitigate potential bias. The researcher was required by Eric Hodges (the developer of the scale) to code the 3 x gold standard videos to 85% agreement before she was given permission to begin coding for the study. Three of the videos were also analysed by a research assistant to provide inter-rater reliability data. The research assistant was trained by the researcher to use the RCFCS during a four hour workshop that included talking through the hunger and fullness rating scale, providing definitions and examples of infant or maternal behaviours and practise coding infant feeding cues using this tool. The final part of this training involved the researcher and research assistant co-coding 5 minutes of the gold standard video of the infant being fully fed by the caregiver. This video was chosen as the infants in this study were fully fed by their caregivers due to their age.

3.11.4. Field Notes

Observations of participant experiences were also recorded as field notes by the instructor as the participants spoke about these anecdotally in conversation during the intervention sessions. This allowed additional data to be captured as it was brought up by the participant in spontaneous conversation. The researcher also noted down relevant contextual factors such as who was present for intervention sessions, whether the infant was unwell during the assessment session, changes in the stage of infant feeding (e.g. progressing from formula to solids) or distractions present in the environment (e.g. visitors arriving or the TV being on in the background).

3.11.5. Semi-structured interview

Participants' experiences of participating in the Healthy Kiwi Programme were explored using an individually conducted semi-structured interview. Interviews have been identified as one of the major modes of inquiry, allowing insights into the real-life experiences of others and in-depth subjective understanding to be established (Gubrium, Holstein, Marvasti & McKinney, 2012). Semi-structured interviews have three key components. The first is that it involves a conversational exchange of dialogue that focuses on the experience of the individual being interviewed rather than their beliefs or opinions (Edwards & Holland, 2010). The second is that the interviewer has the topics, themes and issues that they want to cover but these are approaches with a flexible or fluid structure (Edwards & Holland, 2010). The third is that the interviewer has relevant situational and contextual knowledge that allows them to bring these topics, themes and issues into focus so that relevant information can be acquired during the interview process. In this study the semi-structured interview covered several themes including accessibility of the intervention, generalisation of the knowledge and skills acquired, personal experience of the intervention and feedback regarding potential future improvements. This semi-structured interview aimed to gather details of the participants' individual experiences and personal reflections regarding the HKP intervention (Seidman, 2015).

This interview was conducted by one of two research assistants who both followed the same semi-structured interview guide which can be seen in Appendix E. This guide consisted of a series of open-ended questions and some prompt suggestions to enable the interviewer to gather information relating to the participant's experiences and the core themes. The interviews were audio recorded and transcribed from the audio recordings taken by the interviewer using the process of intelligent verbatim. This is a process that eliminates hesitations, pauses and repetitions and overlapping talk between the interviewer and participant, to aid clarity of reading, while ensuring that the transcription remains faithful to the participants' meaning (Creswell & Plano Clark; 2011; Irwin, Pannbacker & Lass, 2013; Punch, 2005).

Researchers have identified that the relationship between the interviewer and interviewee can result in social desirability bias (Edwards & Holland, 2010; Herbert, Clemow,

Pbert, Ockene & Okene, 1995). Social desirability refers to people's desire to convey an image they perceive as being socially acceptable, seek approval for certain behaviours and avoid criticism (Fisher, 1993). The social desirability bias suggests that some people sometimes distort their answers in the hopes of presenting themselves as having more socially desirable behaviours. In order to mitigate the effects of social desirability bias participants there was social distance between the interviewer and interviewee (Holbrook, Green & Krosnick, 2003). Social distance refers to the closeness or familiarity of the interviewer and interviewee. The semi-structured interviews were therefore completed by a research assistant not the researcher who delivered the Healthy Kiwi Programme to the participants.

Member checking is used frequently in qualitative research as a measure of reliability to ensure that the results are an accurate reflection of the participant's experiences (Creswell & Plano Clark, 2011). Member checking is outlined as one of ways of improving the credibility of a qualitative study by Guba (1981). Once the interviews were transcribed, participants were given the opportunity to revise and amend their transcripts. All of the participants reported they were happy with their transcripts and did not ask for any amendments to be made. Once the transcriptions and had been checked by the participants' the researcher commenced the process of paraphrasing or summarising the key points within the data.

A thematic analysis was then carried out on the data gathered from the semi-structured interviews and organised to show any commonalities and patterns between participants. The process used for this is described in further detail below.

3.12. Data Analysis:

3.12.1. Quantitative Analysis:

Descriptive statistics were used to analyse the quantitative data gathered through the MKS, IFSQ and RIFCS. The researcher and research assistant were trained to analyse the videos used to gather the data for the RCFCS as described earlier in this chapter. Three of the eight infant feeding videos were cross analysed by both the researcher and research assistant. The inter-rater agreement on the RCFCS was 88.55% for these videos. Where there was disagreement regarding the coding of cues a discussion was held to gain agreement. The

differences were a mix of both maternal and infant measures. These differences were all within one point of each other on the rating scale for example changing from (3) somewhat responsive to (4) fairly responsive.

The researcher re-coded three of the infant feeding observation videos again to provide the intra-rater agreement for this measure. The intra-rater agreement result for this study was 95.9%. There were no changes in the coding of any of the maternal measures across the three repeated videos. The differences were all in infant measures. These differences were within one point of each other on the rating scale for example changing from (3) somewhat responsive to (4) fairly responsive.

For the data gathered through the MKS, IFSQ and RCFCS modes and frequency counts were attained for these responses in order to look at potential patterns and establish what response occurred most frequently in the sample population (Irwin et al., 2013). The ranges were also calculated for the mealtime observations (difference between highest and lowest). IBM *SPSS*® statistics software platform was used to calculate the effect sizes and significance of changes in participant responses between the pre and post test scores for both within and across participant measures. Effect size was selected as it highlighted the size of the difference in the participant responses to statements in the measures before and after they received the HKP, and it does not confound this with sample size (Coe, 2002).

3.12.2. Qualitative analysis:

Creswell (1998) recommends that multiple case analysis should begin with each individual case being described and the themes within the case outlined. This component is referred to as a with-in case analysis (Creswell, 1998). The themes that emerged from the individual cases were used to form concepts and indicated the start of the synthesis (Miles & Huberman, 1994). This was followed by a thematic analysis across the cases, referred to as cross–case analysis (Creswell, 1998; Yin, 2004). This analysis process utilised the themes established in the with-in case analyses. Themes that were common across cases were retained.

Thematic analysis refers to the search for themes within data, these themes are recognised as being important to the description of the phenomenon (Daly, Kellehear, & Gliksman, 1997). The process of thematic analysis involves the identification of themes through "careful reading and re-reading of the data" (Rice and Ezzy, 1999, p.258). It is a form of pattern recognition within the data, where emerging themes become the categories for analysis (Fereday & Muir-Cochrane, 2006). This research project combined both the data-driven inductive approach of Boyatzis (1998) and deductive theory-driven approach outlined by Crabtree and Miller (1999) in its thematic analysis. This approach was planned as it complemented the research questions and ensured that the principles of social phenomenology were integral to the process of thematic analysis. This approach enabled broad patterns of commonality across the cases to be identified.

3.12.3. The coding process

In order for researchers to make sense of and logically organise the raw data gathered through interviews and field notes they must engage in the process of coding data (DeCuir-Gunby, Marshall & McCulloch, 2011). Miles and Huberman (1994) classify codes as being 'tags or labels for assigning units of meaning to the descriptive or inferential information complied during a study" (Miles & Huberman, 1994, p.56). The core codes developed to analyse the data in this study were derived from existing theory, specifically from the SCT (Bandura, 2004). These core codes are shown below in Table 5. These core codes were devised using a deductive approach and formed a framework for the analysis of the qualitative data. These core codes were used initially to help the researcher reduce the quantity of raw data by identifying relevant quotes.

Table 5. The core codes developed from the SCT theory (Bandura,1986; Bandura, 1997; Bandura, 1999).

Code	Label	Definition
1	Personal Factors	Personal influences include an individual's cognition, outcome expectations, self-efficacy, biological influences and psychosocial issues including an individual's thoughts, feelings and beliefs (Williams et al, 1999). What a person thinks, believes and feels can contribute to a person's intentions and in turn influence how they behave (Bandura, 1986).
2	Social Factors	Social factors refer to the social support or barriers present for an individual. This may include reference to interactions with, discussions or involvement of family and friendship networks (Bandura, 1997).
3	Environmental Factors	Environmental influences refer to conditions within the physical surrounding of the individual. (Bandura, 1997). In the case of this study both factors regarding the physical environment and the structure of the intervention programme were classified as being environmental e.g physical - such as having the TV or radio on and intervention – length of the intervention
4	Behavioural Factors	Behavioural influences refer to the actions or decision individuals make. These actions and decisions are influenced by the individual's knowledge, skills and behavioural capability to successfully complete the task (Bandura, 1886).

Further sub-codes were later derived from within the raw data during the process of completing open coding of the interviews (Coffey & Atkinson, 1996). Open coding involves separating the raw data into meaningful sections, exploring ideas and defining concepts that arise from this data (Corbin & Strauss, 2008). For examples of the sub-codes developed from the semi-structured interview data refer to Table 6. These sub-codes were then analysed through the process of axial coding, which enabled the researcher to establish any connections between sub-codes (DeCuir-Gunby et al., 2011). Sub-codes were then aligned under the most pertinent theory driven core code.

A codebook was developed through this process, refer to Table 7 for the full coding matrix. This codebook comprised of the main code label, sub-code label, a brief definition and an example from the raw data. As suggested by Boyatzis (1998) code labels were selected to be clear, concise and meaningful. The definitions of the codes were precise and clearly explained the construct. Quotes from the raw data were selected to clearly illustrate each code. The core codes and sub-codes included in the codebook were reviewed and revised throughout this process. The researcher re-examined both the theory driven and data driven codes several times. In addition to improve the credibility of this codebook it was critically reviewed by the researcher's supervisor as recommended by Guba (1981). Following this review some alterations and additions were made to the sub-codes. For example, the addition of a sub-code around participants' desire for ongoing support was suggested in this review and added to the code book. The themes and the connections between these are outlined in the following chapter.

Table 6. Examples of the coding table of sub-themes developed from semi-structured interview data.

Code	Definition	Example
Participant knowledge	Participant reflection that they have learnt new information through participating in the HKP	'I felt like I've learnt a lot of what the evidence says rather than just what is a fad or what's out there at the moment'
Alignment with personal beliefs and family values	The participants' acceptance that something is true or is in line with their family ideals	' (the intervention) aligned pretty well with our family values'
Self-efficacy	The participants' perspective in terms of their own ability and confidence to introduce solids to their infant	'I think that if I didn't have those sessions with her I would have felt a bit like a fish out of water and might not have felt so prepared'

3.13. Ethical considerations:

Human ethics applications were submitted and approved by the Northern Massey University Ethics Committee (MUHEC) (Appendix C). This application outlined the procedures and ethical considerations for the study. This study involved gathering data that related to infants, therefore, careful consideration was given to ethical considerations of research involving young people and vulnerable populations.

This study recruited participants on a voluntary basis. All potential participants were informed verbally and in writing about the purpose of the study and were required to provide written consent before participating (see Appendix B). Informed consent requires that sufficient information is provided to potential participants, enabling them to make an informed decision about their participation in a study. This extends to informing participants of their right to withdraw this consent at any time (Creswell, 2012; Denscombe, 2010). In order to satisfy informed consent, a detailed information sheet (see Appendix A) was supplied to all potential participants outlining: (a) the purpose and procedures of the study, (b) the extent of involvement, (c) their right and (d) information on how to withdraw from the study.

Alongside informed consent, issues of confidentially are also paramount (Cohen, Manion, & Morrison, 2007; Creswell, 2012; Patton, 2002). Confidentially was addressed through the use of anonymity in the questionnaires which did not require the participants to reveal any personal information about themselves or their infant. The New Zealand Privacy Act (1993) defines personal information as information about an identified individual or an individual who is reasonably identifiable. In this research project personal information refers to details such as the participant's name, residential address and date or birth. All participants were allocated a pseudonym during the recruitment stage of the study. In addition, the specific geographical area that each participant resided in has not been specified in order to maintain confidentiality.

Raw data including completed questionnaire data, video files and transcriptions have been stored securely in a password protected digital folder or in a locked cabinet only accessed by the author and her research supervisors. These will remain stored for a period of five years

as required by the Northern Massey University Ethics Committee. After which the data will be disposed on in an appropriate manner e.g. shredded of in a confidential disposal bin.

3.14. Summary

The methodological considerations outlined here provided justification for the procedures and tools employed in this study. As this study involved the sharing of information about infants, careful consideration was given to ethical issues to ensure that both the parents' and infants' privacy was not compromised. Utilizing a multiple case study design with qualitative and quantitative data was an ideal choice for this study as it allowed for an in-depth examination of several parents' beliefs, experiences and opinions in relation to the research questions identified, both before and after their participation in the Healthy Kiwi Programme. The results and findings of this research project are discussed in the next chapter.

Chapter 4 - Results

This chapter outlines the outcomes, perspectives and experiences of four mother-infant dyads following their participation in the Healthy Kiwi Programme (HKP). This research project utilised four measures to gather data. The quantitative data were collected using two self-reported questionnaires and through the analysis of two five-minute long videos of the infant being fed by their main caregiver. The qualitative data utilised in this research project was collected through semi-structured interviews carried out with each participant following their completion of the HKP. This chapter will start by providing some background information regarding each measure pertinent to all four participants. Then each individual case will be described, followed by the outcomes from the video observations and participant responses to the statements on the Likert scale based questionnaires. Their perspectives gathered via the semi-structured interview will be integrated throughout the chapter. Finally, a summary of the similarities and disparities in the outcomes and experiences across the four cases is provided.

4.1. Context:

4.1.1. Infant feeding Style Questionnaire

The mothers were asked to complete the Infant Feeding Style Questionnaire (IFSQ) before and after they completed the HKP. Maternal responses to this tool were considered to be significant if there was a change of three or more points in their response from pre-test to post-test e.g. 1 to 4 or 5 to 2. The results from the IFSQ showed significant effect size changes on two questions across all four participants. Question 3 'I watch TV while feeding my child' had an effect size of .78. The pre-test results showed that 50% of the participants strongly agreed with this statement and the other 50% agreed with this statement. The post results showed that 50% of participants disagreed with the statement and 50% felt neutral about this statement. Question 37 'An infant under six months needs more than breast milk or formula to feel full' had an effect size of .72. The pre-test results showed that 75% of the participants slightly agreed with this statement and the other 25% disagreed with this statement. The post results showed that 100% of participants disagreed with the statement. Individual results are

shown in Table 8 below and will be discussed in further detail later in this chapter. For a complete copy of the data collected refer to Appendix G.

4.1.2. Maternal Knowledge Scale

The mothers were asked to complete the Maternal Knowledge Scale (MKS) before and after they completed the HKP. The results from the MKS showed medium effect size changes on three questions (Q3,5,7) across all four participants. Question 3 'Infants' need snacks between meals' the pre-test results showed that 50% of the participants agreed with this statement and the post-test showed that 100% of the participants agreed with this statement. Question 5 'Giving my baby solid food will help them sleep through the night'. The pre-test results showed that 75% of the participants agreed or slightly agreed with this statement. The post-test showed that 50% disagreed and 50% responded neutrally towards this statement. Question 7 'It is ok to offer my infant small amounts of smooth peanut butter and egg when I start giving them solid foods'. The pre-test results showed that 50% of the participants agreed with this statement and the post-test showed that 25% of the participants agreed with this statement. For a complete copy of the data collected refer to Appendix H.

4.1.3. Responsiveness to infant feeding cues- video observations

Mother-infant dyads were videoed being fed by their mother before and after the mother participated in the HKP. The researcher intended on videoing a full infant feed at these data collection points prior to commencing this research project. However, due to time constraints and feasibility these videos were limited to five minutes in length. These videos were then analysed using the RCFCS tool developed by Eric Hodges. The RCFCS tool is designed to analyse not only the mother-infant dyad during feeding but also their cues and responses before and at the end of a feed. As a result of the video time constraint, often the infant hunger and some fullness cues were unable to be observed. This prevented the researcher from coding these infant cues as well as maternal responsiveness to these cues. Therefore, most of the video observations were coded for infant engagement in the feed, receptiveness to feeding and early hunger cues and maternal responses to these cues. The relevant outcomes for both the

caregiver and infant will be discussed for each participant later in this chapter. For the complete scoring matrix refer to appendix I.

While obtaining the infant feeding videos there were generally few interruptions or distractions in the participants' environment. However, during the pre-programme feeding observation video participant 1 had the TV on in the background and participants 3 and 4 had visitors arrive during the pre-programme feeding observation video recording. There were no significant environmental interruptions or distractions during the post-programme infant feeding videos.

All four participants were positioned within arms' reach of their infant for both the pre and post programme infant feeding video observations. During the infant feeding videos for all four participants the infants were fully fed by their main caregiver. This was due to the age and developmental level of the infants at the time of the programme. All four of the infants were observed to always be in straight alignment, given adequate head support and appropriately supported by their caregiver when appropriate during the infant feeding observation videos. All four infants were either breast or bottle fed in the pre-programme video. One participant was given puree in the post-programme video while the other three were breastfed.

4.1.4. Semi-structured interviews

Following each participant's completion of the HKP they participated in a brief semi-structured interview. This explored their engagement and experiences of participating in the HKP. The interview setting for the participants varied. One participant was interviewed in their home, face to face. The other three participants were interviewed by telephone. This decision was due to travel distance and the feasibility of organising a time that suited both the participant and research assistant.

Interview themes

After the data had been transcribed it was then coded following the process described in Chapter 3. As previously outlined, four core codes were derived from existing theory. These

four codes became the four core themes from the interviews (Personal/Cognitive Factors, Behavioural Factors, Social Factors and Environmental Factors). Through the process of inductive analysis outlined in further detail in Chapter 3, 15 related sub themes were developed from the data (Thomas, 2006). The full coding matrix showing the core codes and sub-codes is shown in Table 7 below.

Table 7. Coding matrix developed from the semi-structured interview transcripts.

Code	Sub Code	Definition	Example
Personal/ Cognitive Factors	Participant knowledge	Participant reflection that they have learnt new information through participating in the HKP	'I felt like I've learnt a lot of what the evidence says rather than just what is a fad or what's out there at the moment'
	Alignment with personal beliefs and family values	The participant's acceptance that something is true or is in line with their family ideals	' (the intervention) aligned pretty well with our family values'
	Self-efficacy	The participant's perspective in terms of their own ability and confidence to introduce solids to their infant	'I think that if I didn't have those sessions with her I would have felt a bit like a fish out of water and might not have felt so prepared'
Social Factors	Social supports	The support of the participants' family and friends in relation to their infant feeding plan	'mum has slightly different ideas around solids like when she started (with her kids) … but she is very aware that things have changed since then, so she is very open to the way we want to do things'
	Ongoing support	Participant wanting further contact with the instructor or supports regarding infant feeding practises	'when you have ended the programme then you start solids you don't have that person to ask questions there'

	Alternative sources of information	Participant perspective on other sources (not HKP) of infant feeding information	‘there are facebook groups that give information but a lot of it is either misinformation or may not be evidence based’
Behavioural Factors	Personal behaviour	Participant reflection on any changes they have made in regard to feeding their infant since participating in the HKP	'I have been trying to read her (feeding cues) a bit better'
	Awareness of infant cues	Participant perspective in terms of their awareness and responsivity to infant feeding cues	'I’ve become much more aware of her feeding cues or at least to be looking out for them'
	Responsivity to Infant feeding cues	Participant perspective in terms of how they react to their infant’s cues	‘I offer the breast to my baby and it is up to her whether or not she takes the breast’
	Dissemination of information	Participant sharing information and knowledge learnt through the HKP with others	‘ I shared information with my coffee group' 'they are effectively benefitting from us and them even within my coffee group I’ve shared information back with them'
Environmental Factors	Environment	Environmental distractors in the home environment during observations or home visits	e.g. tv or radio
	Length of intervention	The number and length (time in minutes) of intervention sessions	'I did think instead of stretching it out a lot of it could be condensed into half the time e.g. three longer sessions' ' committing to 5-6 weeks is difficult for some families. So 3 weeks would make it more accessible'
	Structure of	The organisation or activities	' I particularly enjoyed

intervention	of the HKP intervention	the little activities e.g. food preparation practise with the banana'
Intervention Setting	Location where the intervention was completed	'home visits made engaging easier'
Timing of intervention	When the interventions were completed	'She (the instructor) was available in the weekends … really flexible with anytime on a Saturday'

4.2. Case Study 1

4.2.1. Case description

The main caregiver participating in the HKP was the infant's mother. She identified as being from the New Zealand European ethnic group. The family's main language spoken within the home was English. Prior to being on maternity leave the mother worked as a teacher. Her first child was a typically developing five-month-old male.

The mother and her son attended all six of the HKP intervention sessions. The infant's father also attended five out of the six intervention sessions. Sessions generally lasted for around 60 minutes. These were all carried out within the family's suburban Auckland home. There were no disturbances or significant interruptions during the home-based intervention sessions.

4.2.2. Infant Feeding Style Questionnaire

As seen in Table 8 this mother demonstrated an improvement of 6.75% in her total score response on the IFSQ. She demonstrated significant changes in responses to 4 of the 81 statements (statements 23, 40, 44 & 51) on the IFSQ. Her response changed from disagreeing with statement 23 'A toddler should only eat healthy food' to slightly agreeing with this statement. Her response also changed from disagreeing with statement 40 'I carefully control how much my child eats' to slightly agreeing with this statement. She also had significant changes in her response to statement 44 'My child lets me know when he/she is full' which was

slightly disagreed with in the pre-test and agreed with in the post-test. This mother discussed being more aware of her infant's hunger and fullness cues being one of the biggest changes that she had noticed since participating in the HKP. She reported:

> *"being more aware of his cues has probably been the biggest change and not just his. I look after one of the other boys in the coffee group every so often….. so being able to spot his cues as well because they are so different to my child's"*

Finally, a significant change in response was given to statement 51 'I allow my child to eat desserts/sweets if she/he wants' in the pre-test the participant slightly disagreed with this statement and in the post-test they agreed with this statement.

Table 8. Graph showing the total scores of the case study's pre-test and post-test responses for the Infant Feeding Style Questionnaire

Case Study Number	Pre-test total Score (Max 400)	Post-test total Score (Max 400)
1	296 (74%)	331 (82.75 %)
2	344 (86%)	365 (91.25%)
3	326 (81.5%)	389 (97.25%)
4	320 (80%)	313 (78.25%)

6.2.3. Maternal Knowledge Scale

As seen in figure 3 below this mother demonstrated an improvement in her total score response on the MKS from 53 (81%) to 62 (95%) after receiving the HKP intervention. She demonstrated the most significant improvement on this assessment tool across all of the case studies. She gave more decisive responses more frequently in the post-test than in the pre-test e.g. either agree (5) or disagree (1) which resulted in the 14% overall increase in her total score from pre-test to post-test. In the interview this mother reported feeling prepared to start giving her infant complementary foods. She reported that the information and activities she learnt in the HKP sessions helped her preparation:

"I think that if I didn't have those sessions with her I would have felt a bit like a fish out of water and might not have felt so prepared."

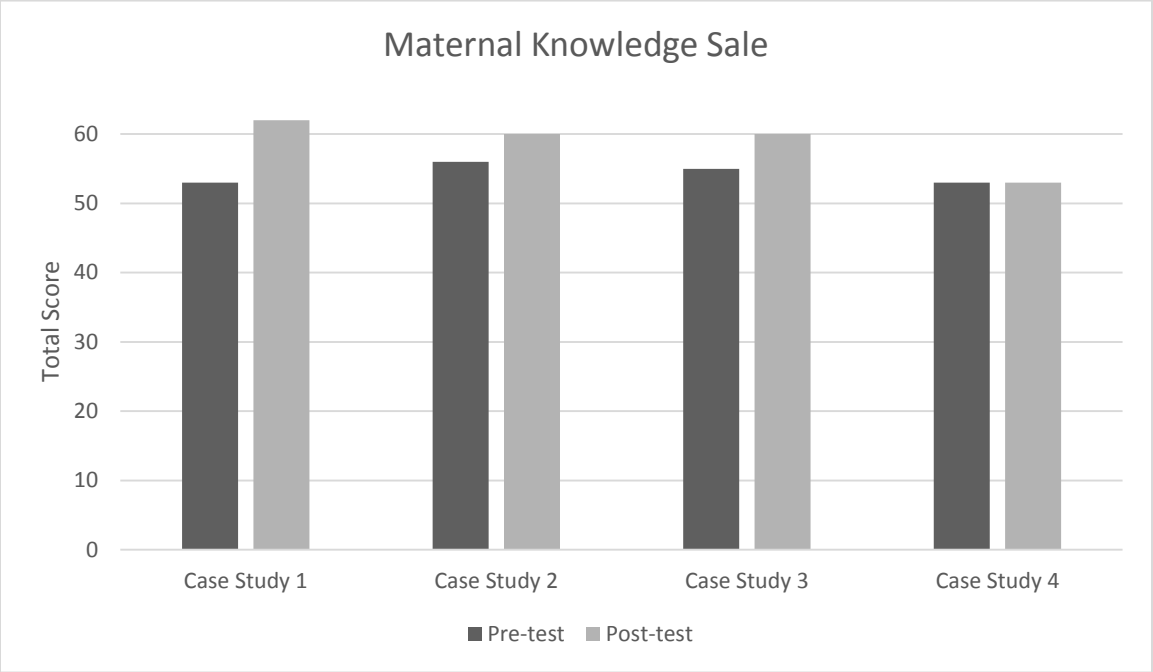

Figure 3. Graph showing the total scores of the case study's pre-test and post-test responses for the Maternal Knowledge Scale questionnaire

4.2.4. Responsiveness to Infant Feeding Cues Scale

Maternal

The mother and infant were evenly paced in terms of feeding rate in the pre-programme video. In the post-programme video, the mother's pace was a little slower than the infant cued for. In the pre-programme video the television was on in the background while in the post programme video there were no significant distractions in the environment. The mother was fairly attentive to her infant's receptiveness to feeding cues in both videos. She demonstrated a balanced affect and appeared very relaxed during both mealtime videos. She was predominately positively expressive in her facial expressions, body language and communication with her infant during the videos. The timing of the post-programme infant feeding video coincided with the mother starting to introduce complementary foods to her son.

Infant

The infant was observed to demonstrate a balanced affect in both the pre- and post-programme videos. He was fairly engaged in the pre-programme feeding video, he became distracted by the television which was on in the background at times. The infant was extremely receptive to feeding in the pre-programme feeding video. At this time, he was bottle fed by his mother. The infant was fairly engaged and moderately receptive to feeding in the post-programme feeding video, he was observed to be unsettled when having episodes of the hiccups during his mealtime. During the post-programme video the infant was spoon fed complementary foods by his mother. The infant was very relaxed in the pre-programme video. He was observed to be fairly relaxed in the post-programme video.

4.2.5. Semi-structured interview

Personal factors:

This mother stated that she found some information on introducing complementary foods to infants confusing or misleading. She commented that "some of it [the information] is conflicting about what to give them to eat and what to introduce when and things". Despite this she reported feeling prepared to start introducing complementary foods to her infant after a few sessions of the HKP identifying that it contributed to her feeling prepared and confident to introduce complementary foods to her infant.

> *"I felt pretty prepared because we had a few sessions with [the researcher] before we started solids and we covered most of the how and whats of how you start solids, and what you're going to use and things like that. Come actually starting it we felt pretty prepared in that we had stuff ready to go".*

Socio-environmental Factors

She reported that she felt supported by her family throughout the HKP. She stated that she did not feel pressured by her family regarding the decisions she had made about feeding her infant. This mother reflected:

> *"our family have all been pretty good. They have their ideas on how things were when we were kids but .... they're very open to the fact that there is new information and that things have changed….. They've been very supportive".*

This mother's sense of being well supported extended to her friendship networks as well. She recalled "I've shared information back with them (my coffee group). They've really enjoyed it". This mother reported feeling supported by both her family and friendship networks. She discussed some of the content she learnt in the HKP with others in her social network.

Environmental Factors

This mother stated that having the intervention programme run at their family home made it easier for them to access and with "[the researcher] made it really easy in terms of coming to us, in our home". She also mentioned that this enabled both her and her husband to participate in the programme together. "It was really good to have my husband there for most of it as well because it meant that we both were getting the information". She reported that the HKP content aligned well with their family values and beliefs regarding food.

> *"We eat pretty healthy kinds of foods and have idealistic ideas in a lot of ways. As kids both of us sat down for dinner with our parents and you ate your vegetables and your meat. So, it [HKP content] was on par with all that and what we expected to do"*

She found the practical activities most beneficial. This mother remarked "The main thing was making up different foods. I loved that. Getting us to make baby rice. That was good because it gave us an idea of the consistency for the first couple of times". She identified being

able to generalise some of the learning from these practical activities directly into her daily life when starting her son on complementary foods.

Finally, this mother felt hat the length of the HKP was appropriate and reported she was open to the idea of it running for longer if additional information could be included “I love learning, so I could have easily had another couple of sessions”.

4.2.6. Summary

This mother demonstrated improvements in her total scores on both the MKS and IFSQ following the competition of the HKP. She experienced the most significant increase in total response score on the MKS compared with the other participants. She was reportedly well supported by her family and friendship networks throughout her involvement in the HKP. She most enjoyed the practical activities included in the HKP and found she was able to generalise some of the learning from the activities into her daily life. According to this mother the most significant change for her after doing the HKP was being more aware of her own and other infant’s feeding cues.

4.3. Case Study 2

4.3.1. Case Description

The main participant in the HKP was the infant’s mother. Identified as being from the New Zealand European ethnic group. The main language spoken within the home was English. Prior to being on maternity leave the mother worked as a Speech Language Therapist. This mother’s first child was a typically developing three-month-old female. The mother and her daughter attended all six of the HKP intervention sessions. Sessions generally lasted for around 60 minutes. These were all carried out within the family’s suburban Auckland home. There were no disturbances or significant interruptions during the home-based intervention sessions.

4.3.2. Infant Feeding Style Questionnaire

As seen in Table 8 this mother demonstrated an improvement of 5.25 % in her total score response on the IFSQ. She demonstrated significant changes in responses to 20 out of the 81 statements (Question 3, 15 , 18 , 19 , 22 , 31 ,32 ,34 ,35 ,37 ,39 ,40 ,41 ,42 ,43 ,45 ,46 ,47 ,48 & 49) on the IFSQ. Her response changed from slightly agreeing with the statement 'I watch TV while feeding my child' to disagreeing with this statement. The mother's responses to the following five statements changed from agreeing or slighting agreeing with them to disagreeing 'It is important for my child to finish all milk in his/her bottle', 'The best way to make an infant stop crying is to feed him/her', 'I give/gave my child cereal in his/her bottle', 'Putting cereal in my infants bottle is good because it helps him/her feel full' and ' An infant under six months old needs more than formula or breastmilk to feel full'. She also had significant changes in her response to statement 44 'My child lets me know when he/she is full' which was disagreed with in the pre-test and agreed with in the post-test. Finally, a significant change in response was given to the statements 48 and 19 'My child knows when he/she is hungry they need to eat' and 'My child knows when he/she is full' in the pre-test the mother agreed with these statements and in the post-test they disagreed with these statement. During the semi-structured interview this mother mentioned feeling as though

> "*I've become a lot more aware of her feeding cues or at least to be looking out for them... Its given me the confidence to be like that's ok, that's who she is and give her the space to get use to new things, rather than getting frustrated about it. I guess that's a change for me".*

Thus, demonstrating that she knew what to look for in terms of her infant's hunger and fullness feeding cues after completing the HKP.

4.3.3. Maternal Knowledge Scale

As seen in figure 3 this mother demonstrated an improvement in her total score response on the MKS from 56 (86%) to 60 (92%) after receiving the HKP intervention. This

participant gave more decisive responses more frequently in the post-test than in the pre-test e.g. either agree (5) or disagree (1) which resulted in the 6% overall increase this participant's total score from pre-test to post-test. She shared that "I felt like I didn't know much before (the HKP) at all about starting solids". She reported after the HKP feeling that "overall I felt like I've learnt a lot of what the evidence says rather than just what is a fad or what's out there at the moment". She also spoke about the current government funded free education service for all parents in New Zealand.

> *"The Plunket talk that we did which for most parents that is all they are offered in terms of understanding solids, was more of a question and answer type thing. So you only know what you asked. Whereas this (HKP) programme covered it all whether you knew it or not. So that was really helpful"*

This mother therefore demonstrated a sense of increased knowledge on how to introduce complementary foods to infants after completing the HKP.

4.3.4. Responsiveness to Infant Feeding Cue Scale

Mother

The mother and infant were evenly paced in terms of feeding rate in both the pre and post-programme videos. There were no significant distractions in the environment during either video. The mother was very attentive to her infant's receptiveness to feeding cues in both videos. She demonstrated a balanced affect and appeared fairly relaxed during both mealtime videos. She was predominately positively expressive in her facial expressions, body language and communication with her infant during the videos.

Infant

The infant was observed to demonstrate a balanced affect in both the pre and post programme videos. The infant was very engaged in the pre-programme feeding video. The infant was not very engaged in the post-programme feeding video, she was observed to be

unsettled and distracted by the presence of the researcher videoing. The infant was fairly relaxed in the pre-programme video. She was observed to be somewhat relaxed in the post-programme video. The infant was moderately receptive to feeding in the pre-programme and demonstrated weak receptiveness to feeding in the post-programme feeding video. She was breast fed by her mother in both videos.

4.3.5. Semi-Structured interview

Personal factors

This mother spoke about confusion from social media groups and commercial infant food packaging at the supermarket regarding the introduction of complementary foods to infants. She reported that a lot of the mothers in her coffee group were confused about when to start introducing complementary foods to their infants. She commented:

> *"There is a lot of misinformation out there, particularly on Facebook groups which give information that may not be evidence based. A lot of mums in my coffee group started solids at four months or were confused 'should I be starting at four months?"*

She reported she found the HKP

> *"helpful in terms of giving me confidence and having a forum where I could ask my questions and not feel stupid and feeling like I was getting information I could trust".*

This mother recognised that participating in the HKP and having a knowledgeable support person available to ask questions on introducing complementary foods to infant helped increased her self-confidence to introduce complementary foods to her daughter.

Social-environmental factors

She reflected that while participating in the HKP that she felt well supported by her family.

"my parents live nearby…. Mum and Dad are super supportive. Mum's probably got slightly different ideas around solids like when she started (with her kids). But she is very aware that things have changed since then."

She did voice some concern around her mother in law trying to pressure her to give her infant complementary foods before she wanted to. During one intervention session she reported that her mother in law offered to make apple puree for her to give her infant. However, this mother reported that she felt confident enough to decline this offer and reiterate her plan for introducing complementary foods to her daughter.

This mother also reported feeling well supported by her friendship networks. She commented

"I did share a lot about what [the researcher] did with us with them. It was quite cool to be able to go to the coffee group girls and say this is some of the things I've learnt and share that with them".

Environmental factors

This mother reflected that the content covered in the HKP aligned with her values and beliefs related to food. "I think it (the HKP) aligned pretty well. The only thing we maybe differ on is we will probably take more of a natural health approach". She had decided to start her infant on a homemade fruit or vegetable puree rather than baby rice which was used in the HKP to allow parents to learn about the consistency of puree.

She commented that "I still feel a bit iffy in terms of how and when to progress. How do I know when she is ready to progress? I feel like know the next texture but am unsure when to do that". She felt it would have been good to have some ongoing support after the HKP. She detailed feeling confident regarding where to start but unsure about when to progress through textures.

She gave some suggestions regarding possible improvements for the HKP if it was utilised in the future. "I think the group setting would work well. In a group situation you learn

a lot from each other. A lot of misconceptions can be thrown out there and talked about in a group setting". She felt that completing the HKP in a small group setting could be beneficial due to the capacity to learn from each other and learn about common misconceptions together. This participant also felt that the length of the HKP was too long. The participant expressed thinking that "a lot of it (the content) could be condensed to half the time… committing to 5-6 weeks is difficult for some families so 3 weeks would make it more accessible for people". She felt that shortening the programme could facilitate better familial engagement in the programme.

This mother participated in the current public provision which includes a one-off workshop provided by Plunket as part of the Well Child Tamariki Ora Programme, which when discussed she highlighted:

> *"We did the Plunket solids talk, I just did it this week with a lot of the coffee group girls. It was interesting. Nothing they said contradicted what was covered in the HKP but they didn't cover nearly as much. Like they just really skimmed the surface in terms of start solids sometime around 6 months, covered the signs like being able to sit supported. Everything they said wasn't new to me but I just felt that there was so much that they missed"*

She elaborated further by saying:

> *"The Plunket talk that we did which for most parents that is all they are offered in terms of understanding solids, was more of a question and answer type thing. So, you only know the answers to what you asked. Whereas this programme covered it all whether you knew it or not. So that was really helpful"*

This mother who completed both the HKP and attended the Plunket workshop reported she felt as though the Plunket workshop only provided a brief overview of the process of introducing complementary foods to infants. She also mentioned that "I felt like it (the Plunket talk) was offered too late, a lot of the mums in my coffee group had already given their infant solids (before they attended the Plunket talk)". She felt that this may leave parents in a position

where they need to seek further information elsewhere and had concerns regarding the quality of the information many parents rely on.

4.3.6. Summary

This mother demonstrated improvements in her total scores in both the MKS and IFSQ following the competition of the HKP. She was reportedly well supported by her family and friendship networks throughout her involvement in the HKP. She enjoyed sharing some of the information she had learnt in the HKP with peers in her coffee group. She most enjoyed the practical activities included in the HKP and she was able to generalise some of the learning from these activities into her daily life. She reported the biggest change for her after doing the HKP was being more aware of her infant's feeding cues and how to respond to these cues. She reported feeling more confident to introduce complementary foods to her infant after participating in the HKP.

4.4. Case Study 3

4.4.1. Case description

The main participant in the HKP was the infant's mother. Identified as being from the New Zealand European ethnic group. The main language spoken within the home was English. Prior to being on maternity leave the mother worked as an Occupational Therapist. This mother's first child was a typically developing four-month-old male. The mother and her infant attended all six of the HKP intervention sessions. Sessions generally lasted for around 60 minutes. Five of the intervention session were all carried out within the family's home based and the other session was completed at a café in order to fit in with the family's schedule. The infant's father also attended five out of the six home intervention sessions. These home visits did not experience any disturbances or significant interruptions.

4.4.2. Infant Feeding Style Questionnaire

As seen in Table 8 this mother demonstrated an improvement in her total score response on the IFSQ of 16%. She demonstrated significant changes in responses to 16 questions (Question 1,3, 4, 20, 21, 27, 29, 35, 37, 39, 41, 43, 44, 48, 49 & 50) on the IFSQ. Her response changed from agreeing with the statements 'I watch TV while feeding my child' and 'I watch TV while feeding my child' to disagreeing with these statements. In the semi-structured interview, she commented that

> *"we have noticed that with (our child) since starting solids, often when he has slowed down or he's distracted that rather than just stopping (feeding him) we will give him a bit of a break or try to turn some of the distractions off"*

Her responses to the following three statements changed from slighting agreeing with them to disagreeing 'An infant under six months old needs more than formula or breastmilk to feel full', 'The best way to make an infant stop crying is to feed him/her' and 'When an infant cries it usually means he/she needs to be fed'. She also demonstrated significant changes in her response to the statement 'It is important that the parent decides how much an infant should eat' which was agreed with in the pre-test and disagreed with in the post-test. Finally, a significant change in response was given to the statements 'My child knows when he/she is full' and 'My child knows when he/she is hungry they need to eat' the pre-test the participant disagreed with these statements and in the post-test they agreed with these statement. During the intervention session where infant feeding cues were discussed this mother admitted knowing that *'I can miss his cues at times and misinterpret them'*. Later in the semi-structured interview she stated that

> *"something we probably wouldn't have done as well is picked up on his cues and maybe we would have stopped offering him food if he showed less interest rather than just holding off then reoffering"*

4.4.3. Maternal Knowledge Scale

As seen in Figure 3 above this mother demonstrated an improvement in her total score response on the MKS from 55 (84%) to 60 (92%) after receiving the HKP intervention. She demonstrated a significant change in response from disagreeing (1) to agreeing (5) with statement 10, 'I am responsible for deciding what and when my baby eats'. This participant also gave more decisive responses more frequently in the post-test than in the pre-test e.g. either agree (5) or disagree (1) which resulted in the 8% overall increase this participant's total score from pre-test to post-test.

4.4.4. Responsiveness to Infant Feeding Cues Scale

Mother

The mother and infant were evenly paced in terms of feeding rate in both the pre- and post-programme videos. The mother was fairly attentive to her infant's receptiveness to feeding cues in both videos. She demonstrated a positive affect and appeared very relaxed during both mealtime videos. She was predominately positively expressive in her facial expressions, body language and communication with her infant during the videos.

Infant

The infant was observed to demonstrate a balanced affect in both the pre and post programme videos. The infant was very engaged in the pre-programme feeding video. The infant was fairly engaged in the post-programme feeding video, he was distracted by the presence of the researcher videoing. The infant was very relaxed in the pre and post-programme videos.

The infant was very receptive to feeding in the pre-programme and demonstrated moderate receptiveness to feeding in the post-programme feeding video. He was breast fed by his mother in both videos.

4.4.5. Semi-structured interview

Personal Factors

During the semi-structured interview after the completion of the HKP this mother reported

> *"[we felt] very prepared… I felt we basically the started (solids) the week after she finished the programme with us and it (the HKP) just gave us the confidence to get in there, get going and just start really"*

This statement was further supported by her husband who also took part in the programme who stated, "Yes very prepared… especially to know what kind of textures and what kinds of food and stuff like that and how to start". This family reported feeling as though the HKP was a nice simple introduction to reading her baby's cues and how to prepare complementary foods to give them. The HKP contributed to her feeling more prepared and confident to introduce complementary foods to her infant.

Social Factors

This mother and her husband reported feeling well supported by their families. She commented that

> *"both of our mums have been really supportive through the programme and they are also supportive of our decisions around what we feed our child and how we start solids'.* She went onto say *'None of them (our parents) pressured us into starting (solids) any earlier than six months. They were interested. My step mum started her kids (on complementary foods) much earlier but she didn't put any pressure on us. My coffee group has been really supportive and there have been lots of chats (about complementary foods)"*

She expressed that her and her husband felt well supported by their families and friends regarding their infant feeding decisions and throughout their participation in the HKP. They did not feel pressured into starting complementary foods before they were ready.

Environmental Factors

This mother and her husband both found the practical activities included within the HKP most enjoyable and beneficial. She stated that "I loved the activities and they were really, really helpful". Later in the interview she elaborated by saying

> *"I think what was really helpful was one of the first lessons she showed us how to mash banana, it was about different textures. We have been able to model that, doing it smooth, then a bit thicker"*

This mother highlighting how she was able to generalise some of the learning from these practical activities into her daily life when starting her infant on complementary foods.

This mother reflected that the content of the HKP aligned well with their family values and that the programme length was appropriate. She commented

> *"It (The HKP) fit exactly with us. What she (the researcher) was talking about was very similar to our I'm cooking and stuff I will offer him food, so he is in the kitchen with me. We are cooking and eating together. It all worked well with our family I think"*

This mother and her husband participated in most of the HKP programme session together and both took active roles in the practical activities. This mother reported "I feel like the six sessions were really helpful, like they all lead on one from the other. She revised things which was really helpful". The parents in this case shared similar family values to those discussed in the HKP and supported each other to participate equally in the programme.

One thing that this mother was concerned about was having questions in the future regarding the introduction of complementary foods to her infant and no one to ask after the completion of the HKP. She said

"[when you are] starting solids then you have more questions to ask, more can be covered. Whereas, when you have ended the programme then you start solids you don't have that person to ask questions there".

This participant implied that she felt like she would like a follow up visit or a contact to discuss any further questions.

4.4.6. Summary

This mother demonstrated improvements in her total scores on both the MKS and IFSQ following the competition of the HKP. She demonstrated the most significant improvement in their total score on the IFSQ across all four participants. She was reportedly well supported by her family and friendship networks throughout her involvement in the HKP. She most enjoyed the practical activities included in the HKP. She reported the biggest change for her after doing the HKP was being more aware of her infant's feeding cues. She reported feeling more confident to introduce complementary foods to her infant after participating in the HKP but would have liked an ongoing contact to ask any follow up questions.

4.5. Case Study 4

4.5.1. Case Description

The main participant in the HKP was the infant's mother. She identified as being from the New Zealand European ethnic group. The main language spoken within the home was English. Prior to being on maternity leave this mother worked as a physiotherapist. Her first child was a typically developing four-month-old female. The mother and her infant attended all six of the HKP intervention sessions. Sessions generally lasted for around 60 minutes. The intervention sessions were all carried out within the family's home based in suburban Auckland. These home visits did not experience any disturbances or significant interruptions.

4.5.2. Infant Feeding Style Questionnaire

As seen in Table 8 this mother demonstrated a slight decrease in her total score response on the IFSQ from 320 (80%) to 313 (78.25%). She had significant changes in responses to 10 questions (Question 14, 19, 35, 37, 52, 61, 75, 77, 79 & 81) on the IFSQ. Her responses changed from slightly agreeing with the statements in the pre-test 'I make sure my child does not eat junk food like potato chips', 'A toddler should never eat fast food' and 'I allow my child to drink sugared drinks/fizzy drinks to keep him/her happy' to disagreeing with the same statements in the post-test. She also had significant changes in their response to the statement 'The best way to make an infant stop crying is to feed him/her' which was agreed with in the pre-test and disagreed with in the post-test.

4.5.3. Maternal Knowledge Scale

As seen in Figure 3 above this mother demonstrated no change in their total score on the MKS from pre-test to post-test. They scored 53 (81%) the assessment both times. Their responses to 5 out of the 13 questions did change. However, this participant tended gave more neutral (3) responses in the post-test than the pre-test.

4.5.4. Responsiveness to Infant Feeding Cues Scale

Mother

The mother and infant were evenly paced in terms of feeding rate in both the pre- and post-programme videos. The mother was fairly attentive to her infant's receptiveness to feeding cues in the pre-programme videos and somewhat attentive in the post-programme video. She demonstrated a positive affect in the pre-programme video and a balanced affect in the post-programme video. She appeared fairly relaxed during both mealtime videos. She was predominately positively expressive in her facial expressions, body language and communication with her infant during the videos.

Infant

The infant was observed to demonstrate a balanced affect in both the pre and post programme videos. The infant was fairly engaged in the pre-programme feeding video. The infant was somewhat engaged in the post-programme feeding video, she was unsettled due to her coughing throughout the feed. The infant was fairly relaxed in the pre-programme video and somewhat relaxed in the post-programme video.

The infant was moderately receptive to feeding in the pre-programme and post-programme feeding videos. She was breast fed by her mother in both videos. It is important to note that the infant had a cold and was coughing throughout the post-programme video.

4.5.5. Semi-structured interview

Personal Factors

In the interview this mother spoke about a change she decided to make based on some of the information shared in the first two sessions of the HKP. She reported that

> *"I was going to start solids with my baby at four months but then when the researcher came over and explained all the pros and cons [of starting complementary foods before six months] I decided to stick it out until, I was trying to stick it out to six months but at five months I started"*

This participant initially spoke about wanting to start giving her infant complementary foods before starting the HKP when her infant was four months old. After participating in the HKP sessions which discussed the current WHO organisation recommendations and the rationale behind these recommendations this mother changed her mind regarding when she would start introducing complementary foods to her infant. This participant also reported that people in her social networks and personal beliefs contributed to her wanting to wait before introducing complementary foods to her infant.

This mother reported during the first HKP programme session feeling as though she had no idea where to start with solids, she was not sure what to give, or how much to give her infant. During the semi-structured interview after the completion of the interview she reported

"I have a lot more confidence in starting solids I guess when it came to it". She acknowledged that the HKP was only one of her sources of information regarding the introduction of complementary foods "I would say really prepared because of that and then Plunket as well and I had a niece that was just starting solids as well, so I was pretty prepared". This mother reported feeling as though the HKP was a nice simple introduction to reading her baby's cues and how to prepare complementary foods to give to them. It was one of multiple sources that she used to gain information regarding the introduction of complementary foods to infants. It contributed to her feeling more prepared and confident to introduce complementary foods to her infant.

Social Factors

This mother utilised a range of sources of information to form her infant feeding decisions including the HKP, family members and people in her social networks

> *"I have a coffee and we have discussed solids and feeding at that. Family as well I chatted with my parents about what they did and kind of compared what they have done with what the researcher was saying with the programme and then made my own decisions about what I was going to do for my child"*

Environmental Factors

This mother reported she found the practical activities included within the HKP most enjoyable and beneficial. She stated that:

> *"I actually really enjoyed the first or second appointment. Where (the researcher) got out a whole lot of baby rice and we mixed it up, for the consistency. Which was good to start with. It was different to what I imagined. And also same with the banana"*

She later reflected she was able to generalise some of the learning from these practical activities into her daily life when starting her infant on complementary foods. She reported "I just went and got some spoons and started with mashed banana because (the researcher)

showed me". This mother was able to use the skills she learnt in one of the practical activities in the HKP in real life after the completion of the HKP.

This mother also mentioned that having the intervention sessions being run in her own home made the HKP easy to access. She reflected that "it was very easy. The researcher came to me so it was really easy". One suggestion made by this mother was that she felt the HKP could be successful completed within a small group setting. She proposed "it (the HKP) could be quite good to do it in small groups, I would say as opposed to individually".

This mother also reflected that she felt the HKP was lengthy and wondered if it could be condensed. She reflected

> *"I found six weeks quite a long time for it as well and there was a lot of information which was good but it might have been able to be shorter in some ways. I don't know if that would be like one session or maybe not six appointments but do it in four appointments"*

4.5.6. Summary

This mother had the same total score in the pre and post-test improvements in the MKS. Her total score response in the IFSQ following the competition of the HKP decreased by 1.75%. However, despite these quantitative results the mother reflected that she found the HKP beneficial and was able to identify some behaviour she decided to make based on the information provided in the HKP. She was reportedly well supported by her family and friendship networks throughout her involvement in the HKP. She most enjoyed the practical activities included in the HKP and was able to generalise these tasks into her daily life after the completion of the intervention. She reported the biggest change for her after doing the HKP was delaying her decision regarding when to start giving he infant complementary foods. She reported feeling more confident to introduce complementary foods to her infant after participating in the HKP.

4.6. Across Case Summary

4.6.1. Personal Factors

All of the mothers were in strong agreement that they felt well prepared to start giving their infant solids and that participating in the HKP helped them feel prepared. As seen in Table 8 and Figure 3 above the results of the MKS and IFSQ showed that three out of the four mothers increased their knowledge on infant feeding and the introduction of complementary foods by 5-16% after participating in the HKP. The other mother had no change to her total score on the MKS and a slight decrease of 1.75% in her total score on the IFSQ. Despite these quantitative results this mother expressed that the HKP programme taught her how to know when to start solids, what to offer and resulted in her delaying the introduction of complementary foods to her infant. All of the mothers recognised that participating in the HKP contributed to them feeling prepared and confident to introduce complementary foods to their infants.

All the mothers identified that they enjoyed and found the practical activities within the programme beneficial. They reported that the tasks they participated in during the HKP were things that they remembered and were able to utilise when making complementary foods for their infant in real life.

The mothers generally agreed that the content covered in the HKP aligned reasonably well with their families' values. One of the mothers reported while her values predominately aligned with the HKP she felt that she had more of a natural health approach and therefore, made some infant feeding decisions that reflected this approach for example opting for homemade vegetable purees rather than offering her infant baby rice. They agreed that generally the principles and content of the HKP aligned well with their family values.

The majority of mothers reported that after they completed the HKP they felt like they were more aware of their own and other infants hunger and fullness cues. As seen in the results from the RIFCS the mothers in this study were all found to be moderately, fairly or highly responsive to their infants' cues in the pre-treatment infant feeding videos. Three out four of

the mothers mentioned that education on infant feeding cues specifically helped them identify and respond more appropriately to not only their own infant's but other infants feeding cues.

4.6.2. Behavioural Factors

Collectively the participants felt that they had sufficient access to social supports and felt well supported by extended family and friendship networks throughout the HKP programme. Several mothers described ways in which they shared the information they learnt in the HKP with others in their social networks. Two mothers commented on the fact that they had shared some of the information they had learnt in the HKP with others most commonly family members or those in their coffee groups. All of the mothers expressed that they felt well supported by their families regarding their infant feeding decisions.

4.6.3. Social factors

Participants agreed that there is a lot of misleading or conflicting information about the introduction of complementary foods to infants. Most of the mothers reported having multiple sources of information about introducing complementary foods, not just what they learnt through the HKP. Three of the four mothers reported that older family members had discussed or suggested that they offer their infant complementary foods before their infant reached six months old. Despite these recommendations the mothers in the programme reported that they did not feel pressured to start giving their infant complementary foods before they were ready. They also felt confident to decline purees if they were offered by these family members. Most of the mothers in the HKP were exposed to multiple sources of information about introducing complementary foods to infants.

Some of the mothers who participated in the HKP also participated in the current complementary feeding workshops provided to new mothers by Plunket. The mothers who completed both the HKP and attended the Plunket workshops reported they felt as though the Plunket workshops only provided a brief overview of the process of introducing complementary foods to infants. They felt it was not in depth enough and left other mothers in a position

where they need to seek further information elsewhere. They felt that the HKP covered a lot more information and allowed them to learn more effectively due to the inclusion of practical activities. Some of the mothers specified that the HKP taught them more than just about the introduction of complementary foods to their infants. They found the lessons on their infants' personality and feeding cues valuable and specified that these topics are not discussed elsewhere by other services available to new parents.

Two of the mothers identified that they felt it would have been good to have some ongoing support after the HKP. One mother detailed feeling confident regarding where to start but unsure about when to progress through textures. Another mother outlined concerns regarding having questions in the future and no one to ask. According to the mothers the HKP provided appropriate support and information which enabled them to feel confident about starting to introduce complementary foods with their infant. However, the process of introducing complementary foods is carried out over number of months and these mothers suggested that having someone they could contact with questions would further increase their self-confidence throughout this transition.

4.6.4. Environmental factors

The mothers were in agreement that having the intervention sessions completed within their home made it more straightforward to engage with the HKP and less demanding in terms of time and organisation. Two of the mothers reflected that having the HKP intervention sessions within their home enabled their husband to participate in the programme as well. The most significant disparity between the mothers who participated in the HKP was around the length of the programme. Two mothers felt that the length of the programme was appropriate while the other two reported that they felt it was too long.

Two mothers suggested that they felt the HKP might be suitable to be run in small groups such as delivering to their coffee groups. They reported feeling completing the HKP in a small group setting could be beneficial due to the increased capacity to learn from each other and learn about common misconceptions together.

4.7. Chapter Summary

This chapter presented the experiences and outcomes for each of the four cases. In the next chapter, the key findings will be interpreted further.

Chapter 5 – Discussion and Conclusions

The use of parental education programmes internationally on infant feeding practices have been shown by the literature to be useful in improving parental awareness of current infant feeding recommendations and increasing adult knowledge on the introduction of complementary foods to infants (Bentley et al., 2013; Bhandari et al., 2001; Black et al., 2001; Cameron et al., 2013; Horodynski et al., 2008; Horodynski et al., 2010; Kang et al., 2017; Saleem et al., 2014; Sanders & Woolley, 2005; Schroeder et al., 2015; Walsh et al., 2015; Wen et al., 2011). This chapter will discuss this study's findings in relation to the research questions and international literature on this topic.

5.1. Research Questions

Given the growing role that speech and language therapists have supporting parents with early infant feeding, this study was developed to investigate parental perceptions and experiences after participating in the Healthy Kiwi Programme within the New Zealand context This programme focused educating parents on the introduction of complementary foods to infants and infant feeding cues.

This research addressed the following research questions:

1) What are the parental perceptions and experiences of their participation in the 'Healthy Kiwi Programme'?
2) How do these parental perceptions and experiences influence parental participation and engagement in the, 'Healthy Kiwi Programme' education programme?
3) What are the parental outcomes from participating in the 'Healthy Kiwi Programme'?

The key findings related to the research questions are discussed below.

5.2. Parental perceptions and experiences of their participation in the 'Healthy Kiwi Programme'

5.2.1. Sources of information

All of the participants identified that they were given different advice from members in their social networks regarding starting their infant on complementary foods. After participation in the HKP all of the mothers perceived that there is a lot of misleading or conflicting information about the introduction of complementary foods to infants particularly on social media. One mother commented that she found there is a non-evidence based information on social media groups and acknowledged that the HKP helped her to learn a lot of evidence-based information on complementary feeding for infants. This aligns with the findings from Ashida and colleagues (2015) who identified one common social factor that influenced maternal infant feeding decisions was maternal exposure to more than one piece of infant feeding advice. This exposure to multiple mixed messages was associated with confusion. New parents are exposed to a wide range of sources of information on infant feeding, it can be challenging for them to discern which information comes from credible sources. It is important that parents are provided with access to evidence-based information to be able to make informed decisions regarding their infants feeding.

5.2.2. Current infant feeding supports

Currently, in New Zealand parents have access to the Well Child Tamariki Ora (WCTO) service. This programme offers a one-off information evening for parents to attend on the introduction of complementary foods to infants. The information evening was run in a question and answer format which may result in inconsistencies in information that is distributed between sessions depending on the questions asked. One of the mothers in this study mentioned that the information evenings were available too late as some of the mothers within their coffee groups had already started to introduce complementary foods to their infants. She commented "I felt like it (the Plunket talk) was offered too late, a lot of the mums in my coffee group had already given their infant solids (before they attended the Plunket talk)". Two of the

mothers in this study also commented that they felt as though they would need to seek out further information to supplement the overview provided through this information evening. These mothers also perceived that although the Well Child information evening was evidence-based, it was not in depth enough and thought that it missed a lot of important information such as how to progress through textures and teaching parents about infant feeding cues.

5.3. Parental outcomes from participating in the 'Healthy Kiwi Programme'

5.3.1. Awareness of Infant Feeding Cues

Following the HKP all participants reported that that the education on infant hunger and fullness cues specifically being one of the most valuable things they learnt through the programme. Three of the mothers commented in the interview that this was the main thing they took from the HKP. They felt that education on infant feeding cues was something that helped them identify and respond more appropriately to not only their own infant's but other infants feeding cues. These results support evidence in the literature that shows that parental education on identifying, interpreting and responding appropriately to infant feeding cues can support the development of a more responsive maternal feeding style and positive parent-infant feeding relationships (Ainsworth & Bell, 1969; Black et al., 2001; Hodges et al., 2008; Mallan, Sullivan, de Jersey & Daniels, 2016; Redsell et al., 2017). Maternal responsiveness to infant hunger and fullness cues is essential to a mother demonstrating a responsive feeding style (Hodges et al., 2008). Previous literature has suggested that parental education programmes that include specific education on infant feeding cues were more beneficial than those without (Redsell et al., 2017). The provision of education on complementary feeding and infant feeding cues may improve parent-infant feeding relationships and general parental knowledge on introducing complementary foods. This leads to the next outcome from this study on changes to maternal knowledge.

5.3.2. Maternal Knowledge

Parents are not taught to be parents and therefore they only know what they have learnt through experience; been told by others in their social networks; or read on social media. The mothers who participated in the current study were all well-educated however, despite having a high level of education they all indicated that they felt as though they knew little about introducing complementary foods to their infant prior to participating in the HKP. In the post programme interview one mother commented that she felt like she didn't know much about starting solids with her infant before the HKP. This finding aligns with Barlow and colleagues (2007) who reported many of the parents in their study experienced feeling they had inadequate knowledge in relation to their child's behaviour.

One of the key outcomes from this study was that three out of the four mothers who participated in this study experienced a total score increase of between 5 and 16% on both the MKS and IFSQ following their participation in the HKP. This finding aligns with outcomes reported in previously completed studies which measured changes in maternal knowledge on complementary feeding for infants after receiving an education programme (Bentley et al., 2013; Penny et al., 2005; Shi et al., 2010; Yin et al., 2009). Alike the current study the findings from these studies also showed positive shifts in maternal knowledge on complementary feeding following the mother's participation in an education programme. This further strengthens growing body of evidence which suggests parental education programmes lead to an increase in parental knowledge about complementary feeding for infants.

In the interview one of the mothers who participated in the HKP reported that she decided to delay the introduction of complementary foods to her infant due to information she received from the HKP. She reported that this shift in her decision was due to specific information outlining the rationales for current WHO recommendations as well as some members of her social network encouraging her to wait. These factors resulted in a shift in this mother's decision as well as a change in her behaviour when it came to introducing complementary foods to her infant. Other studies have found similar behaviour changes in mothers who received parental education interventions on introducing complementary foods (De Oliveira et al., 2012; Edwards et al., 2013; Wen et al., 2011; Vitolo et al., 2005). These

studies found that mothers who received an education programme on introducing complementary foods to infants were significantly less likely to introduce complementary foods to their infants before the recommended age of six months old when compared to a control group. Parental education programmes on complementary feeding and infant feeding cues may create positive shifts in parental knowledge, decisions and behaviours about introducing complementary foods to their infant. This leads to the third outcome from this study which is the sharing of knowledge learnt with others in their social networks.

Another important outcome from this study was that three of the mothers commented in their interviews that they shared information they learnt in the HKP with others in their social networks. One mother commented that she shared information back with her coffee group and that the mothers in this group really enjoyed hearing about what she had learnt in the HKP. Another mother mentioned that she enjoyed being able to share some of the information from the HKP with the coffee group girls and extended family members. The mothers in this study reflected that they had strong social support networks therefore it seems reasonable that some of the participants in this study would want to share what they have learnt with others in their social networks (Subramani & Rajagopalan; 2003). People tend to pass along information that they consider useful to other people and who they felt might benefit from this information (Subramani & Rajagopalan; 2003). The most common groups of people the mothers shared information they had learnt through the HKP with were their families and coffee groups. The mothers in this study tended to share information in their coffee groups regarding the current WHO recommendations, allergies and food suggestions. They shared information specifically regarding their infant's personality and feeding cues with family members who were likely to feed their child at some stage. The knowledge these mothers shared was gained through their participation in the HKP. There were some factors that the mothers identified which enhanced their engagement and participation in the HKP. These factors will be discussed in relation to the final research question in the next section.

5.4. The influence of parental perceptions and experiences on parental participation and engagement in the 'Healthy Kiwi Programme'

5.4.1. Practical activities

The mothers involved in this study recognised that participating in the HKP contributed to an increase in their self-efficacy when it came to introducing complementary foods to their infants. Collectively, they identified that they learnt best through participating in the practical activities within the HKP such as practising making up baby rice and found these activities most valuable. This supports the theoretical principle from pedagogy, which suggests that adult learning is more effective when participants are given opportunities to actively apply new learning through carrying out practical activities (Addae, 2010; Edgar 1969; Norris, 2003). Similarly, mothers who participated in another parental education intervention study (Horodynski et al., 2008) were reported to have found hands-on practical activities the most beneficial and that these practical learning opportunities supported them to generalise new learning to real life situations. The use of practical activities in parental education interventions seems to support increased parental self-efficacy and increase generalisation of new learning into daily life. Another factor identified by the mothers that supported their participation in the HKP was the intervention being delivered at home.

5.4.2. Home- based intervention

In the early stages of parenthood parents experience a range of challenges as they develop their own routines one way in which researchers can encourage parents to engage in an intervention is to make as convenient as possible for them by completing it in the family's home. The majority of recent parental education studies are completed within participant's homes in an attempt to make participation in the intervention programme more convenient for new parents (Horodynski et al., 2008; Horodynski et al., 2013). All the mothers who participated in the HKP agreed that having the intervention sessions completed within their own home made it easy for them in terms of participating in the HKP. Families with young infants have a lot of responsibilities vying for their time. They may find an intervention

programme more straightforward to engage with and less demanding in terms of time and organisation if it is carried out within their home. The completion of a parental education programme within their home may facilitate the development of a more robust working relationship between the parent and the interventionist.

5.4.3. Effective working relationships

The importance of developing an effective working relationship with families has been emphasised in previous studies as being essential (Allen, 2007; Jeyendra et al., 2013; Shanti, 2017). The mothers within the HKP reflected positively in the interview on their relationship and interactions with the interventionist. In order to develop an effective working relationship a family needs to experience continuity with the same professional over time (Jeyendra et al., 2013). The HKP consisted of six individual home-based sessions which allowed ample time for the interventionist and families to develop a strong working relationship. All of the mothers in this study attended all six of the intervention sessions which may indicate that their engagement was related to the robust relationship that developed between the interventionist and families during this intervention. One mother perceived that due to the time they spent with the interventionist throughout the HKP programme they were able to gain individualised support for their infant that reflected their family values. Eronen and colleagues (2011) suggested that parents want to build a relationship with community health workers. Therefore, a single one-off group-based workshop such as the information evening provided to first time parents by WCTO is unlikely to result in the development of an effective working relationship between a professional and a parent. This may negatively affect parental acceptance of advice or feedback given during this information evening. An effective working relationship between the family and interventionist is central to the success of an intervention programme as it encourages parental engagement, reduces the likelihood of participant attrition and can lead to better outcomes (Shanti, 2017). The mothers identified an additional factor that influenced their participation and engagement with the HKP was the length of the intervention.

5.4.4. Length of the intervention

Half of the mothers in this study expressed the opinion that having a shorter programme length would make it easier for themselves and other mothers to participate in the HKP programme. They suggested that some of the content could be condensed into three slightly longer sessions. Coren and colleagues (2003) suggest that the use of longer parental education programmes require significant parental commitment and has the potential to lead to increased rates of participant attrition. The mothers in the HKP who shared this point of view attended in the HKP sessions alone and did not have a support person attend the intervention sessions. The other mothers in the HKP contradicted this perspective by reporting that they thought the programme length was appropriate. These mothers had their husbands attend the majority of the intervention sessions with them. Mothers who attend an intervention programme with a support person may be better able to engage and participate over an extended period than those who participate individually.

The mothers who expressed a preference for a shorter programme also suggested that the HKP could be run in a small group format. This finding could indicate that these mothers sought social support while engaging in the programme. Findings from the literature suggests that parental education programmes that are run in group formats can allow opportunities for peer to peer learning through the sharing of ideas or experiences and creation of social support networks (Coren et al., 2003; Jackson et al., 2016). A recent randomised control trial found that clinician's thought that parents demonstrated higher treatment engagement in an individualised programme (Gross, Belcher, Budhathoki, Ofonedu & Uveges., 2018). However, the parents rated their satisfaction more favourably in the group training. Finally, some of the mothers who participated in the HKP identified that they felt they would benefit from ongoing support following the completion of the intervention.

5.4.5. Ongoing support

Two of the mothers who participated in the HKP identified that they felt it would have been good to have some ongoing support after the HKP. One mother commented that she

wanted to have access to someone to ask questions as she was introducing complementary foods to her infant. The addition of either a follow up visit or a contact number for the interventionist could enable participants to seek further support as necessary after the completion of the HKP. This agrees with the findings from a recent study which provided a parental education programme for school aged children around healthy food choices (Besnilian, Johnson & Plunkett., 2018). The main feedback from parents who participated in this programme was that they wanted more information on the next stage for their children and were happy to participate in further classes. The researchers commented that one of the reasons for wanting ongoing support was the effective working relationship between the instructors and the parents. This further supports our previous finding of importance an effective working relationship and the impact of this on parental engagement in programmes.

5.5. Significance of the study

This study provides some initial insight into delivering a parental education programme on complementary feeding and infant feeding cues for parents within New Zealand. It is the first study exploring the use of such a programme within New Zealand. The findings from this study are applicable across a wide range of professional fields, services and settings.

The HKP was founded on the Healthy Baby Programme (HBP) (Horodynski et al., 2011). The HBP was developed using a theory-based approach as well as embedding the principles of effective adult learning (Addae, 2016; Dale, 1969). The use of the Social Cognitive Theory (SCT) (Bandura; 2008) to consider the factors effecting the effectiveness of the HKP in this study further added to the theoretical foundation of this parental intervention programme. The adaptation and use of the HBP in the New Zealand context may contribute to the efficacy of the HBP by strengthening its social validity and transferability to a new setting and population. This can add to the evidence base for both the theory underpinning the intervention and the intervention itself.

5.6. Strengths of the study

One of the strengths of this study was its robust coding process which was developed and utilised to ensure the rigour of the thematic analysis used to analyse the qualitative data gathered in this study (DeCuir-Gunby, Marshall & McCulloch, 2011). The process used both inductive and deductive methods to ensure codes were drawn from both existing theory, specifically from the SCT (Bandura, 2001) as well as from within the raw data (Coffey & Atkinson, 1996). A codebook was developed and revised by the researcher before being critically reviewed by the researcher's supervisor (Guba, 1981). The codebook was used to ensure consistency and precision through the coding of the interviews.

Another strength of this study was its attempt to mitigate the influence of bias through the use of the triangulation of methodologies, researchers and data sources (Denzin, 1978; Tashakkori & Teddlie, 1998). Bias is often a weakness that is often seen in parental education interventions due to their use of self-reported data collection methods. This study utilised several data measures to enable the comparison of a variety of data sources and methods to gain insight into the outcomes and experiences of the parents in this study. This cross-checking of data through triangulation can improve the credibility of the results (Mills, 2014; Guba, 1981). This study also utilised a research assistant to complete the post programme interviews in an attempt to control for bias. Data, researcher and methodological triangulation were used in this study.

5.7. Limitations of the study

One limitation of this study is that the participants were recruited on a voluntary basis (Coren et al., 2003; Bhandari et al., 2004; Black et al., 2001; Horodynski et al., 2008). Parents who volunteer are often more motivated than those who do not self-refer to attend an intervention and were referred by either a health professional or health agency (Coren et al., 2003). This may impact the transferability of this study's findings as the mothers within this study may have been more driven and open to learning than many parents in the wider

population. Therefore, comparable results may not be achieved if this programme was replicated with different participants from a different context.

5.8. Implications for practice

SCT (Bandura, 1986) has significant potential and could be used as part of a health model to support health professionals when developing or reviewing the success of a parental education programme. SCT allows health professionals to identify environmental, behavioural and personal factors which have the ability to influence a family's infant feeding decisions as well as their engagement and participation in a parental education programme. The SCT model aligns with the World Health Organisation's (2002) International Classification of Functioning, Disability and Health model (ICF). The ICF model has been and is currently used in a range of New Zealand healthcare settings (Ministry of Health, 2007). The ICF model assesses the relationship between a person's health condition, the environment and personal factors. This model ultimately looks at the extent to which the disability affects a person's functioning in daily life. These two models could be used together to support the identification of key factors which would allow healthcare professionals to individualise intervention specifically for families. Enabling health professionals to provide effective and efficient intervention which supports parents follow current infant feeding guidelines and engage in best practice when transitioning their infant onto complementary foods.

The use of a strong theoretical foundation and inclusion of adult learning principles are essential when developing a novel parental education programme. Through the consideration of these two core components professionals can develop interventions that are robust in design and facilitate positive outcomes for both parents and their infants. However, for an intervention to truly maximise its benefits for a family the impact of relevant personal, behavioural and environmental factors that could influence familial engagement and participation in the intervention should be considered. The identification of these factors can allow the researcher to consider how to mitigate potential barriers and augment facilitators

prior to the family engaging in the intervention leading to improved engagement in the intervention.

5.9. Directions for future research

Future studies in this area could explore the benefits of delivering the HKP programme in a small group format. This concept was suggested by two of the mothers in this study who felt the programme could be effectively delivered to a small group of mothers such as those in their coffee groups. This format would enable larger groups of mothers to receive the programme more efficiently and provide peer to peer learning opportunities. It is important to acknowledge that by providing the HKP in a small group setting some of the individualisation and convenience of the programme would need to be sacrificed.

Future research could also explore the concept of adapting the content of the HKP for specific populations or cultures. This could be particularly beneficial for populations shown by previous research to be associated with the early introduction of complementary foods to infants such as mothers who experience postnatal depression, Maori, Pacific Island or Asian cultures. The mothers who participated in this study all agreed that generally the principles and content of the HKP aligned well with their family values. However, it is important to note that they were all from the New Zealand European ethnic background. Therefore, it is likely that some of the content included in the HKP may not align as well with families from other cultural backgrounds. Families who feel as though they can relate to the content of a programme are more likely to engage with an education programme and generalize some of the content into their daily lives. If the HKP was adapted specifically for these populations, it may lead to better engagement and uptake of the information delivered.

5.10. Final Thoughts

Health professionals may assume parents with higher education levels have more knowledge about introducing complementary foods to their infants when this is not actually the case. There is some additional support provided in New Zealand for families with infants that have developmental difficulties or parents with limited education within the health and education systems. However, the mothers in this study highlight the need for support to be provided to all first-time mothers no matter their educational background or their child's health status.

Mothers who participated in the HKP identified that they felt the current provision of professional support for parents transitioning their children onto complementary foods through the Well Child Tamariki Ora (WCTO) is insufficient. The process of teaching parents new knowledge and skills is complex and multi-faceted (Mahoney et al., 1999). The WCTO information evening does not reflect the principles of effective adult learning (Addae, 2016) such as having practical activities to support generalisation and retention of new learning. One way that a mother's self-esteem and self-belief that they have the knowledge and skills to successfully transition their infant onto complementary foods is through allowing them to practise completing relevant tasks such as making a puree (Hauck & Irurita, 2003). This also provides an opportunity for the mother to receive positive feedback regarding their parenting skills, something that has been identified as being important to parents in previous studies (Eronen et al., 2007). The current WCTO service may increase parental knowledge about introducing complementary foods to infants but it does not provide practical learning opportunities. These practical learning opportunities have been associated with increased parental self-efficacy as well as the retention and generalization of new learning into real life situations.

Parents in New Zealand are not currently provided with education on identifying, interpreting or responding to infant feeding cues. The literature states that a responsive maternal feeding style supports healthy food intake and growth in infants (Ainsworth & Bell, 1969; Engle, 1999; Engle, Bentley & Pelto, 2000; Hodges et al., 2008). In order for a mother to demonstrate responsive feeding style she needs to be able to successfully identify and interpret

her infant's hunger and fullness cues. The majority of mothers in the HKP commented that the education on identifying and interpreting infant feeding cues was the most valuable component of the programme.

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Appendix A: Participant Information Sheet

MASSEY UNIVERSITY
INSTITUTE OF EDUCATION
TE KURA O TE MATĀURANGA

Starting Solids: Exploring the outcomes of a brief parental educational programme on the introduction of solid foods to infants in New Zealand

INFORMATION SHEET

Researcher(s) Introduction

This project is being carried out by Deirdre Murray, a Master of Speech-Language Therapy Candidate at Massey University. The project is being supervised by Doctor Elizabeth Doell, Senior Lecturer and Coordinator of Speech Language Therapy Programme, and Emily Jones, Senior Professional Clinician, Speech and Language Therapy, Massey University.

Project Description and Invitation

The aim of this study is to determine the outcomes of a brief parental education programme improves about the World Health Organisation (2008) recommendations (about when to introduce solid foods to their infants). Another aim is to determine, and if this programme helps parents to better identify and understand what their infant is trying to communicate during mealtimes.

The Healthy Kiwi's Programme is designed to cover a number of topics about solid foods, including:

- When to introduce solids to infants
- Why there is a recommendation to start introducing solid foods to infants at a particular age
- Common misconceptions about when to introduce solid foods to infants
- Which infant behaviours indicate that they are ready to start eating solid foods
- What are examples of appropriate first foods to introduce

This research may provide information that may support the inclusion of an education training programme about introducing solid foods to infants as part of the standard postnatal service provided by New Zealand District Health Boards. Providing support to parents/caregivers

through an education programme may enable parents/caregivers to feel more confident when it is time to manage their infant's transition to solid foods.

I would be very grateful if you would consider participating in this project. I hope that the educational programme enjoyable is informative and beneficial to both you and your infant.

Participant Identification and Recruitment

I am inviting first time mothers or caregivers who are over the age of 18 to be involved in this research project. To participate you must be fluent at both speaking and understanding English. You need to have a healthy infant without medical complications or feeding difficulties. Your infant needs to be less than four months old and only having either breastmilk or formula. They cannot be eating any solid foods.

Project Procedures

If you express interest by emailing, texting or calling the researcher, you will be give an information sheet on the research project. We will then contact you by phone to explain the study further and gather some basic information from you such as your ethnicity and the age of your baby. This phone call will also give us the opportunity to answer any questions you may have about the study.

After the phone conversation we will send out two questionnaires for you to fill out either by post or email. It will take about 30 minutes to fill out both questionnaires.

After you have filled out the questionnaires you will be assigned to receive:

- The Healthy Kiwi programme in conjunction with the standard Plunket Tamariki Ora/Well Child service. We will arrange a time to video record 5 minutes of one of your infants feeds (likely a breast or bottle feed at this stage). This video observation process will take about 30 minutes. This will be done at your home. You are welcome to have a support person with you. The Healthy Kiwi programme will require 6 x 1-hour weekly home visits. The Healthy Kiwi programme is being offered on an individual basis we will try to work around the times and days that are best for you. If you need to cancel or reschedule a session we will find an alternative time and date that suits you to complete this session. YOU will need to complete all 6 education sessions. These are in addition to the 6 x 1 hour Plunket Tamariki Ora/Well Child sessions, that are spaced throughout the first year of your infant's life. Each participant in this group will spend 9 hours of their time on this research project (1 hour on questionnaires; 1 hour on the video observations; 6 hours on the education sessions; 1 hour on a follow up interview). You are welcome to have a support person present for any/all of the education sessions.

When your infant is around 6 months old, we will send out the same two questionnaires for you to fill out either by post or email. It will take about 30 minutes to fill out both questionnaires. We will make a suitable time to take another 5-minute video of one of your infant's feeds (breast, bottle or solid food). This video observation process will take about 30 minutes. You are welcome to have a support person with you. There will also be a brief semi-structured interview to help us learn more about your experience in participating in the Healthy Kiwi Programme.

A summary of the findings of the research will be made available to everyone who participated in this research project. You can request this by emailing or verbally asking the researcher for a summary of the findings. A summary of findings will be either posted or emailed to you after the completion of the project.

Data Management

All data will be kept confidential. No material that could personally identify you will be used in any reports on this study. Codes will be used instead of names in the report. The returned questionnaires, consent forms and any other written material will be stored in a locked filing cabinet in a locked room at Massey University. This written material will only be accessed by the researcher and their supervisors. After ten years the data will be destroyed in the Massey University confidential information shredding system.

Audio and video recordings will be transferred from the video or audio recorder onto a password protected computer and the original recording on the video camera will be deleted. All electronic files (video and audio files recordings) will be stored on a password computer and only the researcher or their supervisor will have access to this computer. You have the option of being given a copy of your videos recordings after the programme is completed. You can request this by emailing or verbally asking the researcher for a copy. A copy of these videos will be transferred directly onto your computer or emailed to you after the completion of the project.

All of the information that you provide to the researchers will be kept strictly confidential and will be stored in a locked office at Massey University. Only the researchers will have access to the information.

When the project is finished, the results of the study may be published in journals or presented at conferences; however, the information will not include the names of any of the participants.

The information will be kept for 10 years following the completion of the final publication. When disposed of, the University confidential waste service will be used for printed materials, and audiotapes will be wiped.

There is no conflict of financial interest and the role of the researcher has been considered by the Ethics Committee.

Participant's Rights

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- Ask any questions about the study at any time during participation.
- Provide information on the understanding that your name will not be used.
- Withdraw from the study at any stage (initial questionnaire/ video observation or treatment phase)
- If at any time you or your child feels uncomfortable during the video recording of their mealtime you can ask for the video camera to be turned off.
- You will be given access to a summary of the project findings when it is completed.

Project Contacts

If you would like to participate in this study, or you have any questions please contact me, Deirdre Murray, at [redacted] or my supervisor Elizabeth Doell at E.H.Doell@massey.ac.nz.

Please note: Although I am employed as a Speech-language therapist by Counties Manukau District Health Board, this research is being conducted by me as an individual separate to the organisation.

Massey University Human Ethics Committee (MUHEC) ethics statement:

This project has been reviewed and approved by the Massey University Human Ethics Committee: Northern, Application NOR 17/50. If you have any concerns about the conduct of this research, please contact Dr. Ralph Bathurst, Acting chair, Massey University Human Ethics Committee: Northern, email humanethicsnorth@massey.ac.nz

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Appendix B: Participant Consent Form

Massey University Auckland
Private Bag 102904
North Shore Mail Centre
Auckland 0745

Starting Solids:

Exploring the outcomes of a brief parental educational programme on the introduction of solid foods to infants in New Zealand

PARTICIPANT CONSENT FORM

I have read the Information Sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I understand that all information I give will be kept confidential to the extent permitted by law, and the names of all people in the study will be kept confidential by the researcher. I understand that all video/audio recordings are for data analysis only and will not be shown to the public.

I agree/ do not agree to having me and my infant video recorded during a mealtime

I agree/ do not agree to participating in an individual interview with the researcher following completion of the education programme
I agree/do not agree to having this interview audio recorded

I agree/ do not agree to participate in this study under the conditions set out in the information sheet

I wish/ do not wish to have my video recordings returned to me after the completion of the project.

I wish/ do not wish to have receive a summary of the research projects findings after the completion of the project.

Signature: ..... **Date:** .....

Full Name - printed

.....

Email address: ……

Appendix C: Ethics Approval Letter

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

Date: 12 December 2017

Dear Deirdre Murray

Re: Ethics Notification - **NOR 17/50 - The Healthy Kiwi Programme: Exploring the effectiveness of increasing parental knowledge and responsiveness through a brief educational training on the introduction of complementary foods to infants in New Zealand**

Thank you for the above application that was considered by the Massey University Human Ethics

Approval is for three years. If this project has not been completed within three years from the date of this letter, reapproval must be requested.

If the nature, content, location, procedures or personnel of your approved application change, please advise the Secretary of the Committee.

Yours sincerely

Dr Brian Finch
Chair, Human Ethics Chairs' Committee and Director (Research Ethics)

Research Ethics Office, Research and Enterprise
Massey University, Private Bag 11 222, Palmerston North, 4442, New Zealand **T** 06 350 5573; 06 350 5575 **F** 06 355 7973
E humanethics@massey.ac.nz **W** http://humanethics.massey.ac.nz

Appendix D: Maternal Knowledge Scale

Please tick to show how strongly you agree or disagree with the following statements.

	Disagree	Slightly disagree	Neutral	Slightly Agree	Agree
Question	**1**	**2**	**3**	**4**	**5**
1. It's ok to add cereal to my infant's bottle					
2. Solid foods are not breast milk or formula					
3. Infant's need snacks between meals					
4. Infant's under 6 months old receive all of their daily nutritional requirements from formula or breastmilk					
5. Giving my baby solid food will help them sleep through the night					
6. If my baby is given solid food too early it will pass through their digestive tract without problem					
7. It is ok to offer my infant small amounts of smooth peanut butter and egg when I start giving them solid foods					
8. It is ok to put my baby to bed with a bottle					
9. My baby decided how much he or she wants to eat					
10. I am responsible for deciding what and when my baby eats					
11. It is important for me to understand my baby's temperament as it may affect how they like to feed					
12. I can change my feeding style to better fit my baby's temperament					

13. My baby can clearly show me when they are hungry or full					

Appendix E: Semi-structured Interview Guide

Semi-Structured Interview Guide

Participant number:

- *Tell me about your experience participating in the Healthy Kiwi's programme*
    a. *Try to explore - Which topics and/or activities they found most beneficial?*

- *How easy was it for you to access this programme?*

- *Tell me about any support you had from friends or whanau during the programme.*

- *Can you tell me about something you have done differently or any changes you have made since doing the HKP?*

- *Were there any things that you felt made these changes hard to make?*

- *How did the information and ideas you learned fit with your family values and activities?*

- *How prepared do you feel/ were you for starting to introduce solids to your baby?*

    a. *Try to explore why they feel they way they feel (the impact of self research, family support/advice, the HKP)?*

- *How would other people benefit from this project?*

- *What could we do to improve this programme?*

- *Are there any other comments or feedback you would like to give?*

Do you have any questions for me to pass on to the researcher?

Thank you for your time.

Appendix F: Example of programme resources adapted for New Zealand

My Baby's First Foods

Solid foods for babies

- Baby cereal -Farex
- Juice

- Mashed/pureed fruit and vegetables
- Yogurt

Not solid foods for babies

- Breast milk
- Formula

Health professionals recommend no solid foods before baby is six months old.

When to start feeding solids

Sitting with support

Holding head steady

Eating food from spoon and not pushing food back out with tongue

Opening mouth
for spoon

Reasons Babies Don't Need Solids Until About Six Months

- Solid foods hurt baby's digestive tract (stomach and intestines).
- Solid foods may cause baby to choke.
- Babies given solid food too early may develop allergies or diabetes.
- Giving baby solid food early does not help them sleep through the night.

Common Myths About Solid Foods

✗ Breast milk or formula by itself isn't enough for a big baby.

✗ It won't hurt to give the baby a little bit of cereal.

✗ Babies need cereal to sleep through the night.

Appendix G: IFSQ results

Infant Feeding Style Questionnaire Results

Pre-test																														
Participant Number	Q .1	Q .2	Q .3	Q .4	Q .5	Q .6	Q .7	Q .8	Q .9	Q. 10	Q. 11	Q. 12	Q. 13	Q. 14	Q. 15	Q. 16	Q. 17	Q. 18	Q. 19	Q. 20	Q. 21	Q. 22	Q. 23	Q. 24	Q. 25	Q. 26	Q. 27	Q. 28	Q. 29	Q. 30
1	5	1	4	4	4	4	4	1	1	4	5	5	5	1	1	3	2	2	2	1	1	1	1	4	2	4	2	2	1	1
2	4	1	4	4	4	5	5	3	1	3	4	5	5	5	1	1	4	5	5	4	5	5	1	1	1	1	1	1	3	1
3	5	1	5	1	5	5	5	1	1	5	4	4	5	5	1	1	1	2	5	2	2	5	4	2	4	1	5	2	4	1
4	5	1	4	5	5	5	5	1	3	5	1	1	3	2	3	3	1	4	4	2	2	2	2	4	4	4	2	5	4	1
Post-test																														
Participant Number	Q .1	Q .2	Q .3	Q .4	Q .5	Q .6	Q .7	Q .8	Q .9	Q. 10	Q. 11	Q. 12	Q. 13	Q. 14	Q. 15	Q. 16	Q. 17	Q. 18	Q. 19	Q. 20	Q. 21	Q. 22	Q. 23	Q. 24	Q. 25	Q. 26	Q. 27	Q. 28	Q. 29	Q. 30
1	5	2	3	3	4	4	5	1	1	4	5	5	5	1	1	3	3	3	1	2	1	3	4	4	3	3	2	2	1	1
2	5	1	1	3	5	5	5	1	1	2	5	5	5	4	5	2	1	2	1	2	4	1	1	1	1	1	1	1	1	1
3	1	1	1	5	5	5	5	1	1	5	5	5	5	5	1	1	1	1	5	5	5	5	5	1	1	1	1	1	1	1
4	5	2	3	5	5	5	5	1	5	5	1	3	3	5	2	2	3	5	1	1	1	1	4	3	3	3	4	5	4	1

Key
1 - disagree
2 - slightly disagree
3 - neutral
4 - slightly agree
5 - agree

Pre-Test																									
Participant Number	Q. 31	Q. 32	Q. 33	Q. 34	Q. 35	Q. 36	Q. 37	Q. 38	Q. 39	Q. 40	Q. 41	Q. 42	Q. 43	Q. 44	Q. 45	Q. 46	Q. 47	Q. 48	Q. 49	Q. 50	Q. 51	Q. 52	Q. 53	Q. 54	Q. 55	Q. 56
1	3	1	1	1	1	1	1	1	1	1	3	3	2	2	4	4	4	4	4	4	2	2	2	3	2	2
2	4	4	1	4	5	1	4	1	1	2	1	2	1	5	5	5	5	5	5	1	1	1	1	1	1	1
3	1	1	3	3	4	1	4	4	4	1	5	4	5	5	5	5	5	1	1	1	1	1	1	1	1	1
4	3	1	1	1	1	1	4	5	5	3	2	2	1	2	4	4	4	5	5	3	1	5	3	3	1	3
Post-Test																										
Participant Number	Q. 31	Q. 32	Q. 33	Q. 34	Q. 35	Q. 36	Q. 37	Q. 38	Q. 39	Q. 40	Q. 41	Q. 42	Q. 43	Q. 44	Q. 45	Q. 46	Q. 47	Q. 48	Q. 49	Q. 50	Q. 51	Q. 52	Q. 53	Q. 54	Q. 55	Q. 56
1	1	1	1	1	1	1	1	1	2	4	3	2	5	4	5	5	5	5	5	5	5	1	1	1	1	1
2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	5	5	5	5	5	5	1	1	1	1	1	1
3	1	1	1	1	1	1	1	5	1	1	1	5	1	1	5	5	5	5	5	5	1	1	1	1	1	1
4	1	1	1	1	5	1	1	3	3	3	1	1	1	1	5	5	4	4	4	4	3	1	3	3	3	1

Pre-Test																											
Participant Number	Q. 56	Q. 57	Q. 58	Q. 59	Q. 60	Q. 61	Q. 62	Q. 63	Q. 64	Q. 65	Q. 66	Q. 67	Q. 68	Q. 69	Q. 70	Q. 71	Q. 72	Q. 73	Q. 74	Q. 75	Q. 76	Q. 77	Q. 78	Q. 79	Q. 80	Q. 81	total /405
1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	3	3	3	3	3	2	2	2	3	3	3	3	296
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	344
3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	326
4	3	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	4	1	1	1	4	1	1	320
Post-Test																											
Participant Number	Q. 56	Q. 57	Q. 58	Q. 59	Q. 60	Q. 61	Q. 62	Q. 63	Q. 64	Q. 65	Q. 66	Q. 67	Q. 68	Q. 69	Q. 70	Q. 71	Q. 72	Q. 73	Q. 74	Q. 75	Q. 76	Q. 77	Q. 78	Q. 79	Q. 80	Q. 81	total /405
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	331
2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	365
3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	389
4	1	3	1	1	1	4	1	1	1	4	2	1	1	1	1	1	1	1	3	1	1	4	1	1	1	4	313

Appendix H: Maternal Knowledge Scale Results

Maternal Knowledge Scale Results

Pre- test														
Participant Number	Q.1	Q.2	Q.3	Q.4	Q.5	Q.6	Q.7	Q.8	Q.9	Q.10	Q.11	Q.12	Q.13	Total
1	1	5	3	4	1	1	3	1	4	2	4	4	4	53
2	1	5	4	5	3	1	5	1	5	1	5	5	3	56
3	2	5	5	5	4	1	4	1	5	4	5	5	5	55
4	1	5	5	2	5	2	5	1	5	5	3	5	3	53
Post-test														
Participant Number	Q.1	Q.2	Q.3	Q.4	Q.5	Q.6	Q.7	Q.8	Q.9	Q.10	Q.11	Q.12	Q.13	Total
1	1	5	5	5	1	1	4	1	5	3	5	5	5	62
2	1	5	5	5	3	1	5	1	5	5	5	5	2	60
3	1	5	5	5	1	1	1	1	5	5	5	5	5	60
4	1	5	5	5	3	2	1	1	5	5	3	3	4	53

Key
1 = disagree
2 = slightly disagree
3 = neutral
4 = slightly agree
5 = agree

Appendix I: Responsiveness to Infant Feeding Cues Scale Results

Maternal Results

Participant	caregiver pace of feeding	caregiver general visual attentiveness to infant during feed	caregiver general visual attentiveness to infant hunger cues	caregiver general visual attentiveness to infant receptiveness cues	caregiver general visual attentiveness to infant fullness cues	caregiver s affect	proportion of mother's positive expressiveness during feed
1- pre	3 evenly paced	no observed	6 not observed	4 fairly attentive	6 not observed	2 balanced	3 somewhat expressive
1-post	2 a little slow	4 fairly attentive	6 not observed	4 fairly attentive	6 not observed	3 positive	5 very positive
2-pre	3 evenly paced	5 very attentive	6 not observed	5 very attentive	4 fairly attentive	2 balanced	4 fairly positive
2- post	3 evenly paced	5 very attentive	6 not observed	5- very attentive	6 not observed	3 positive	3 somewhat expressive
3-pre	3 evenly paced	3 somewhat attentive	6 not observed	4 fairly attentive	6 not observed	3 positive	4 fairly positive
3-post	3 evenly paced	4 fairly attentive	6 not observed	4 fairly attentive	4 fairly attentive	3 positive	4 fairly positive
4-pre	3 evenly paced	4 fairly attentive	6 not observed	4 fairly attentive	6 not observed	3 positive	4 fairly positive
4-post	3 evenly paced	4 fairly attentive	6 not observed	4 fairly attentive	3 somewhat attentive	3 positive	4 fairly positive

Participant	proportion of mother's negative expressiveness	caregiver's physical disposition	caregiver proximity	caregiver responsiveness to infant hunger cues	caregiver responsiveness to infant responsivity cues	caregiver responsiveness to infant fullness

	during feed					cues
1- pre	1 not at all	5 very relaxed	1 within arm's reach	6 not observed	4 fairly responsive	6 not observed
1-post	1 not at all	5 very relaxed	1 within arm's reach	6 not observed	3 moderately responsive	6 not observed
2-pre	1 not at all	4 fairly relaxed	1 within arm's reach	6 not observed	5 highly responsive	2 unresponsive
2- post	1 not at all	4 fairly relaxed	1 within arm's reach	6 not observed	5 highly responsive	6 not observed
3-pre	1 not at all	5 very relaxed	1 within arm's reach	6 not observed	5 highly responsive	6 not observed
3-post	1 not at all	5 very relaxed	1 within arm's reach	6 not observed	5 highly responsive	6 not observed
4-pre	1 not at all	4 fairly relaxed	1 within arm's reach	2 unresponsive	4 fairly responsive	6 not observed
4-post	1 not at all	4 fairly relaxed	1 within arm's reach	6 not observed	4 fairly responsive	6 not observed

Infant results

Participant	strength of early/subtle hunger cues	strength of positive active hunger cues	strength of negative active hunger cues	the presence of late hunger cues prior to the infant being aware food is coming	strength of early/subtle fullness cues	strength of positive active fullness cues	strength of negative active fullness cues	the presence of late fullness cues prior to the infant being aware food is coming
1- pre	6 not observed	6 not observed	6 not observed	6 not observed	5 strong	5 strong	1 not apparent	0 absent
1-post	6 not observed	6 not observed	6 not observed	1 present	6 not observed	6 not observed	6 not observed	6 not observed
2-pre	6 not observed	6 not observed	6 not observed	6 not observed	4 strong	3 moderate	1 not apparent	1 present
2- post	6 not observed	6 not observed	6 not observed	6 not observed	6 not observed	6 not observed	6 not observed	6 not observed
3-pre	6 not observed	6 not observed	6 not observed	6 not observed	6 not observed	6 not observed	6 not observed	6 not observed
3-post	6 not observed	6 not observed	6 not observed	6 not observed	6 not observed	6 not observed	6 not observed	6 not observed
4-pre	6 not observed	6 not observed	6 not observed	1 present	6 not observed	6 not observed	6 not observed	6 not observed
4-post	6 not observed	6 not observed	6 not observed	0 absent	4 strong	3 moderate	1 not apparent	0 absent

Participant	infant's receptiveness to feeding	infants feeding engagement	infant's visual attentiveness	infants affect	proportion of infant's positive expressiveness during feed	proportion of infant's negative expressiveness during feed
1- pre	5 extremely receptive	5 very engaged	6 not observed	2 balanced	3 intermittently	1 not at all
1-post	3 moderate	4 fairly engaged	3 somewhat attentive	2 balanced	3 intermittently	3 intermittently
2-pre	3 moderate	5 very engaged	6 not observed	2 balanced	6 not observed	6 not observed
2- post	2 weak	2 not very engaged	4 fairly attentive	2 balanced	2 rarely	2 rarely
3-pre	5 extremely receptive	5- very engaged	5 very attentive	3 positive	4 mostly	1 not at all
3-post	3 moderate	4 fairly engaged	5 very attentive	3 positive	4 mostly	1 not at all
4-pre	3 moderate	4 fairly engaged	5 very attentive	2 balanced	2 rarely	2 rarely
4-post	2 weak	4 fairly engaged	3 somewhat attentive	2 balanced	3 intermittently	2 rarely

Participant	infants' physical disposition during feed	adequate head support	straight alignment	adequately and appropriately supported during feed	percentage of time infant fed themselves during feed
1- pre	5 very relaxed	5 always	5 always	5 always	1 completely fed by caregiver
1-post	4 fairly relaxed	999 not applicable	999 not applicable	5 always	1 completely fed by caregiver
2-pre	4 fairly relaxed	5 always	5 always	5 always	1 completely fed by caregiver
2- post	3 somewhat relaxed	5 always	5 always	5 always	1 completely fed by caregiver
3-pre	5- very relaxed	5 always	5 always	5 always	1 completely fed by caregiver
3-post	5- very relaxed	5 always	5 always	5 always	1 completely fed by caregiver
4-pre	4 fairly relaxed	5 always	5 always	5 always	1 completely fed by caregiver
4-post	4 fairly relaxed	5 always	5 always	5 always	1 completely fed by caregiver

Additional environmental results

Participant	tv or other distractions present	interruptions during the feed	any procedural problems
1- pre	1 yes (tv on)	2 no	2 no
1-post	2 no	1 yes (cat moving around)	2 no
2-pre	2 no	2 no	2 no
2- post	2 no	2 no	2 no
3-pre	2 no	1 yes (visitors arrived)	2 no
3-post	2 no	2 no	2 no
4-pre	2 no	1 yes (visitors arrived)	2 no
4-post	2 no	2 no	2 no

Appendix J: Consent from Mildred Horodynski to utilise the Healthy Babies Curriculum

Feb 28th 2017

Dear Ms. Murray,

Thank you for your email and interest in our work with infants in promoting healthy eating habits early in the reduction of childhood obesity. Yes, you may use resources that we have developed. You may access them on line by going to the following link:

Http://www.nursing.msu.edu/Research/ResearchProducts/HealthBabies.htm

There you can click on the link

Just one word of caution –we have not updated to include the new APA guidelines regarding the earlier introduction of peanut butter to young children that has just come out this year.

Wishing you most success in your endeavor.

Sincerely
Dr. Millie Horodynski

Mildred A. Horodynski, PhD, RN, FAAN
Professor
Michigan State University
College of Nursing
Life Science
1355 Bogue St., Room #C244
East Lansing, MI 48824-1317
Phone: (517) 355-8360 | Fax: (517) 355-5002