

**DEVELOPMENT AND EVALUATION OF AN
INTERVENTION TARGETING PARENTING
PRACTICES ASSOCIATED WITH OBESITY-
RELATED BEHAVIOURS IN YOUNG
CHILDREN ATTENDING PLAYGROUP**

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Autonomy promoting, eating behaviours, intervention, obesity prevention, obesity-related behaviours, parenting practices, parenting styles, parents, physical activity, playgroup, screen time, self-determination theory, social cognitive theory, sleep, young children

Abstract

Introduction

The importance of early prevention to tackle the current obesity epidemic cannot be overstated. As such, interventions need to focus on the obesity-related behaviours of young children before unhealthy norms are established in respect to diet/eating, screen time, physical activity, and sleep. Parents are the greatest influencers of their child's behavioural development, so it is prudent to target parenting practices associated with these behavioural domains. Further, there is evidence that autonomy promoting parenting practices play a major part in the development of self-regulation, and the internalisation of healthy behaviours, in early childhood. Barriers and facilitators to parents using autonomy promoting parenting practices need to be considered when designing interventions, particularly in respect to the target population.

Parents, parent-child dyads, and families have all been targeted in obesity prevention interventions in a range of settings, often in early childhood education and health service delivery settings. Interventions generally target one or more of the obesity-related behaviours, although few have targeted all four behaviours (i.e. eating, physical activity, screen time, and sleep), particularly in respect to the associated parenting practices. In addition, most are delivered by researchers or health professionals. There is minimal evidence of interventions delivered to existing parent groups, in particular community playgroups. Community playgroups are parent groups where parents and their children meet for social interaction, play, and support. The aim of this research was to 1) identify the barriers and facilitators to parents using autonomy promoting parenting practices and, 2) develop and evaluate an obesity-prevention intervention delivered to parents of young children in a community playgroup setting.

Methodology

The research was conducted in two main phases. The first was formative research, using intervention mapping and a qualitative research methodology, to develop an obesity-prevention intervention to be delivered to parents in playgroups. The second phase was to evaluate the feasibility, acceptability, and potential efficacy

of the intervention, using a mainly quantitative methodology. The intervention was tested in two randomised controlled trials. The conceptual framework for the research was based Self-Determination Theory and Social Cognitive Theory, specifically autonomy promoting parenting practices and parental self-efficacy. Prior to the commencement of the research a formal partnership was established with Playgroup Queensland, the State’s largest provider of playgroup services.

Focus groups – methods and results

For the formative research, focus groups were conducted with parents at community playgroups across Brisbane. The aims were to 1) identify barriers and facilitators for parents of children aged 0-5 years in respect to using autonomy promoting parenting practices, and 2) to explore parent preferences in respect to an intervention to be delivered at playgroup. The focus group transcripts were coded and analysed using both deductive and inductive qualitative content analysis.

Five focus groups were conducted in May 2018 with 30 parents (including 27 mothers). At the focus groups, participants discussed their challenges of being a parent, particularly in respect to parenting practices around child eating, screen time and sleep. Barriers were mainly in respect to feeling stressed, frustrated, tired or time-poor. As a result, parents often used inappropriate strategies in the moment of feeling stressed. They discussed using iPads® or TV to soothe or distract the child, and relying on “bribing” with chocolate or dessert in an effort to get the child to eat vegetables. Parents also generally felt that they were powerless to influence physical activity or sleep behaviours. Parents attended playgroup for socialisation for themselves and their children. The support and guidance from their peers at playgroup was a facilitator to autonomy promoting parenting practices. Parents were open to a program at playgroups that would provide strategies to help them with their parenting challenges. However, they were unsure how a program could fit into the busy, noisy playgroup environment.

Intervention development – methods and results

The intervention was developed using an Intervention Mapping protocol. The focus groups results, in conjunction with the evidence around autonomy promoting parenting practices, and input from Playgroup Queensland, were used by the intervention planning team to develop the “Supporting Parents at Playgroup Program”.

The intervention closely followed the preferences of the focus group participants for a program that was brief and informal, and flexible and unstructured enough to fit into the busy playgroup environment. The intervention delivery model used the concept of “healthy conversations” conducted by a peer facilitator, and the “signposting” strategy of providing links to online resources relevant to the topic after each session. The intervention consisted of five sessions and was designed to run fortnightly over the 10 weeks of a school term. Each session consisted of two brief group conversations addressing a child healthy behaviour: 1) mealtime challenges; 2) active play and movement; 3) limiting screens; 4) sleep routines, and Session 5 being a re-cap of the key messages. The facilitated discussions aimed to generate ideas for parenting strategies to deal with challenges around each of these topics. The facilitator guided the group to come up with ideas that aligned with autonomy promoting parenting practices and encouraged each parent to choose and implement a strategy at home.

Trial 1 – methods and results

In the first trial, the intervention was delivered by volunteer parent facilitators from each playgroup recruited to take part in the study. The volunteer facilitators received four hours of training on intervention content and group facilitation skills. After randomisation, playgroups in the intervention arm received the intervention immediately, and the wait-list controls received the intervention in the following term. Outcomes measured at baseline and post-intervention included parental self-efficacy and autonomy promoting parenting practices in respect to eating, screen time, physical activity, and sleep. Feasibility and acceptability were evaluated via post-session surveys.

Nine playgroups (35 parents) took part in the first trial (intervention n=22; wait-list control n=13). However, at least another 12 playgroups expressed an interest but were unable to provide a parent to volunteer as facilitator, and three of the five intervention playgroups withdrew from the study. The results of the trial showed that the intervention was acceptable but that the volunteer peer facilitator model was not feasible. Despite the limitations in the study design, there were positive indications of intervention impact on autonomy promoting parenting practices, in particular small-to-medium effect sizes for modelling of physical activity ($d=0.42$; $p=0.25$), verbal encouragement for physical activity ($d=0.37$; $p=0.31$), and use of screen time to control child behaviour ($d=0.41$; $p=0.26$). There was also a small positive intervention effect

observed for overall parental self-efficacy ($d=0.21$; $p=0.55$), driven mainly by self-efficacy for promoting physical activity ($d=0.34$; $p=0.32$).

Trial 2 – methods and results

A second trial was conducted, removing the need for playgroups to provide a volunteer parent as facilitator. Instead, two external facilitators, with experience in the challenges faced by parents of young children and in group facilitation, were recruited to deliver the intervention. Parental self-efficacy was measured at baseline and post-intervention, and feasibility and acceptability were evaluated via post-session surveys.

Twenty-four playgroups (184 parents) took part in the study evaluation (intervention $n=90$; wait-list control $n=94$). The results showed that the intervention was both feasible and acceptable with the external peer facilitator model. Just over 74% of the parents receiving the intervention were satisfied or very satisfied with the group conversations, and 68% rated the overall program to be useful or very useful. A statistically significant small effect size was observed for parental self-efficacy for promoting intake of fruit and vegetables ($d=0.39$; $p=0.03$), and there was a positive trend for limiting intake of unhealthy food and screen time and promoting physical activity.

Conclusion and implications for further research

A brief intervention targeting obesity-related behaviours in families attending community playgroups is feasible and acceptable. The peer-led “healthy conversations” delivery model, and the leveraging of existing social support networks, were important and novel aspects of the intervention. Parents enjoyed taking part in the intervention, and there were indications of intervention effect. The community playgroup setting is feasible and worthy of further intervention testing in a fully powered trial. The partnership already established with the state’s lead playgroup organisation and the sustainable factors within the intervention itself mean that the intervention has potential to be delivered at scale.

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List of Publications

Publication arising directly from thesis:

Fuller, A. B., Byrne, R. A., Golley, R. K., & Trost, S. G. (2019). Supporting healthy lifestyle behaviours in families attending community playgroups: Parents' perceptions of facilitators and barriers. *BMC Public Health*, *19*(1), 1740. <https://doi.org/10.1186/s12889-019-8041-1>

Conference oral presentation:

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Conference poster presentation

Fuller, A. B., Byrne, R. A., Golley, R. K., & Trost, S. G. Development of a parenting intervention at community-based playgroups targeting obesity-related behaviours: what parents want. 18th Annual Meeting of the International Society of Behavioural Nutrition and Physical Activity, Prague, Czech Republic. 2019.

Conference pre-recorded presentation*

Fuller, A. B., Byrne, R. A., Golley, R. K., Hesketh, K. D. & Trost, S. G. A peer-led intervention targeting obesity-related behaviours and delivered to parents at community-based playgroups is both feasible and acceptable. 19th Annual Meeting of the International Society of Behavioural Nutrition and Physical Activity, Auckland, New Zealand, 2020.

* The 2020 ISBNPA conference was cancelled due to COVID-19. The accepted late breaking abstract was upgraded to a video presentation for ISBNPA XChange (online Annual Meeting that replaced the cancelled conference).

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List of Abbreviations

BMI	Body Mass Index
CBPR	Community-based Participatory Research
CDC	Centre for Disease Control
CHANCE	Collaboration for Health, Activity and Nutrition in Children's Environments
CHILE	Child Health Initiative for Lifelong Eating and Exercise
CHL	Communities for Healthy Living
CP1	Primary Contact Person (volunteer parent leading a community playgroup)
EM	Electronic Media
HCHF	Healthy Children, Healthy Families
HENRY	Health Exercise Nutrition for the Really Young
InFANT	Infant, Feeding, Activity, and Nutritional Trial
INSIGHT	Intervention Nurses Start Infants Growing on Healthy Trajectories
IOTF	International Obesity Task Force
MCHC	Maternal and Child Health Centre
MEND	Mind, Exercise, Nutrition... Do it!
MVPA	Moderate to Vigorous Physical Activity
NAFLD	Non-Alcoholic Fatty Liver Disease
NEAT	Nutrition Education Aimed at Toddlers
PA	Physical Activity
POI	Prevention of Overweight in Infancy
PSE	Parental Self-Efficacy

PTT	Parents and Tots Together
REFERESH	Reminder on Food, Relaxation, Exercise and Support for Health
RCT	Randomised Controlled Trial
SCT	Social Cognitive Theory
SDT	Self-Determination Theory
SMARTER (goals)	Specific, Measurable, Action-oriented, Realistic, Timed, Evaluated, Reviewed
SPG	Supported Playgroup
SSB	Sugar-Sweetened Beverages
TV	Television
UCLA	University of California, Los Angeles
WIC	Women, Infants and Children
WHO	World Health Organisation

Statement of Original Authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Signature: [QUT Verified Signature](#)

Date: _____ 9th October 2020 _____

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Chapter 1: Introduction

1.1 BACKGROUND

It is universally agreed that the prevalence of overweight and obesity in Australia, and globally, is at unacceptable levels (World Health Organisation, 2019). It is also clear that the key to tackling the problem is prevention. While there are numerous biopsychosocial factors associated with obesity risk (Russell & Russell, 2019), self-regulation of behaviour in respect to eating, screen time, physical activity and sleep plays a major part (Calkins, 2007). Obesity-related behaviours are established in the early years of life, so this is where prevention must be focussed. Targeting parents and their parenting practices in respect to the four child behavioural domains is therefore essential when designing healthy lifestyle interventions. It is parents who provide food for their child, provide opportunities for active play, and set rules and limits around meal time, screen time and bed time. It is parents who provide the social environment for children to develop self-regulation (Ryan & Deci, 2017a).

A wide variety of obesity prevention interventions that target children under the age of 5 years and/or their parents in a range of settings have been developed and evaluated (Brown et al., 2007). There are interventions in the home, community venues, child health clinics, childcare centres, and preschools. There are programs that provide anticipatory guidance to parents of infants (Daniels et al., 2015). Others aim to change child behaviours in pre-schoolers, focus on the home food environment, or support families to limit screen time and increase physical activity (Bell & Golley, 2015; van de Kolk et al., 2019). Parental self-efficacy is one of the keys to behaviour change (Grossklous & Marvicsin, 2014), and many programs aim to increase this in tandem with increasing participants' knowledge around authoritative parenting practices and eating and activity guidelines. However, obesity prevention interventions, internationally and in Australia, have produced mixed results in respect to changing parenting practices and/or influencing child health behaviour outcomes. Importantly, many that show results of intervention impact have not been evaluated using a randomised controlled trial study design. In addition, despite the wide variety of settings across the obesity prevention intervention research, there is a gap in the literature in respect to interventions delivered to parent groups with existing social

networks. Peers, with a shared lived experience can offer suggestions when other parents of young children are struggling with the many demands of parenting, or are looking for strategies to manage eating, screen time, activity and sleep behaviours. In Australia, interventions have been delivered at new-parent groups and Supported Playgroups, but the community playgroup setting is under-explored.

Interventions often use a theoretical framework based on ecological theories (Skelton et al., 2012) or Social Cognitive Theory (Bandura, 1986). There is a lack of interventions with a strong focus on Self-Determination Theory (SDT) (Ryan & Deci, 2017a). It is important to incorporate SDT into the theoretical framework of interventions that target child behaviours via parenting practices because the parenting constructs of autonomy support, structure, and involvement are strongly linked to the development of self-regulation in children (Ryan & Deci, 2017a). Many interventions use some SDT constructs by focussing on parenting practices such as responsive feeding or providing rules and limits in the home environment, but few make full use of the theory, particularly in addressing parenting practices across all child health behaviours.

This thesis evaluates an intervention developed from focus groups with parents at community playgroups (Fuller et al., 2019). The intervention targeted parents of children under the age of 5 years, and aimed to increase parental self-efficacy in respect to the use of autonomy promoting parenting practices. The intervention applied a novel peer facilitation of “healthy conversations” approach to the program delivery. There is emerging research in respect to the use of peers to support health behaviour change, but few group interventions have explored this delivery mode. Likewise, there is lack of evidence in the use of the “healthy conversation” concept in a group setting. “Healthy conversations” is a counselling technique used primarily by health practitioners to support the client in making changes to health behaviours (Barker et al., 2011). Its principles of helping people to identify their own priorities, barriers, solutions, and goals via open questions and supportive listening were applied to facilitated group discussions for this intervention. The intervention was also designed to maximise the social support at playgroup. The results from the evaluation of the intervention can be used to inform further healthy lifestyle interventions in the community playgroup setting and ultimately add to obesity prevention intervention research.

1.2 RESEARCH AIMS AND RESEARCH QUESTIONS

1.2.1 Aims

The aim of the research was to:

- investigate the barriers and facilitators to parents promoting healthy behaviours in their child/ren; and
- develop and evaluate the acceptability, feasibility, and potential efficacy of a multi-behaviour obesity prevention intervention for parents of young children attending community playgroups.

1.2.2 Research questions

1. What are the barriers and facilitators for parents in respect to using parenting practices that encourage the development of healthy obesity-related behaviours in their child?
2. What do parents want in a parenting support and early childhood lifestyle program at playgroup?
3. Is a child obesity prevention intervention for parents attending playgroup feasible and acceptable when delivered in the community playgroup environment?
4. Can a healthy lifestyle intervention targeting parents attending community playgroup be effective in increasing parental self-efficacy in respect to autonomy promoting parenting practices?
5. Can a healthy lifestyle intervention targeting parents attending community playgroup be effective in improving parenting practices that support healthy development of obesity-related behaviours in young children?

1.3 THESIS OUTLINE

The thesis consists of seven chapters, with distinct chapters for each of three studies (focus group study, intervention trial 1 and intervention trial 2) and including a chapter dedicated to the intervention design process. The next chapter is a review of the literature in respect to the prevalence, health outcomes and parent perceptions of childhood overweight and obesity; obesity-related behaviours in young children; parenting influences on those behaviours; and the main theories associated with

obesity prevention in young children. The review then critiques the literature regarding community-based obesity prevention interventions that target parents of young children. Throughout this thesis, the term “young children” refers to children under the age of 5 years. More specifically, infant refers to a child under 12 months old, a toddler is a child aged 12-24 months, and a pre-schooler generally means a child aged 2-4 years.

Chapter 3 is an edited extract from the publication arising from the focus study. As such, the chapter discusses the focus groups that were conducted as part of the formative research for intervention development, including the methodology and results of the discussions with parents at playgroups. Chapter 4 describes the intervention design using the Intervention Mapping framework. This includes how the intervention was developed using the focus group results, literature review, theoretical framework, and a planning day. The intervention delivery and content are also detailed in this chapter.

Chapters 5 and 6 describes the methodology, evaluation methods, results, and discussion of the outcomes of the two pilot trials of the intervention. Both trials used a peer facilitation delivery model. Chapter 5 (Trial 1) used volunteer facilitators from each playgroup taking part in the trial and Chapter 6 (Trial 2) recruited external peer facilitators experienced in group facilitation. Chapter 7 summarises the findings from the focus groups and the two trials in the context of answering the research questions. It also discusses the strengths and weaknesses of the thesis overall, and provides implications for practice and for future research, particularly the proposed modifications to the intervention and evaluation methods in preparation for a fully powered trial. A bibliography completes the thesis. Appendices include additional literature review tables, participant information sheets and consent forms, and examples of the evaluation instruments. An additional appendix of written comments from control group volunteer facilitators in the first trial is also included.

Chapter 2: Literature Review

2.1 OVERWEIGHT AND OBESITY

2.1.1 Definition and measurement of overweight and obesity

Overweight and obesity are defined as “abnormal or excessive fat accumulation that may impair health” (World Health Organisation, 2019). Overweight occurs as a result of an energy imbalance between energy (kilojoules) in and energy out. Therefore, the major reasons for the global obesity epidemic is the increase in intake of energy-dense foods high in fat and the decrease in physical activity (World Health Organisation, 2017). For children, Body Mass Index (BMI) or weight-for-length/stature growth charts are used to determine the weight category according to the child’s sex and age. Growth charts have been developed by the World Health Organisation (WHO) (World Health Organisation, 2006), the United States Centres for Disease Control and Prevention (CDC) (USA Centres for Disease Control and Prevention, 2017), and the International Obesity Task Force (IOTF) (Cole et al., 2000; Cole & Lobstein, 2012).

The WHO growth charts are standards developed using growth data from over 8,000 healthy breastfed infants from several countries and ethnicities (World Health Organisation, 2006). Weight status using these standards is determined by plotting the weight-for-height z-score on the growth chart. If the z-score is equal to or greater than 2 standard deviations (SD) from the mean, then the child is classified as overweight. A z-score equal to or greater than 3 SD from the mean is classified as having obesity (World Health Organisation, 2006). The CDC growth charts are growth references, based on a reference population in the USA, and were developed using data from several national health surveys (Kuczmarski et al., 2002). The BMI-for-age charts use percentiles whereby the 50th percentile equates to the median value of the reference population (USA Centres for Disease Control and Prevention, 2017). A value greater than or equal to the 85th percentile is considered overweight, and a value equal to or greater than the 95th percentile classifies the child as having obesity (National Health and Medical Research Council, 2013b). In Australia, in the clinical setting, the WHO reference standards are generally used for determining the weight status in children up

to 2 years of age, and the CDC charts for children aged 2-18 years (National Health and Medical Research Council, 2013b).

For population-based overweight and obesity assessments of children aged 2-18 years in Australia, and in many international studies, the IOTF overweight and obesity cut-off points by age are used (Cole et al., 2000; Cole & Lobstein, 2012). These cut-offs were developed in 2000 by the IOTF and further refined in 2012, using international survey data from six studies totalling around 200,000 children and adults under 25 years (Cole et al., 2000; Cole & Lobstein, 2012). They provide an equivalent BMI by age (in 6 months increments) for boys and girls to the adult healthy weight cut-off of 25kg/m² and overweight cut-off of 30kg/m², allowing children to be categorised as overweight or as having obesity according to their age and sex (Cole & Lobstein, 2012). However, the WHO still use their own growth standards for childhood overweight and obesity prevalence figures published on their website (World Health Organisation, 2019). As a result of these different methods and cut-offs for defining overweight and obesity in children in different settings, prevalence figures for overweight and obesity in a population may vary depending on which growth reference, standard or cut-off is used (Pattinson et al., 2017). As such, care must be taken when comparing and applying overweight and obesity prevalence data (Pattinson et al., 2017).

2.1.2 Prevalence and cost of overweight and obesity in Australia

Globally, 42 million children under the age of 5 years were living with overweight or obesity in 2015 (UNICEF et al., 2016). In Australia, according to the 2014-2015 National Health Survey, 11.3% of children aged 2-4 years were overweight and 8.7% had obesity (total overweight and affected by obesity 20.0%), and the prevalence figures increase with each age group and into adulthood (Australian Bureau of Statistics, 2015). There is no national data on overweight and obesity in children under the age of 2 years, but data from two Australian intervention trials (n=290) that was interpreted using the WHO growth standards, found 5% of children aged 12-16 months were already overweight (Byrne et al., 2016). In Australia, 63% of adults are overweight or have obesity (Australian Bureau of Statistics, 2015).

The total cost of obesity in Australia has been estimated at \$58 billion (Australian Institute of Health and Welfare, 2014). In terms of healthcare costs associated with overweight and obesity in children aged under 5 years, there is minimal

research in this area (Hayes et al., 2016). However, a study conducted in Sydney between 2011 and 2014, analysed the healthcare costs of 350 children aged 2-4 years. The cost of healthcare for children in the overweight category was similar to healthy weight children, but the costs for children with obesity were 1.62 times that of healthy weight children (Hayes et al., 2016). Most of the additional cost was attributable to hospital costs, and generally associated with diseases and disorders of the ear, nose, mouth and throat, respiratory disorders, digestive system disorders, and musculoskeletal conditions (Hayes et al., 2016). Another study, that analysed non-hospital Medicare costs (medical and pharmaceutical), found that overweight and obesity in the 4-5 year-old age group was associated with significantly higher health care costs (Au, 2012). Medical costs of children with overweight or obesity were an average of \$87 (10%) higher than healthy weight children, and pharmaceuticals were an average of \$35 (59%) higher (Au, 2012).

2.1.3 Health outcomes for children with obesity and tracking into adulthood

Obesity can impact multiple organ systems, and therefore children with obesity are at a higher risk of several diseases and disorders than their healthy weight peers (Daniels, 2009). A systematic review of 47 Australian studies found that comorbidities often associated with childhood obesity include cardio-metabolic diseases, obstructive sleep apnoea, non-alcoholic fatty liver disease (NAFLD), asthma, and musculoskeletal pain (Sanders et al., 2015). Cardio-metabolic risk factors include hypertension, dyslipidaemia, hyperglycaemia, and markers for systemic inflammation (Sanders et al., 2015). The study authors noted that there were limitations with many of the studies (29 were cross-sectional and 12 relied on non-clinical reports of comorbidities) (Sanders et al., 2015). However, the findings of the cardio-metabolic and NAFLD risks, in particular, were consistent across the studies (Sanders et al., 2015). For example, a cross-sectional study of 283 Australian children aged 6-13 years (105 overweight or with obesity; 178 healthy weight) found significantly higher rates of hypertension, impaired glucose tolerance, hyperinsulinism, and elevated alanine transaminase (liver function enzymes) in the children affected by overweight/obesity (Bell et al., 2011). The same Australian study identified that musculoskeletal pain, especially in knees, was common in children with overweight (1.3 times) or with obesity (3.0 times) children compared to children of healthy weight (Bell et al., 2011). This result is further supported by a systematic review of studies that examined the

association between musculoskeletal complaints and overweight/obesity in children (Paulis et al., 2014).

As a result of societal weight stigma, children who have obesity may also experience lower health-related quality of life, mental health issues (for example, anxiety and depression), lower self-esteem, and be victims of bullying (Pulgarón, 2013; Sanders et al., 2015). An Australian study of 158 children of healthy weight and 27 children with obesity aged 8-13 years found associations between increasing obesity and depressive symptoms, with young girls at a higher risk of depression than boys of the same age (Gibson et al., 2008). There is also a clustering of psychosocial problems in children affected by overweight or obesity children, further adding to the significance of the issue (Gibson et al., 2008).

Children with overweight or obesity are at least double the risk of becoming overweight or being affected by obesity as adults than healthy weight children (Singh et al., 2008). Once an adult has obesity and associated co-morbidities, it becomes more difficult to address, so prevention of obesity is key to tackling the obesity epidemic (Lobstein et al., 2004). The potential health consequences of obesity in adulthood include cardiovascular diseases, Type 2 diabetes, NAFLD, asthma, obstructive sleep apnoea, musculoskeletal disorders (particularly osteoarthritis), polycystic ovarian syndrome, and some cancers (for example, breast, ovarian, prostate, liver, and colon) (Llewellyn et al., 2016).

2.1.4 Parental perceptions of overweight

One of the challenges for obesity prevention intervention planners and promoters is that often parents do not perceive their child at risk of obesity, even when the child is overweight (Lundahl et al., 2014; Slater et al., 2009). Parents of younger children are less likely to perceive their child as overweight, and even if parents do recognise their child as overweight, they often do not see it as a health risk (Townes & D'Auria, 2009). One possible reason for this is the media stereotype of a “severely overweight child”, whereby parents do not identify with the stereotype when comparing their own child (Campbell et al., 2006; Slater et al., 2009). In addition, some parents have stated that if their child has a healthy appetite and eats healthy foods (in addition to unhealthy, energy-dense foods) then they do not see weight as an issue (Jain et al., 2001). It is also common for parents to believe that intervention is not required unless/until their child is overweight (Townes & D'Auria, 2009). These findings are consistent with other

studies conducted in Australia (Byrne et al., 2016; Campbell et al., 2006; Crawford et al., 2006; Merema et al., 2016; Spargo & Mellis, 2014). However, regardless of whether a child is currently overweight, many behaviours established during childhood are associated with later obesity risk. These behaviours are now discussed.

2.2 OBESITY RELATED BEHAVIOURS IN YOUNG CHILDREN

Although childhood obesity tracks into adulthood, and adults with obesity are at increased risk of many chronic diseases, childhood overweight does not appear to be, in itself, a risk factor in adult ill health (Llewellyn et al., 2016; Park et al., 2012). Rather, it is the behaviours established in childhood that increase the risk of adult obesity, and associated morbidities (Craigie et al., 2011). Children who fail to meet guidelines in respect to eating and activity behaviours are at increased risk of overweight and obesity in adulthood, even if they are of healthy weight status in childhood (World Health Organisation, 2017). Therefore, interventions that target child obesity-related behaviours should target all children, not just those who are overweight or who have obesity (Llewellyn et al., 2016).

The following sub-sections will discuss the guidelines for each of the four obesity-related behaviours for young children, and whether Australian children are meeting those guidelines and recommendations.

2.2.1 Diet and eating behaviours

Excessive consumption of energy-dense, high sugar and/or fat foods and beverages that contain low levels of fibre increase the risk of overweight and obesity in children and adults (National Health and Medical Research Council, 2013a; Ritchie et al., 2005). The consumption of nutrient-poor, high-caloric foods in young children sets up an eating pattern that greatly increases the risk of overweight or obesity in later childhood and/or adulthood (National Health and Medical Research Council, 2013a). The WHO has identified “free sugars”¹ of specific concern to obesity risk, and recommends that free sugars should ideally be less than 5% of total energy intake in both adults and children (World Health Organisation, 2015). Eating behaviours of

¹ “Free sugars” is defined by WHO as “monosaccharides and disaccharides added to foods and beverages by the manufacturer, cook or consumer, and sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates” World Health Organisation. (2015). *Guideline: Sugars intake for adults and children*. https://www.who.int/nutrition/publications/guidelines/sugars_intake/en/

Western society influence childhood eating patterns that impact obesity risk, including snacking, increased portion sizes, irregular meal times, eating in front of the television (TV), and eating away from the home (Proctor et al., 2003). Sugar-sweetened beverages (SSBs) (soft drinks, fruit juice and energy drinks) are also a major factor (te Velde et al., 2012).

According to the Australian Dietary Guidelines, it is recommended that children aged 2-3 years consume 2.5 serves of vegetables, one serve of fruit, four serves of grain foods, one serve of meat or alternatives, and 1.5 serves of dairy or alternatives each day, with no allowance for energy-dense, nutrient-poor discretionary foods (National Health and Medical Research Council, 2013c). For children aged 4-8 years, the recommended numbers of serves in each of the five food groups is the similar, but with another two serves of vegetables and another half serve each from the fruit, meat and dairy food groups (National Health and Medical Research Council, 2013c).

The guidelines are not meant to be prescriptive, as actual intake of young children can vary significantly from day to day, and at different growth stages (Queensland Health, 2017). However, according to the 2014-15 National Health Survey, only 5% of toddlers were consuming adequate vegetables (Australian Bureau of Statistics, 2015), and a 2015 study reported that 96% exceeded the saturated fat recommendations (Chai et al., 2016). A study using dietary data from the 2011-2012 National Nutrition and Physical Activity Survey found that 30% of 2-3 year old children consume SSBs, and that other discretionary items such as fruit drinks, cakes, biscuits and processed meats were part of the usual diet in that age group (Johnson et al., 2017). The same study found that 40% of the energy consumed by Australian children (aged 2-18 years) comes from discretionary foods (Johnson et al., 2017). Children under the age of 2 years also consume excessive amount of cakes, biscuits, confectionary and fruit juice (Byrne et al., 2014; Devenish et al., 2019; Devenish et al., 2018). Clearly, this has implications for health and the risk of obesity, and the development of healthy eating patterns as the child ages.

2.2.2 Physical activity

There is evidence of an inverse relationship between physical activity (PA) and overweight in children (te Velde et al., 2012), so it is important that children engage in activities that require movement. For PA in respect to young children, the term “active play” is increasingly used by researchers and educators. Although it may

include both indoor and outdoor activities, it is more commonly applied to the outdoor setting (Truelove et al., 2017). Active play may be defined as “gross motor or total body movement in which young children exert energy in a freely chosen, fun, and unstructured manner” (Truelove et al., 2017, p. 164). The daily recommended amount of PA for children aged 1-5 years is at least three hours, spread across the day (Department of Health, 2017). For children aged 3-5 years, that three hours should include at least one hour of “energetic play” (Department of Health, 2017). For infants under 12 months of age, the recommendation is 30 minutes of “tummy time” per day (Department of Health, 2017).

There are mixed reports on the proportion of children meeting PA guidelines and recommendations. According to the 2011-12 Australian Health Survey, which used self-report data from parents, 72% of children aged 2-4 years met the guidelines (Australian Bureau of Statistics, 2013). A recent study of toddlers (mean age 19.7 months), which measured activity using accelerometers, found that 96.5% met the physical activity guidelines (Santos et al., 2017). Conversely, a study by Hinkley and colleagues, where PA was also measured objectively via accelerometer, found that only 5% of the children aged 3-5 years met the guidelines on an average day (Hinkley et al., 2012). Another study with infants aged 4 months reported that only 29.7% met the 30 minutes of “tummy time” guideline (Hesketh et al., 2017). Finally, a review of 40 studies of children aged under 5 years, that used pedometers or accelerometers to measure PA, found that time spent in light-intensity PA ranged from 4% to 33%, and time spent in moderate to vigorous-intensity physical activity (MVPA) ranged from 2% to 41% (Hnatiuk et al., 2014). These conflicting results demonstrate that determining the exact level of PA in young children is problematic due to issues with measurement (Hnatiuk et al., 2014). However, regardless of the exact proportions of children meeting guidelines for PA, there is general consensus that activity levels in children are inadequate, and that interventions are required to address this issue (Okely et al., 2009; Oliver et al., 2007; Schranz et al., 2016).

2.2.3 Sedentary behaviour

Sedentary behaviour has been implicated in obesity risk, partly because of its impact on the daily total amount of energy expended (Rey-López et al., 2008). In adults, there is evidence that sedentary behaviours increase the risk of chronic diseases, regardless of the level of physical activity (Stamatakis et al., 2011). Sedentary screen

time, (behaviours associated with the use of electronic media (EM) such as TV, computer games, iPads® etc.), are considered to be of particular concern in respect to the risk of obesity (Rey-López et al., 2008). This also highlights a potential difficulty when interpreting studies that aim to measure levels of sedentary behaviour and/or screen time. Depending on how recent the study took place, and the measurement tools used, screen time may refer only to TV viewing or it may include one or more other modes of EM. Within this document, screen time refers to the sedentary use of all types of EM, unless specified otherwise (for example, where TV viewing (alone) has been measured in a particular study). Other aspects of sedentary behaviours (for example, prolonged sitting not associated with screen time) is out of scope for the current study.

Two large studies have explored the association between TV viewing and obesity risk. Reilly and colleagues analysed a sub-set of data (n=8,234) from the Avon longitudinal study in UK (Reilly et al., 2005). They found that one of the risk factors for obesity at 7 years of age was an excess of eight hours per week viewing TV at age 3 years (Reilly et al., 2005). A US cross-sectional study of 8,500 pre-schoolers found that 16% of children who had their screen time (TV, videos and DVDs) limited to 2 hours on week days had obesity compared to 20% of children who were exposed to greater than 2 hours (Anderson & Whitaker, 2010). The issue with TV is that not only is the child inactive, but there are associations with increased dietary intake of energy dense foods (Cox et al., 2012; Johnson et al., 2016). This may be due to the influence of junk food advertising and/or increased snacking in front of TV (Chaput et al., 2010; Chaput et al., 2017).

Added to concerns about TV viewing is the fact that there are a lot more opportunities for children to use EM in today's society of iPads®, laptop computers, and young children possessing their own electronic devices (Radesky et al., 2016). The recommendation for the use of screen time by children aged 2-5 years is less than one hour per day, and for children under 2 years the recommendation is that children not be exposed to electronic media at all (Department of Health, 2017). The guidelines also state that children under 5 years should not be sedentary (sitting in a stroller, car seat or high chair) for a maximum of one hour at a time (Department of Health, 2017). However, a large proportion of young children are not meeting the guidelines in respect to time spent sitting or engaged with screens.

According to the 2011-12 Australian Health Survey, the average amount of EM sedentary time for 2-4 year-olds was 1.5 hours, and 57% of this age group used EM for over one hour per day (Australian Bureau of Statistics, 2013). In addition 16% these children had at least one item of EM (TV, computer or game console) in their bedroom (Australian Bureau of Statistics, 2013). They spent, on average, an extra 22 minutes per day using EM, and were twice as likely to use it for more than one hour per day than those without EM in their bedroom (Australian Bureau of Statistics, 2013). In even younger children, a recent study with 202 toddlers (average age 19.7 months) reported that only 11.4% met the guidelines for sedentary behaviour (Santos et al., 2017). Finally, another study of 455 infants aged 4 months reported that only 27.9% met the guideline of zero screen time, and that 56.9% met guidelines for being restrained in a stroller, high-chair etc for less than one hour per day (Hesketh et al., 2017). Given the association between sedentary behaviour and obesity risk, these behaviours need to be addressed.

2.2.4 Sleep timing, quality, and duration

The Australian Guidelines for Healthy Growth and Development (24-hour Movement Guidelines for the Early Years) include recommendations for sleep from birth to 5 years² (Department of Health, 2017). Sleep guidelines also state that sleep should be “good quality”, with “consistent sleep and wake-up times” (Department of Health, 2017). However, up to 35% of Australian 2-year-old children do not meet these recommendations (Price et al., 2014), and over 30% of Australian parents perceive that their child has a sleep problem (Teng et al., 2012). Two recent studies compared sleep in children under the age of 12 months against the guidelines. A study measuring sleep using parent reports found that only 58.7% of 4-month-old infants met the sleep guideline (Hesketh et al., 2017). Another study exploring compliance with the 24-hour guidelines, using accelerometers attached at the hip, reported that 79.7% of 20-month-olds met the “11-14 hours, including naps” sleep guideline (Santos et al., 2017).

Inadequate sleep is associated with obesity in both adults and children (Cappuccio et al., 2008; Nielsen et al., 2011; Patel & Hu, 2008; Spruyt & Gozal, 2012). There are limitations with the tools used to measure sleep, and it is often difficult to

² 14-17 hours for age 0-3 months; 12-16 hours for age 4-11 months; 11-14 hours for 1-2 years; 10-13 hours for 3-5 years

make comparisons between studies that use different criteria and measures, but this does not alter the fact that there is a link between sleep and obesity risk. A meta-analysis of 11 studies found that young children with the shortest sleep duration were at a higher risk of obesity than those meeting recommendations³ (Chen et al., 2008). Another meta-analysis also found that children with short sleep duration (less than the Australian Sleep Health Foundation recommendations⁴) had twice the risk of being affected by overweight or obesity compared to longer sleepers (Fatima et al., 2015). Further, a recent systematic review examining associations between sleep and weight status in children aged 5-13 years, found that 98 out of the 112 reviewed studies reported a significant association between sleep and overweight (Morrissey et al., 2020). In younger children, the Avon longitudinal study, conducted in the United Kingdom, identified short (<10.5 hours) sleep duration at age 3 years as a factor associated with risk of obesity at age 7 years (Reilly et al., 2005). Finally, an analysis of data from the Longitudinal Study of Australian Children found a significant inverse relationship between short sleep duration at 4 to 5 years of age and higher BMI at 8 to 9 years of age (Magee et al., 2014).

Sleep timing has also been linked with obesity risk. A recent systematic review reported that, despite the need for more research in this area, later bed-timing/sleep onset was likely positively associated with overweight in young children (Morrissey et al., 2020). An Australian study of 2,200 children aged 9-16 years found that children who went to bed late (and woke late) had a higher BMI z-score, than those who went to bed early (and woke early)⁵, independent of sleep duration (Golley et al., 2013). In contrast, a recent study of 823 children aged 6-10 years found no association with sleep timing and BMI z-score (Taylor et al., 2020). However, other results in this study were consistent with previous evidence in respect to the association between sleep duration and obesity risk (Taylor et al., 2020). In the same study, there were also indications that sleep quality (frequent night waking or awake for longer periods during the night) was associated with increased obesity risk (Taylor et al., 2020). Finally, a systematic review investigating sleep quality and obesity risk also found that quality of sleep,

³ For children under 5 years, the recommended sleep duration used as a benchmark in the meta-analysis was ≥ 11 hours

⁴ 9-12 hours for age 2 month to 1 year; 9.5-11.5 hours for 1-3 year-olds; 11-13 hours for 3-5 year-olds

⁵ Early to bed group in this study median 9.20pm-7.03am; Late to bed group median 10.46pm-8.22am

independent of duration, was associated with increased risk (Fatima et al., 2016). However, the review highlighted the limitations of the current evidence, as results were inconsistent across studies, many studies were cross-sectional, and the heterogeneous sleep assessment methods made comparisons between studies problematic (Fatima et al., 2016).

The reasons for the relationship between sleep behaviours and obesity appear to be multifactorial. Lack of sleep has been associated with increased energy intake (Chaput, 2013, 2016), and lower PA (and, therefore, decreased energy expenditure) (Taheri, 2006). However, the mechanisms for increased adiposity may be more complex than just being awake for longer to eat more food, or being too tired to exercise. The potential links between obesity and chronic inadequate or low quality sleep may be explained via disrupted circadian rhythms (Bray & Young, 2007), and/or changes in hormones, such as leptin, ghrelin and insulin, that affect metabolism (Beccuti & Pannain, 2011; Must & Parisi, 2009; Taheri, 2006) or appetite regulation (Greer et al., 2013; Taheri, 2006). Clustering of sleep and eating behaviours, as well as with other obesity-related behaviours, is now discussed.

2.2.5 Clustering of obesity-related behaviours

Of concern is the fact that obesity-related behaviours often occur in clusters, so that children who do not meet recommendations for one behavioural domain (for example, diet), also display unhealthy behaviours in one or more of the other domains (PA, sedentary behaviour and/or sleep) (Leech et al., 2014). For PA, sedentary behaviour, and sleep, the interrelationship may seem intuitive as there are a finite number of hours of the day in which to allocate these activities, but in reality the interaction of the three behaviours is complex (Chaput et al., 2017). For example, decreased sleep, rather than providing more hours in the day for PA, is more likely to result in a child who is too tired for active play and therefore increases their sedentary behaviour at the expense of activity (Must & Parisi, 2009). This combination of low levels of PA, insufficient sleep and excessive sedentary behaviour is not only a risk factor in childhood obesity, but is also linked to increase energy intake, including energy dense foods (Chaput et al., 2017; Cox et al., 2012; Dubois et al., 2008). An Australian study of 2,200 children aged 9-16 years found that bed-times were associated with diet quality, whereby those with later bed-times consumed higher

amounts of discretionary foods, and those with earlier bed-times consumed more fruit and vegetables (Golley et al., 2013).

Other studies have identified clusters of unhealthy behaviours, and the increased risk of obesity in children who can be classified into an “unhealthy” cluster. An analysis of data from children aged 6-7 years, collected for the 2006 Longitudinal Study of Australian Children, classified obesity-related behaviours into 1. “healthy”, 2. “sedentary” and 3. “short sleepers/unhealthy eaters” and found that the second and third groups had increased odds of obesity compared to the “healthy” group at 2-year follow up (Magee et al., 2013). Another Australian study that identified three behavioural clusters of 1. “most healthy”, 2. “energy-dense consumers who watch TV”, and 3. “high sedentary/low MVPA” found that cluster 2 had the highest odds of obesity at 3-year follow up (Leech et al., 2015). Given the complex interplay between eating behaviour, PA, sedentary behaviours (particularly screen time), and sleep, it is essential to consider an intervention that targets all four obesity-related behaviours.

This section has discussed the association between each of the four child health behavioural domains and obesity risk, and compared the behavioural and dietary guidelines with actual behaviours in young children. The next section will discuss how parents influence these behaviours via parenting styles and, more specifically, parenting practices. The term “autonomy promoting parenting practices” will be introduced as optimal for healthy child behavioural development, along with some barriers and facilitators to the use of these parenting practices.

2.3 PARENTAL INFLUENCES ON OBESITY-RELATED BEHAVIOURS IN YOUNG CHILDREN

Behavioural patterns associated with eating, PA, sedentary behaviour, and sleep are established in the early years of life, (Hardy et al., 2012), and parental influences have a major impact on how these behaviours develop (Agras et al., 2004). Although obesity risk is associated with a complex interplay of biological/genetic and environmental/psychosocial factors (Russell & Russell, 2019), parents specifically influence the development of emotional regulation of their children (Aparicio et al., 2016). Emotional regulation is a factor in obesity risk as, when ineffective, it is associated with emotional eating, low physical activity, sedentary behaviour and low quality sleep (Aparicio et al., 2016). Maternal or paternal overweight is also a predictor of childhood obesity (Reilly et al., 2005; van Stralen et al., 2012), but the correlation

may be due to a shared family environment rather than genetic mechanisms alone (Gluckman & Hanson, 2008; Reilly et al., 2005). The family social environment, including family rules and routines, and the way they are enforced, will affect obesity risk by establishing behavioural norms in children (Patrick et al., 2013). In addition, a dysfunctional family environment is less capable of supporting healthy behaviours (Rhee, 2008; Zeller et al., 2007). Specific factors in the family dynamic that may contribute to obesity risk in children include family conflict and poor communication and behavioural control within the family (Halliday et al., 2014). The following sections will expand on some of these family environmental factors. Ethnicity, socioeconomic status, and other community, demographic and societal variables, as described in a number of ecological models (Davison & Birch, 2001; Harrison et al., 2011; Procter, 2007; Sallis et al., 2008), are acknowledged, but are not the focus of this thesis. However, Family Systems Theory warrants inclusion as it serves as a reminder that parenting styles and parenting practices do not operate in isolation. The following section discusses Family Systems Theory and two social learning theories (Social Cognitive Theory and Self-Determination Theory) that are directly applicable to parenting and child development.

2.3.1 Theoretical frameworks and parenting

2.3.1.1 Family Systems Theory

Family Systems Theory can be used to explain the interplay between the home environment, parent and child interactions, and obesity-related behaviours (National Academy of Sciences Engineering and Medicine, 2016). The theory posits that the family is a complex interacting system, and considers factors such as family structure, relationships, rules and rituals, and the way the behaviour of each person in the system (family) affects the behaviour of the others (Berge, 2009; Kaplan et al., 2014; Skelton et al., 2012). In a review of familial correlates of child and adolescent obesity, Berge (2009) identified three domains specific to obesity risk: parental domain, family functioning domain, and sibling domain. The parental domain includes parenting styles and parenting practices in respect to the feeding environment, and encouraging/modelling of health behaviours (Berge, 2009). The family functioning domain focusses mainly on the family meal environment, and the sibling domain was identified in two studies in respect to weight teasing in siblings and adolescent BMI and eating behaviours (Berge, 2009). Parenting styles will be explored in section 2.3.2

and Parenting Practices in section 2.3.3. The sibling domain is out of scope for this thesis.

The family meal environment

The context in which food is consumed and the structure and dynamic of the family food environment are important factors for the development of healthy eating behaviours in children (Frankel et al., 2012; Rosenkranz & Dzewaltowski, 2008). This includes whether there are set meal-times, whether the family eats together, expectations around eating at the table, television or other electronic devices during meals, and atmosphere or mood during meals (Patrick & Nicklas, 2005; Vaughn et al., 2016). Structure in terms of meal setting (eating at the table) and eating as a family is associated with enhanced self-regulation in young children (Frankel et al., 2018). Parents and children eating together also encourages observational learning (Davison & Campbell, 2005). Eating as a family has been associated with healthier diets and protection against future disordered eating behaviours (Baranowski et al., 2013; Vaughn et al., 2016). It has also been linked to and with lower levels of childhood obesity (Anderson & Whitaker, 2010).

Family influences on physical activity and screen time

The evidence is less clear for familial influences in respect to PA and screen time, particularly in young children (Berge, 2009; Brown et al., 2019). Although the Berge (2009) review included physical activity in its search strategy, only the “parental encouraging and modelling of health behaviours” within the parental domain included physical activity, and there were mixed results within the three studies identified by Berge. Much of the research in respect to physical activity and screen time is focussed on one or both parents, rather than the family system.

2.3.1.2 Social Cognitive Theory

Social Cognitive Theory (SCT) can be used to explain the way children develop self-regulation and obesity-related behaviours. The theory suggests that learning occurs in a social context, and that personal factors, environment factors, and human behaviour influence each other in a triadic interaction termed reciprocal determinism (Bandura, 1986; McAlister et al., 2008; National Cancer Institute, 2005). This means that, although an individual’s behaviour is influenced by their environment, it is also

shaped by their ability to regulate their behaviour and alter that environment (McAlister et al., 2008).

A construct of SCT is Outcome Expectations (McAlister et al., 2008). When a person considers engaging in a particular behaviour, they may have expectations of what the outcome will be (Bandura, 2004). The anticipated consequences may be as a result of prior experience in engaging in the behaviour, or by observing others performing the behaviour. These anticipated consequences can influence whether a person performs the behaviour (depending on whether they think it is of value), and whether there is a successful outcome from the behaviour (Bandura, 2004).

Another construct of SCT, Incentive Motivation, is the offering of incentives (for example, rewards or punishments) to influence behaviour (McAlister et al., 2008). This concept is also termed “reinforcement” and refers to the responses or outcomes of a behaviour that affect whether or not a person will repeat the behaviour (National Cancer Institute, 2005). Reinforcements may be internal or external (i.e. from the environment). External rewards for a behaviour increase the likelihood the behaviour will be repeated (National Cancer Institute, 2005). Thus, parents often use rewards to encourage certain behaviours, such as offering a sweet food to entice a child to eat vegetables. Reinforcements may also be negative, where a child receives a punishment as a result of a behaviour, for example having a privilege removed because they have not eaten dinner.

Observational Learning is an important factor in child development. Children may observe their peers (at childcare, for example) eating foods they have not eaten at home, so may be curious to try that food. However, for young children, observational learning primarily occurs through parental role-modelling (McAlister et al., 2008; Mura Paroche et al., 2017). Parents may model healthy or unhealthy behaviours (for example, in respect to food or sedentary behaviour), and the child observes and potentially learns the behaviour (Østbye et al., 2012).

Another construct within SCT is Behavioural Capability (National Cancer Institute, 2005). Behavioural capability refers to a person’s actual ability to perform a behaviour, and therefore their knowledge and skills to do so (National Cancer Institute, 2005). An example of this construct in action may be a parent wanting to provide optimal nutrition to their family. To do so, a first step would be to acquire the knowledge of which foods are nutritious and learn the skills to cook healthy meals.

Finally, Self-Efficacy is the individual's self-belief in their ability to perform behaviours that result in a desired outcome (Bandura, 2004), and their confidence that they can overcome barriers to achieving the desired outcome (National Cancer Institute, 2005). Parental self-efficacy (PSE) is a concept associated with many obesity prevention interventions aimed at increasing confidence in parents to engage in practices that will achieve desired behaviour outcomes in their children (Bohman et al., 2016). PSE is important for effective parenting because the parent needs the confidence (not just the knowledge) to apply parenting practices that will result in healthy obesity-related behaviours in their child (Coleman, 2000; Grossklaus & Marvicsin, 2014; Wright et al., 2014). There is evidence that PSE is associated with healthy eating behaviours (Campbell, Hesketh, et al., 2010), increased PA (Smith et al., 2010), and decreased screen time (Jago et al., 2013) in young children.

Although SCT can be used to explain the way the child learns, and therefore develops certain behaviours, it is particularly useful as a theoretical framework for determining barriers and facilitators to behaviours and behaviour change (National Cancer Institute, 2005). In the parenting context, the constructs of behavioural capability and self-efficacy were applied to the conceptual framework developed for this PhD thesis. The conceptual framework is discussed in sections 3.1.2 and the use of SCT in the intervention developed for this study is detailed in section 4.4.2.2.

2.3.1.3 Self-Determination Theory

Self-Determination Theory (SDT) (Deci & Ryan, 2008a, 2008b) further supports a number of concepts associated with both Family Systems Theory and SCT, particularly in respect to factors in home environment and for the development of self-regulation and self-efficacy (Ryan & Deci, 2017a). In fact, it has several constructs that particularly apply to parenting, so is even more directly aligned with parenting practices that support the development of self-regulation in children. Self-regulation is “the capacity to control one's behaviors and emotions when challenged” (Miller et al., 2016, p. 2). Poor behavioural and emotional self-regulation have both been associated with higher BMI in children (Liang et al., 2014). Self-regulation of energy intake (i.e. behavioural self-regulation) refers to the ability to respond to cues of hunger and satiety (Frankel et al., 2012) and can mean that children are able to moderate their intake of unhealthy foods and/or portion sizes (Frankel et al., 2018). Poor emotional self-regulation in children is associated with eating when stressed or frustrated, and in

throwing tantrums when denied a favourite food (Miller et al., 2016). Parents can support or undermine the development of self-regulation in their young children (Joussemet et al., 2008).

SDT, a theory of human motivation, was developed in the 1970's and 1980's by Edward Deci and Richard Ryan (Deci & Ryan, 2000). Motivation may be either intrinsic or extrinsic (Deci & Ryan, 2000). Intrinsic motivation occurs when a person engages in behaviour because it is inherently enjoyable, whereas extrinsic motivation involves engaging in behaviour for some other external outcome (Ryan & Deci, 2000), for example engaging in PA for health reasons rather than enjoyment of the activity itself. Because many healthy behaviours are not intrinsically enjoyable, and some unhealthy behaviours are, the internalisation or integration of healthy behaviours with one's self is crucial for healthy outcomes (Patrick et al., 2013). Intrinsic motivation and the internalisation of values, behaviours, and attitudes is a natural process in children, and the social environment can either facilitate or undermine this process (Côté-Lecaldare et al., 2016; Deci & Ryan, 2000; Joussemet et al., 2008).

Three key constructs of SDT are the basic human needs to feel competent, autonomous, and related to others (Deci & Ryan, 2000). The satisfaction of the need for autonomy (self-determination) is particularly important for healthy child development (Joussemet et al., 2008), and becomes crucial in the toddler age-group as they start to explore, act independently, and attempt to exert control over their environment (Calkins, 2007; Côté-Lecaldare et al., 2016). Self-determination is often associated with adolescent development, but the foundations around knowledge, skills and beliefs are built in early childhood and are dependent on the level of support provided by the environment (Palmer et al., 2017). Although there is evidence of a genetic influence on a child's ability to self-regulate food intake (Faith et al., 2013), parental support is crucial for the ongoing development of self-regulation skills and self-efficacy in children (Aparicio et al., 2016).

According to SDT, there are three dimensions of parenting: Autonomy Support, Structure, and Involvement, with Autonomy Support being the most important for the development of child self-regulation (Ryan & Deci, 2017a). A parent can support their child's need for autonomy and thus promote healthy development in the child (Joussemet et al., 2008; Patrick et al., 2013). Autonomy supporting parenting practices include offering meaningful choices to the child, providing rationale for requested

behaviours, minimising controlling language, taking the child's perspective, and encouraging initiative (Côté-Lecaldare et al., 2016; Joussemet et al., 2008; Palmer et al., 2017; Patrick et al., 2013; Ryan & Deci, 2017a). Some specific autonomy supporting parenting may be more applicable once the child has reached a certain point in their cognitive development (e.g. offering choices or providing rationale for requested behaviour). For children who have not yet reached the stage of development to understand rationale, the "set limits in noncontrolling way" element from the structure parenting dimension is likely to be more appropriate. Importantly, the Involvement parenting dimension includes devoting time to the child, showing warmth, being caring and supportive and investing attention and resources (Ryan & Deci, 2017a). All three dimensions of parenting are all crucial for the development of autonomy in children.

2.3.2 Parenting styles

Parenting style is defined as "a constellation of attitudes toward the child that are communicated to the child and that, taken together, create an emotional climate in which the parent's behaviours are expressed" (Darling & Steinberg, 1993, p. 488). Thus it is the emotional and relational climate in which parenting occurs (Gerards & Kremers, 2015; Patrick et al., 2013; Piquart, 2014). It is generally accepted that there are four parenting styles, three originally developed by Baumrind in 1971, with a fourth style added by Maccoby and Martin in 1983 (Darling & Steinberg, 1993). They are a reflection of the parent's attitudes, belief systems, and behaviours (Darling & Steinberg, 1993; Power et al., 2013), and are often characterised by the level of parental warmth or responsiveness to the child's needs, combined with the level of parental demandingness or control (Gerards & Kremers, 2015; Patrick et al., 2013).

The four parenting styles are: authoritative, authoritarian, permissive, and neglectful. The authoritative parenting style is characterised by high responsiveness/warmth and high demandingness/control (Patrick et al., 2013). High responsiveness relates to parental nurturance, emotional support, and acceptance (Piquart, 2014). High demandingness relates to parental monitoring of the child's behaviour, setting rules, and setting expectations (Patrick et al., 2013; Piquart, 2014). The authoritative parent is child-centred, and thus responsive to the child's needs but with high expectations (Sleddens et al., 2011; Sokol et al., 2017). Therefore, "control" in this context relates to providing structure (Grolnick & Pomerantz, 2009), and has

been termed “behavioural/firm control” (Lohaus et al., 2009), or “psychological autonomy” (Sleddens et al., 2011). Parents that engage in this style influence the healthy development of emotional regulation in their children (Aparicio et al., 2016).

The authoritarian parent is also high on demandingness but low on responsiveness and, as such, is likely to be a strict disciplinarian (Rhee, 2008), with high expectations in the context of being emotionally cold or distant (Power et al., 2013). “Control” when associated with the authoritarian parenting style is often termed “coercive control” (Vaughn et al., 2016) or “psychological control” (Sleddens et al., 2011). This type of parental control manifests as parenting practices that involve punishment, threats or removal of objects or privileges (Vaughn et al., 2016), and that are often manipulative of the child’s feelings (Sleddens et al., 2011).

The permissive parenting style is high on responsiveness and low on demandingness, and refers to a parent who is indulgent, but provides little guidance or direction to the child (Power et al., 2013). The fourth parenting style, the neglectful or uninvolved parent, is low on both responsiveness and demandingness, so this style is considered parent-centred, displaying little warmth and providing no structure or direction to the child (Johnson et al., 2012; Patrick et al., 2013). Therefore, where there is a lack of structure in the home environment, the parenting style is likely to be either permissive or neglectful (Vaughn et al., 2016). This can mean that children are given little guidance and are allowed to make their own (inappropriate) decisions around eating and other lifestyle behaviours (Vaughn et al., 2016).

2.3.2.1 Parenting styles and childhood obesity risk

There is some evidence linking parenting styles to the risk of obesity in children. Studies have shown that the authoritative parenting style is associated with an increased intake of fruit and vegetables and decreased intake of high fat/sugar foods and beverages (Vollmer & Mobley, 2013), and a lower risk of overweight and obesity (Johnson et al., 2012; Rhee et al., 2006; Sleddens et al., 2011; Sokol et al., 2017). On the other hand, an authoritarian or permissive style both increase the risk of obesity (Johnson et al., 2012). However, most research exploring the association between parenting styles and obesity risk have used Euro-American middle-class children as participants (Patrick et al., 2013). The association between authoritative style and child outcomes is not as definitive in studies that include other racial/ethnic groups (Patrick et al., 2013).

2.3.2.2 Parenting style and dietary intake and eating behaviours

The parenting dimension of high demandingness or control that characterises both authoritative and authoritarian parenting style manifests as either parent-centred practices (authoritarian) or child-centred practices (authoritative) (Stang & Loth, 2011). As such, a distinction needs to be made between the different ways the demandingness/control dimension of parental feeding practices influences the development of the child's self-regulation and their relationship with food. It is generally accepted that the authoritative parenting style promotes self-regulation in respect to food intake, whereas the authoritarian feeding style may result in the parent overriding the child's ability to respond to their own satiety and hunger cues (Berge, 2009). A review of eleven cross-sectional studies found that authoritative parenting was associated with higher availability and child intake of fruit and vegetables, and decreased consumption of SSBs (Berge, 2009). Whereas, authoritarian parenting was associated with increased availability of unhealthy food and decreased vegetable intake (Berge, 2009). Although the impact of permissive/indulgent parenting is not as clear in terms of child obesity risk (Savage et al., 2007), this parental feeding style may result in the development of low competence in self-regulation and a higher child BMI (Hughes et al., 2005).

2.3.2.3 Parenting style and child physical activity

The way in which parents influence their child's PA may reflect parenting style, specific parenting practices and/or environmental factors. However, reviews of studies of children and adolescents found little or no association between parenting style and child PA (Trost & Loprinzi, 2011; Vollmer & Mobley, 2013). A qualitative study in 2012 also found that parenting style was not directly associated with active play of preschool-aged children, nor did it act as a moderator for parental support of PA (Schary et al., 2012a).

2.3.2.4 Parenting style and child sedentary behaviours

The relationship between parenting style and child sedentary behaviour, screen time in particular, has also been a topic of research. Depending on their parenting style, parents may discuss and negotiate the rules around screen time (authoritative parenting style), set rules with little discussion (authoritarian style) or allow children to monitor themselves (permissive style) (Patrick et al., 2013). A study of 201 parent-child dyads,

of children aged 2-5 years, that analysed the association between parenting style and sedentary behaviour found that the authoritative style was associated with the least amount of screen time in the children (Schary et al., 2012b). Unlike most other studies, this study also considered “quiet play” (playing with toys or reading), but found no association between parenting style and this type of sedentary behaviour (Schary et al., 2012b).

2.3.2.5 Parenting style and child sleep

The association between parenting style and child sleep has not been widely researched (Tyler et al., 2019). However, the permissive parenting style is apparently associated with sleep issues in children, including shorter sleep duration (Smith et al., 2014; Tyler et al., 2019). This parenting style is less likely to enforce consistent bedtime routines or enforce limits and rules around sleep hygiene practices (Smith et al., 2014; Tyler et al., 2019). The authoritarian parenting style, specifically the “coercive control” aspect, may also be associated with the development of unhealthy sleep behaviours in children. In a study by Philips et al. (2014), coercive control was negatively associated with sleep duration. One explanation is that this type of parental control undermines the child’s autonomy and overrides the development of sleep self-regulation (Philips et al., 2014; Smith et al., 2014). In contrast, authoritative parenting style, while considered autonomy-promoting for most child behaviours, may not be ideal for promoting the development of sleep self-regulation. The parental involvement (warmth and responsiveness) associated with this style needs to be balanced with parenting practices that promote the child’s development of self-soothing skills (Smith et al., 2014).

2.3.3 Parenting practices

Rather than there being a direct link between parenting style, child behaviours and, therefore, obesity risk, parenting style may act as a moderator to a particular parenting practice (Darling & Steinberg, 1993; Patrick et al., 2013; Rhee, 2008; Sleddens et al., 2011). Parenting practices are the way parents behave (Patrick et al., 2013; Power et al., 2013) or what they *do* in the performance of their parental duties (Darling & Steinberg, 1993). Parenting practices include such things as restricting or making available certain foods; setting, applying and explaining rules on screen time; providing structure and routines; or taking children to sporting activities (Patrick et al., 2013), and may be either general or domain-specific (Power et al., 2013). As has

already been discussed in section 2.3.1, parenting practices that are part of the “controlling” dimension (for example, setting rules and limits) may be experienced differently by the child depending on whether the parent has an authoritative or authoritarian style. An authoritative parent may discuss and explain the limits with the child in a supporting way, whereas the authoritarian parent may set the rules in a dictatorial way. This means that the style in which the practice of setting rules (for example) is applied may result in different outcomes in terms of obesity-related behaviours and obesity risk (Patrick et al., 2013). Parenting practices specific to each of the childhood behavioural domains will now be discussed.

2.3.3.1 Parenting practices and influences on diet and eating behaviours

Parents are the gatekeepers in terms of the food they provide, especially for young children (Anzman et al., 2010; Reid et al., 2015). Their preferences, beliefs and attitudes toward food and eating impact the child (Patrick & Nicklas, 2005). Although parent’s nutrition knowledge is usually linked to healthier diet, knowledge doesn’t always translate to optimal child nutritional intake and eating behaviours (Davison & Campbell, 2005). Parents influence their children’s diet and relationship to food, including the flavours they become familiar with, via their own food preferences, intake patterns, eating attitudes and behaviours, and via the food they make available (Anzman et al., 2010; Savage et al., 2007). The influence of parental feeding practices on the development of self-regulation in the child, the child’s relationship with food and, ultimately, their obesity risk, is a complex interplay of environmental, psychosocial factors (for example, parent feeding styles and practices), and child temperament and traits (Patrick et al., 2013; Russell & Russell, 2019).

A number of specific feeding practices have been identified as potentially influential on the way a child’s relationship with food develops in early childhood. These include modelling behaviours (both healthy and unhealthy); coercion or pressure to eat; rewards of highly palatable (energy dense) foods; withholding food as punishment; restricting food intake; and determining availability and accessibility of both healthy and unhealthy foods (Stang & Loth, 2011). The mother-child dyadic relationship, and attachment security in particular, is a crucial factor in the way feeding practices influence the development of child self-regulation and eating behaviours (Bergmeier et al., 2019).

Many feeding practices evolved at a time in human history when food was scarce, and have subsequently been handed down over generations and become the parenting norm (Savage et al., 2007). They include providing food when a child is distressed, feeding often, offering food that the child prefers, and encouraging children to eat as much as possible (while food is available) (Savage et al., 2007). These practices, not applicable in an environment of easily accessible food, persist in today's obesogenic world. Where parents use food to soothe, calm or manage their child's anger, upset, hurt or boredom, rather than using comfort or support, this may lead to higher BMI in children, and emotional eating or eating in the absence of hunger in adulthood (Mitchell et al., 2013; Vaughn et al., 2016). In addition, parents who are "emotional eaters" may act as negative role models for their children in the development of their relationship with food (Blissett et al., 2010). Parents can also influence the development of self-regulation in the child via the amount of food offered. Studies have shown that children will eat more when given larger portions, possibly because larger portions over-ride the child's self-regulation ability (Rhee, 2008).

Humans naturally prefer sweet and salty flavours, so it is the responsibility of parents to support their child's development and preference for foods, such as vegetables, that are not energy-dense and nutrient-poor (Anzman et al., 2010; Savage et al., 2007). This can be challenging, because parents may not realise that children often need to be repeatedly exposed to novel foods before the food is acceptable to the child, or that initial rejection of unfamiliar foods by young children is a normal developmental phase (Dovey et al., 2008; Mitchell et al., 2013; Wardle et al., 2005). In fact, parents often talk about their child's "fussy eating" or specific food preferences, and their stress and frustration around their child's refusal to eat the food provided (Dwyer et al., 2008; Jarvis et al., 2017; Martin-Biggers et al., 2015).

Modelling

Observational learning is an important factor in the development of child food preferences and eating behaviours (Mura Paroche et al., 2017). Both negative and positive modelling of food behaviours by parents, family members, and peers has a strong impact on a child's relationship with food, and their attitude to trying and liking of specific foods (Collins et al., 2016; Paes et al., 2015). Children have a natural tendency to imitate those around them, especially if there is an emotional connection,

so they are more likely to try a novel food in a family social context, particularly if the parent shows obvious enjoyment in the food (Baranowski et al., 2013; Mura Paroche et al., 2017; Rhee, 2008; Savage et al., 2007). Modelling of negative behaviours (for example, consuming and enjoying “junk food”) may also increase the child’s desire and enjoyment of the food (Rhee, 2008).

Parental support

Parental support of healthy eating is also an important influencer of healthy eating in young children. For example, the association between parental modelling and child dietary intake may be confounded if young children are only offered the foods that the parent likes and prefers (Mitchell et al., 2013). Toddlers can only eat what parents provide, so food must be both available and accessible (cut up and ready to eat) (Baranowski et al., 2013; Davison & Campbell, 2005; Rhee, 2008). Interestingly, a study in 2015 of 173 parent-child dyads found that maternal, but not paternal, support had a positive association with fruit and vegetable intake in children aged around 3 years (Schoeppe & Trost, 2015). This suggests that, for young children, mothers may have a greater influence than fathers in terms of healthy eating (Schoeppe & Trost, 2015).

Responsive feeding

Responsive feeding is a parenting practice whereby the parent recognises and responds appropriately to their child’s hunger and satiety cues (Hurley et al., 2011). Responsive feeding practices are associated with the “Trust model” proposed by Ellyn Satter (Eneli et al., 2008; Satter, 1995, 1996, 2007). According to the model, there is a division of responsibility in that parents provide healthy food choices at appropriate times (meals and snacks) and the child decides what, or if, to eat from the options presented (Eneli et al., 2008). Children are trusted to self-regulate, and to therefore learn responsibility, and develop a healthy relationship with food (Eneli et al., 2008; Vaughn et al., 2016). For children that may have an inherited (genetic) tendency to overeat (Carnell et al., 2008; Faith et al., 2013), and thus have diminished self-regulation, responsive feeding practices may mitigate the increased obesity risk associated with reduced satiety responsiveness and eating in the absence of hunger (Jansen et al., 2018). Conversely, non-responsive feeding does not consider or trust the child’s natural awareness of hunger and satiety and is therefore considered a negative

factor in the development of emotional and behavioural self-regulation, and the child's relationship with food (Hurley et al., 2011).

Restrictive feeding

Parents may restrict access to food (either via portion size, second helpings, snacks, or type of food) because of concerns about the child's weight or health (O'Connor et al., 2017). Restricted foods are generally high in fat and/or sugar (Vaughn et al., 2016). Restriction may involve having these foods in the home but storing them away, and stating they are "off limits", or only allowing the food in certain circumstances (treats, special occasions etc.). This is known as "overt restriction" of unhealthy foods, and has been associated with increased consumption once they become freely available (Ventura & Birch, 2008), eating in the absence of hunger (Fisher & Birch, 1999), and higher BMI (Faith et al., 2004).

However, not all studies find a clear causal link between restrictive feeding practices and weight status (Hurley et al., 2011; Webber et al., 2010). Results and conclusions drawn may be dependent on the type of restrictive practices used by parents (Campbell, Andrianopoulos, et al., 2010). Because most studies are cross-sectional, it can be unclear whether the parent restricts food because the child is already overweight, or if restrictive feeding practices in young children result in overweight later in childhood (Rhee et al., 2009). If there is a causal link, it may be because, when parents control their child's food environment, the restriction of the food decreases the child's ability to self-regulate (Birch et al., 2003). The increased intake results in increased BMI, thereby increasing the restrictive feeding practices and thus creating a feedback loop (Patrick et al., 2013). Therefore, restrictive feeding practices may have a positive association with BMI while the child is too young to access the restricted foods (Hurley et al., 2011), but increase later obesity risk due to impaired self-regulation once the child can independently access the restricted foods (Mitchell et al., 2013). A longitudinal study by Campbell and colleagues (2010) concluded that parental feeding restriction did not influence child BMI. However, they cautioned parents against both restricting foods and making energy-dense foods and drinks freely available (Campbell, Andrianopoulos, et al., 2010).

Pressure to eat

Feeding practices associated with encouraging or pressuring a child to eat also have a negative effect on the child's ability to self-regulate (Stang & Loth, 2011). A parent pressuring their child to eat may use strategies such as insisting they eat everything their plate, providing repeated prompts to eat (even when the child is not hungry), making a child feel guilty, yelling at them, or even physically forcing the child to eat (Vaughn et al., 2016). These strategies do not recognise the child's need to make their own choices and develop autonomy in respect to eating (Baranowski et al., 2013). Parents who mis-interpret self-regulation in young children as "fussy eating", and pressure the child to eat, may actually be contributing to an increased obesity risk in the child (Byrne et al., 2017). An emphasis on external cues (from the parent) may undermine the ability of the child to self-regulate their food intake and respond to their own hunger and satiety cues appropriately (Eneli et al., 2008; Mitchell et al., 2013; Rhee, 2008; Stang & Loth, 2011). Pressuring a child to eat is also linked to neophobia, food avoidance, and decreased liking for a food (Mitchell et al., 2013). In addition, the use of verbal encouragements has been associated with increased weight, especially when child autonomy and option for refusal is decreased (Rhee, 2008).

Rewards and bribes

When parents use rewards or bribes to encourage eating, they may override the child's ability to self-regulate (Powell et al., 2017; Rhee, 2008), and the practice could also lead to emotional overeating (Powell et al., 2017). The status of food as a reward increases its value and desirability (Mitchell et al., 2013), and decreases the preference for the main food (Rhee, 2008). Although parents may bribe a child to eat (healthy food) because of concern over nutritional intake, or because they perceive the child to be "fussy eater", this coercive feeding practice undermines the ability of the child to focus on internal cues of hunger and satiety (Byrne et al., 2017; Rhee, 2008).

2.3.3.2 Parenting practices and influences on physical activity

Parental support

There is increasing evidence that parental support may have a significant influence on PA in young children (Hinkley et al., 2008; Mitchell et al., 2012; Vaughn et al., 2013; Xu et al., 2015). Parental support includes parenting practices such as encouraging the child to engage in PA, taking part in active play or sports with the

child, providing transportation to locations that facilitate PA, watching the child participate in PA, and providing information about the benefits of PA (Schary et al., 2012a; Schoeppe & Trost, 2015). Parents who consider PA important are more likely to engage in these types of parenting practices (Davison & Campbell, 2005; Mitchell et al., 2012; Trost et al., 2003). However, it is not always clear which type of support has the strongest correlation to PA in the child, or how much the influence is moderated by the child's age (Trost & Loprinzi, 2011) or other socio-ecological variables (Pfeiffer et al., 2009). Parents who perceive their child as competent in physical activities are also more likely to provide both instrumental and emotional support for PA (Loprinzi & Trost, 2010). Finally, children are more likely to feel competent when their parent perceives them as such, and therefore take part in a sport or be physically active (Davison & Campbell, 2005; Loprinzi & Trost, 2010; Pfeiffer et al., 2009).

Modelling

The correlation between parent PA and child PA has also been examined in many studies, and a systematic review concluded that children are more active when their parents are physically active (Hinkley et al., 2008). This appears to fit with the Social Cognitive Theory construct of observational learning, whereby the child learns the behaviour via the parent as a role model of PA (Trost & Loprinzi, 2011). However, the correlation may be more indirect as it seems reasonable that active parents who see PA as important are more likely to encourage and support their children to be active (Dowda et al., 2011; Trost et al., 2003). Two studies found a correlation between parents who perceived PA to be of value and the level of child PA (Loprinzi & Trost, 2010; Zecevic et al., 2010). Another study of 369 preschool children concluded that while the parent levels of PA did not directly influence child PA, there was an indirect effect via the parent's support for PA (Dowda et al., 2011). However, it does not always follow that parents who are not physically active will have children who also have low levels of PA. Rather, it is conceivable that parental support and encouragement is more important than the literal modelling of active behaviour by parents. Vaughn (2013) developed a conceptual map that defined parental modelling as "purposeful behaviour on the part of the parent to use his/her own behaviour to encourage the child to be more active by letting the child see him/her being active, hearing him/her talk about activity, being active together, and enjoyment of activity" (Vaughn et al., 2013, p. 2375). Studies that conclude that autonomy and competence

supporting parenting practices increase PA in children, are consistent with Self-Determination Theory. As discussed in section 2.3.1.3, children have a need to feel autonomous, competent, and related to others.

Rewards for physical activity

There is minimal research around whether rewarding PA influences a child's level of PA, particularly for preschool-aged children (Davison & Campbell, 2005), but it is conceivable that any short-term increase in PA (facilitated by rewards) is unlikely to be maintained once the rewards are removed (Deforche et al., 2011; Hardman et al., 2011). Offering of rewards to encourage a particular behaviour undermines the development of autonomy in the child and the development of intrinsic motivation (Ryan & Deci, 2000), particularly in respect to PA (Deforche et al., 2011).

Barriers to supportive parenting practices

Parents are generally aware of both the importance of PA and the importance of supporting PA in their child (Bassett-Gunter et al., 2017), although some parents feel their child is “active enough” (Dwyer et al., 2008) or “naturally active” (Hesketh et al., 2012). However, several studies have reported barriers to parental support of PA. Parents report being too tired or lacking in personal motivation to take part in physical activity with their child (Bassett-Gunter et al., 2017; Dwyer et al., 2008; Jarvis et al., 2017; Martin-Biggers et al., 2015) or for the energy required to encourage a reluctant child (Bassett-Gunter et al., 2017; Pocock et al., 2010). There are also concerns about safety and the availability of community equipment and facilities for children to play in parks, ride bikes, or attend gyms or organised sport (Bassett-Gunter et al., 2017; Dwyer et al., 2008; Hesketh et al., 2012; Ling et al., 2016). The weather can be a barrier to children playing outside, particularly in countries with very cold winters or high rainfall (Dwyer et al., 2008; Jarvis et al., 2017; Perry et al., 2017). However, PA support is more likely when families find “fun” activities to do together or with other families in their social network (Bassett-Gunter et al., 2017).

2.3.3.3 Parenting practices and influences on sedentary behaviour

Providing rules and limits

Children of parents who limit TV viewing and/or provide rules around the use of electronic devices are likely to be less sedentary (Davison & Campbell, 2005; Vollmer & Mobley, 2013). In theory, parents should find it easy to enforce these rules,

as young children cannot usually access electronic devices without their parent's assistance. Even in older preschool children that have the ability to turn on devices unaided, the parent can enforce rules by removing electronic devices from the child's reach or turning off the TV (Hinkley et al., 2010). However, in practice, implementing these rules may not be easy. Implementing screen time rules may challenge existing family norms, and may not be well received by other members of the household (Evans et al., 2011; Kaplan et al., 2014). Parents may be reluctant to limit screen time if it results in conflict with the child or with other family members (Hesketh et al., 2012; Jarvis et al., 2017). In addition, if the TV or a computer game has been used as a "babysitter" for parents preparing meals or having time to themselves, finding an alternative activity for the child may be a barrier to parental behaviour change (Evans et al., 2011; Jarvis et al., 2017; Martin-Biggers et al., 2015). However, a study by Duch et al. (2013) reported that, in households with high levels of cognitive stimulation (availability of educational toys, parent reading to the child etc.), there were lower levels of child screen time.

Modelling

Parental modelling is associated with greater screen time in children (Vaughn et al., 2013). Children may also spend more time in front of electronic devices, particularly TV, if their parents or older siblings are high screen watchers (Hesketh et al., 2012). A systematic review of correlates of screen time in young children found that high levels of TV viewing by family members were associated with higher screen-viewing in children (Cillero & Jago, 2010). Two other systematic reviews also found that the mother's viewing time was associated with the child's viewing time (Duch et al., 2013; Xu et al., 2015).

Parent knowledge

It has become the societal norm for young children to have access to, and use, electronic devices such as play stations, iPads®, and computers, in addition to having multiple TVs in the home, and with additional devices the amount of screen time increases (Radesky et al., 2016). Parents may justify providing iPads® and other mobile electronic devices to their young children because they are both normal and necessary in today's environment, and are important for children to learn computer skills before starting school (Bentley et al., 2016; Hesketh et al., 2012). Although parents generally understand that too much sitting is a factor in obesity risk, they tend

to be more concerned about the content of the TV programs, TV advertising, or video games than the length of time that their children are sedentary (Davison & Campbell, 2005). As such, if parents feel the screen activity is educational, or even just benign, they may use that to justify allowing or encouraging this type of sedentary behaviour (Bentley et al., 2016; Davison & Campbell, 2005; De Decker et al., 2012; Hesketh et al., 2012).

2.3.3.4 Parenting practices and influences on sleep

While parenting practices also influence child sleep behaviours, the bedroom and other aspects of the home environment is also important (Jarvis et al., 2017). Children have reported a number of barriers to sleep that parents can potentially influence. These include household noise, the awareness of parents preparing evening “snacks” after child bedtime, and older siblings watching TV (Golem et al., 2019). While there can be challenges with disrupted routines, parents working irregular hours, or children sleeping part-time in other households (for example, with grandparents), there are strategies that parents can employ at least most of the time (Muller et al., 2019).

Providing rules and routines

Parents influence sleep behaviours in young children primarily through bedtime rules and routines (Jones & Fiese, 2014). However, it is unclear which parental support behaviours (encouragement versus enforcing of bedtime rules) result in children meeting sleep guidelines, and whether the effectiveness of parenting practices are different depending on the child’s age, or between weekdays and weekends (Pyper et al., 2017). Another important factor to consider is that there are cultural differences in respect to sleep parenting practices, including the practice of co-sleeping, and that these practices may also have positive child health outcomes (Giannotti & Cortesi, 2009; Muller et al., 2019). Despite this, in Western cultures, including Australia, USA and UK, a regular bedtime routine is generally recommended for healthy sleep (Allen et al., 2016; Owens & Jones, 2011; Paul et al., 2016). In addition, sleep outcomes are optimal when routines are introduced in infancy (Mindell et al., 2015). The authors of the Bedtimes Routines Questionnaire (BRQ) focussed on three areas relevant for the evaluation of sleep in children aged 2-8 years (Henderson & Jordan, 2010). These were routine consistency, reactivity to change in routine and adaptive versus maladaptive activities (Henderson & Jordan, 2010). As such, inherent in the questionnaire are

routines and bedtime activities that are classified as potentially having either a positive or negative influence on child sleep. Ideally a bedtime routine should include the same activities, in the same order and at the same time each night (both weeknight and weekends) (Henderson & Jordan, 2010).

Pre-bed activities should be inherently “calming” and not overly excite the child. Some activities that are not recommended before bed include watching TV (Henderson & Jordan, 2010; Owens & Jones, 2011; Taveras et al., 2012), active play, games, and snacks (Henderson & Jordan, 2010). Whereas, reading to the child is an appropriate bedtime activity (Henderson & Jordan, 2010). The Healthy Habits, Happy Homes intervention which targeted bedtime routines as part of their obesity prevention aim, used the concept of “the 3 B’s: Bath, Book and Bed” to assist parents in creating a bedtime routine (Haines et al., 2013). The intervention had a positive effect on sleep duration, with the children in the intervention group sleeping 0.75 hours per day longer than those in the control group (95% CI, 0.06 to 1.44; $P = .03$) (Haines et al., 2013).

Parental knowledge

Parents’ knowledge of sleep, including appropriate sleep duration and sleep hygiene practices, is associated with sleep quantity and quality in their children (Owens & Jones, 2011). A number of studies have concluded that children are more likely to get adequate sleep where there is increased parental sleep knowledge (Kanis et al., 2015; McDowall, Elder, et al., 2017; Owens & Jones, 2011). However, parental knowledge of factors associated with healthy sleep in children is low (McDowall, Galland, et al., 2017). These factors include appropriate sleep duration, consistent bedtimes, sleep routines, and signs of insufficient sleep (McDowall, Galland, et al., 2017). A recent New Zealand study assessed parental knowledge via 10 true/false statements about children’s sleep, and nearly a third of the 115 parent participants believed, incorrectly, that it was appropriate for children to have a later bedtime and wake time on weekends compared to week-days. (McDowall, Elder, et al., 2017).

2.3.4 Conclusion

Parents influence the development of obesity-related behaviours in their young children via a complex interaction of parenting styles, parenting practices, and the home environment. Observational learning is only one way that children develop behaviours based on what their parents do. Supportive parenting practices across all

behavioural domains are crucial in the development of self-regulation in the child and to the establishment of healthy behaviours that carry through to adulthood. However, parents face barriers to using autonomy promoting parenting practices, including child preferences, time constraints, conflicting priorities, tiredness, lack of motivation and lack of support from family or social networks (Pocock et al., 2010).

Obesity prevention interventions targeting parents of young children should focus on autonomy supporting parenting practices that ensure children develop healthy behaviours in the four domains of diet/eating, physical activity, sedentary behaviour (specifically screen time), and sleep. Further, intervention designers should focus on addressing the specific barriers that resonate with the target population, including those associated with the child age-group being targeted (Jarvis et al., 2017). In addition, group interventions that provide a supportive environment for parents to increase their own knowledge and skills, strategies to address the barriers, and their self-efficacy in respect to using appropriate parenting practices, may be another crucial factor for intervention success. The next section will review group parent interventions aimed at obesity prevention in children under 5 years that have been evaluated in the literature.

2.4 OBESITY PREVENTION INTERVENTIONS IN CHILDREN UNDER 5

The previous section demonstrated the importance of targeting parenting practices that influence the development of obesity-related behaviours in young children. This section reviews obesity prevention interventions targeting early childhood that include a parent component. The aim was to explore common features of these interventions, including child behaviours targeted, theoretical frameworks used, how parenting practices were targeted, and the extent to which parent factors were measured. The evaluation methodology and intervention outcomes were also examined.

A search of PubMed, CINAHL, PsycINFO and Scopus databases was conducted to identify interventions published after 1999 up until April 2020. The search terms were combinations of “obesity prevention” AND child* AND (program* OR intervention OR evaluation) AND parent* AND (behavior OR behaviour). Results were limited to Infants: birth to 23 months and preschool child: 2-5 years. Section 2.4.1 provides an overview of the settings where the interventions were delivered. The results of the initial literature search were then limited to interventions delivered to

groups of parents in the community setting. Additional studies were identified from reference lists of the papers identified from the database searches that fit the criteria, and from systematic reviews. Section 2.4.2 is a detailed critique of the 28 interventions that met the “community-based group parent intervention” criteria (four interventions targeting parents of infants and 24 interventions for parents of children aged 2-5 years).

2.4.1 Intervention settings

Childhood obesity prevention interventions targeting parents of children under the age of five years have been delivered in a variety of settings. Interventions for parents of children under the age of two years are often delivered by health professionals, one-on-one, either in the home, or in a primary care setting (Ash et al., 2017; Matvienko-Sikar et al., 2018). Other interventions for parents of infants have been conducted at Child Health Clinics with groups of parents (usually first-time mothers), where they regularly attend (Blake-Lamb et al., 2016). In the older age group (2-5 years), many have been implemented in Early Childhood Education and Care settings (Bell & Golley, 2015; Hesketh & Campbell, 2010), with some parental involvement as an adjunct to the main program (Morris et al., 2015; van de Kolk et al., 2019). These programs are generally curriculum- or policy-based, and typically consist of nutrition education for children that includes activities to encourage tasting of new foods, policies to improve the type of food provided (by the parent or childcare provider), or physical activity programs aimed at developing gross motor skills and/or increasing active play at the centre (Appendix A). It is common for these types of programs to use posters, newsletters, and information sheets to encourage parents to apply the healthy eating and active play messages at home (Appendix B). ECEC interventions with more direct⁶ parent involvement include components such as webinars, workshops, family events, lectures, home visits, motivational interviewing sessions, information evenings and phone calls (van de Kolk et al., 2019).

Interventions delivered in a community setting often target parents only, or aim to engage the whole family (Ash et al., 2017; Mehdizadeh et al., 2020). These programs are discussed in detail in section 2.4.2, but a common feature of the setting is that parents need to travel to the venue specifically to attend the program. Few have

⁶This systematic review defined direct parent involvement as “parents’ presence requested at education sessions and/or parents attendance and participation requested for family behavior counselling or parent training sessions” (van de Kolk et al., 2019, p. 2)

been delivered to existing parent groups where parents are already in attendance and have potentially already formed social networks with other parents (Skouteris et al., 2011; Waters et al., 2011). However, as noted above, there are some group programs designed for first-time parents (usually mothers) that are delivered at child health clinics where parents often bring their infant for a “well baby” check. A parent group setting with minimal presence in the literature is the Australian playgroup. The unique aspects of this setting, and the interventions that have been delivered and evaluated in the literature are now discussed.

Playgroup in Australia

In Australia, playgroups are parent groups where parents and their children under the age of 5 years meet informally, once or twice a week for 2-3 hours, for socialising and unstructured play (Playgroup Australia, 2013). The peak body for playgroups in Australia is Playgroup Australia, but each state has an independent playgroup organisation under this umbrella (for example, Playgroup Queensland (PGQ)). There are two main types of playgroups: Supported Playgroups (SPGs) and community playgroups (Gregory et al., 2016). SPGs are government funded, are run by qualified co-ordinators, and provide specific programs and support for disadvantaged and isolated families (Weber et al., 2014). They may be attended by families of high disadvantage, including with issues such as domestic violence, mental health issues, substance abuse and very young parents (Jackson, 2011). Community playgroups are parent groups self-managed and run by the attending parents, and are open to all parents and carers of a child under school age, with the age of children attending ranging from infants up to 5 years old (Playgroup Queensland, 2019a). Community playgroups are places for parents to socialise with their peers and to discuss shared experiences and similar concerns (Njegac et al., 2016; Playgroup Australia, 2013).

Interventions at Supported Playgroups

SPGs have been evaluated as potential settings for health promotion and general parenting programs, particularly in respect to leveraging peer social support and the advantages of the informal setting for play-based learning for children and carers (Lakhani & Macfarlane, 2015; Lloyd et al., 2017). One example is the Active Play@Playgroup program. The program provided training, a manual, and other resources to SPG co-ordinators so that they could promote active play and reduced screen time to the families at playgroup (Weber et al., 2014). The program was

successful in increasing parents' knowledge of the recommendations, and participants significantly increased the time they spent playing actively with their child (Weber et al., 2014). However, the published paper did not provide a lot of detail of the intervention, and the study authors had difficulty contacting all the parents who attended for intervention evaluation, due to ad hoc attendance at playgroup (Weber et al., 2014).

Another SPG intervention that aimed to promote healthy eating and active play was the Have Fun – Be Healthy program run by PGQ (Pathirana et al., 2018). This program used structured play activities, including cooking and physical activity sessions, to encourage healthy eating and active play (Pathirana et al., 2018). The 8-week program was run by trained facilitators and resulted in increased parental self-efficacy and improvement in eating and screen time behaviours in the children (Pathirana et al., 2018).

Finally, *smalltalk* was a program delivered in SPGs and targeted parents from disadvantaged families (Hackworth et al., 2017). This informal program, run during the usual playgroup meeting, used facilitated individual and group discussions, play activities, and home resources, to help parents plan and implement a warm home learning environment for their child (Hackworth et al., 2017; Nicholson et al., 2016). The informal playgroup setting was important for participant engagement and retention, particularly in the vulnerable population targeted, but parents apparently felt more comfortable actively participating in the groups run by a facilitator who was close to their own age (Hackworth et al., 2018). Further information on these programs, including a summary of the outcomes, is provided in Table 2.1.

Table 2.1

Feasibility studies and intervention trials conducted in Australian playgroups

Intervention name (reference)	Type of study	Behaviour Targeted	Location/setting and details of Intervention	Outcomes measured	Results/conclusions
REFRESH (Monteiro et al., 2014)	Feasibility 249 mothers 25 staff	Diet, PA (mothers)	Perth CPGs (multi-strategy, including home-based) 6 mth intervention aimed at mothers - Info booklet on diet and PA supported by diet & PA workshops at playgroup, newsletters & text messages.	Process evaluation	Playgroups are a suitable setting for health promotion targeting mothers of young children
REFRESH (Jancey et al., 2014)	RCT 521 mothers			Diet - fat, fibre, SSB etc.	Improvements in fat, fibre, FV, wholegrains, lean meat/chicken. No changes to SSB
Active Play@Playgroup (Weber et al., 2014)	Feasibility 174 parents (16 playgroups)	PA, Sedentary	Sydney SPGs 10-week intervention. A manual, training & resources provided to the playgroup. Coordinators planned & implemented activities & communicated active play messages to parents. Parents also sent text messages.	Feasibility of SPG setting. Active play & screen time outside playgroup. Knowledge of PA recommendations. Acceptability of text messages.	Small increases in PA & parent knowledge - not statistically significant due to small sample. Increase in coordinators' confidence in answering questions about active play & screen time. Planned more unstructured active play. 53% parents interested in text messages Intervention feasible and potentially effective.
Have Fun – Be Healthy (Pathirana et al., 2018)	Pre-post 312 parents with complete data	Diet, PA (children) PSE	Queensland SPGs (rural and urban locations) 4 play-based healthy eating (cooking) sessions; 4 play-based active sessions Each session 1-2 hrs each, delivered over 8 weeks. Take home resources (information booklets and cards with recipes and play ideas)	PSE for promoting healthy food, limiting unhealthy food, limiting screen time, promoting PA Dietary, PA and sedentary behaviours in children	Significant: Increase in PSE (healthy eating, screen time) Non-significant: Increase in PSE (unhealthy eating, PA) Increased FV and milk Decreased SSB & packaged snacks Increased PA Decreased screen time
<i>Smalltalk (Toddler)</i> (Haekworth et al., 2017)	Cluster RCT (3 arms) 1200 parents of toddlers (12-36 mths)	Parenting (general)	Victorian SPGs (58 locations) 10-week intervention; 2-hr sessions Group intervention (parent and child) with or without home coaching. Facilitators discussed parenting strategies one-on-one or in small groups. Structured play activities. Parents received DVD and printed resources Parents in <i>smalltalk plus</i> arm received 6 x 60min home visits in addition to the group sessions	Parent verbal responsiveness (characterised by parental sensitivity and warmth) Home learning environment (re language and activities)	At 12 weeks follow-up: no effect for <i>smalltalk group-only</i> group compared to control (standard SPG attendance) At 32 weeks follow-up: <i>smalltalk group-only</i> greater improvements in both outcomes compared to control (small effect sizes) <i>smalltalk plus</i> did not show greater improvements than <i>smalltalk group-only</i>

CPG = Community playgroup; SPG = Supported playgroup; FV = Fruit & Vegetable intake; PA = Physical activity; PSE = Parental Self-efficacy; SSB = Sugar-sweetened beverage intake

Interventions at community playgroups

Like SPGs, community playgroups are places of social support (McShane et al., 2016; Playgroup Australia, 2013). In Australia, 7,560 community playgroups operate across 75% of postcodes (Playgroup Australia, 2018), and 36% of children attend playgroup before starting school (Gregory et al., 2017). In Queensland, there are currently 289 community playgroups, with 3,573 participating families (Playgroup Queensland, 2019a). The vision and values of Community Playgroup are to nurture young children, and support the wellbeing of families by playing a role in developing the strengths of children and families (Playgroup Australia, 2018; Playgroup Queensland, 2016). The philosophy behind the playgroup mission, therefore, creates a synergy with childhood obesity prevention initiatives that focus on supporting positive and effective parenting skills and strategies. As such, a community playgroup setting seems an obvious choice to deliver an intervention targeting parents of young children.

Although, there is less evidence in respect to interventions delivered in community playgroups, there is some published research in respect to the feasibility and advantages of this setting, particularly in Western Australian playgroups (Harman et al., 2014; Jones et al., 2010; Strange et al., 2014). A common theme across all of the studies is in respect to the socialisation and support that parents (mothers) receive at playgroup (Strange et al., 2014). It is where mothers can share their experiences and stress of parenting, and receive validation and reassurance from others in the same situation (Harman et al., 2014). Further, a focus group study with 65 mothers at community playgroups in Perth, Western Australia, concluded that playgroups were an appropriate setting for health promotion as long as the intervention was brief and flexible (Jones et al., 2010). However, only one intervention delivered in community playgroups was identified from the literature search. Reminder on Food, Relaxation, Exercise and Support for Health (REFRESH) was a 6-month program that aimed to encourage healthy eating and increase physical activity in young mothers attending playgroup (Jancey et al., 2014), and is summarised in Table 2.1.

REFRESH was a multi-strategy intervention consisting of monthly workshops, information booklets, newsletters, and take-home resources (pedometer, menu planner, exercise chart, recipe booklet etc.) (Monteiro et al., 2011). The workshops covered goal-setting, a 10,000 steps challenge, an exercise program, and recipe modification activities (Monteiro et al., 2011). The outcomes of a feasibility pilot

concluded that the mothers could be successfully engaged in a playgroup setting by including their children in the sessions (Monteiro et al., 2014). However, although the majority of participants rated the workshops highly, participation declined from 82% (Workshop 1) to 51% (Workshop 6) (Monteiro et al., 2014). A further study of REFRESH, with 521 mothers attending 220 playgroups, evaluated intervention impact using a cluster randomised controlled trial design (Jancey et al., 2014). There were moderate post-intervention improvements in consumption of fat, fibre, fruit and vegetables, although not in sugar-sweetened beverage consumption (Jancey et al., 2014). Physical activity outcomes were not reported.

Despite the advantages of delivering an intervention to a community parent group with existing social connections, the community playgroup setting presents a gap in the research in respect to obesity prevention interventions delivered to parents of young children. As such, the exploration of this setting is one of the aims of this thesis. The following section is a review of obesity prevention interventions delivered to parents of children under 5 years delivered in other community-based settings.

2.4.2 Community-based obesity prevention interventions targeting parents

2.4.2.1 Interventions targeted at parents of children under 2 years

Due to the unique needs of first-time parents of infants, there are interventions that specifically target these parents. They generally aim to provide anticipatory guidance on breast-feeding, infant formula composition, sleep issues or transitioning infants to solids (Blake-Lamb et al., 2016; Ciampa et al., 2010; Matvienko-Sikar et al., 2018). Four interventions delivered to groups of parents of infants were identified from the literature, and all were delivered in a clinical setting.

The Infant, Feeding, Activity, and Nutrition Trial (InFANT) program was delivered every three months by a dietitian during a regular first-time-parent group meeting (Campbell et al., 2008; Campbell et al., 2013). The program covered physical activity and TV viewing, in addition to guidance around infant feeding and diet (Campbell et al., 2013). The intervention, delivered over 15 months from when the infants were 4 months old, was effective in reducing sweet snack consumption and TV watching at 20 months (Campbell et al., 2013). The program included group discussions to explore perceived barriers to implementing key messages, and leveraged the social support of the existing parent group to reinforce the messages

(Campbell et al., 2008). In fact, the building of social support was a key aspect of the intervention (Campbell et al., 2013). The majority of parents (68%) attended at least four sessions and over 80% found the group discussions useful and relevant (Campbell et al., 2013).

The NOURISH program was delivered to first-time mothers and targeted eating behaviours only, providing support for authoritative parenting (Daniels et al., 2014). The program, delivered in two modules of six sessions each by a dietitian and psychologist, centred on concepts around responsive feeding (Daniels et al., 2009). Although the program was not delivered to existing parent groups, it was conducted at child health clinics, a location that was likely to be convenient to the mothers who participated. The intervention had a “modest impact” on child eating practices, diet quality and food preferences, and demonstrated the importance of anticipatory guidance before feeding practices are established in first-time mothers (Daniels, 2014).

The USA intervention, Well Baby Group Care program (WBG), also aimed to encourage mothers to implement responsive feeding practices, in addition to providing nutrition education (Machuca et al., 2016). The intervention leveraged the social support of the peer group environment by delivering the program to the same group of 6-8 mothers with infants of the same age, over an 18-month time frame. WBG replaced the one-to-one well-baby visits that parents were scheduled to attend at their health clinic with the 11 group sessions, starting when the infant was 1 month old. The program ran with three themes: 1) applied nutrition knowledge (including label reading, portion size and recipe makeovers); 2) mothers as role models; and 3) responsive feeding practices. Post intervention, the infants were 90% less likely to be overweight at 2 years old than those who received traditional care. However, no other outcomes were measured. (Machuca, 2016).

Table 2.2

Group interventions targeted at parents of children under 2 years old

Intervention (Country) (reference)	Type of Study ^a	Theoretical Framework ^b	N	Setting and Length of Intervention (delivered by)	Parenting Practices and child behaviours targeted ^c			Intervention Effects ^c												
					Parenting Practices or PSE	Diet and/or eating	PA TV Sleep	↑ small or non-significant increase or improvement ↓ small or non-significant decrease ↑/↓ significant effect — no intervention effect	Parenting Practices or PSE	Diet and/or eating	PA TV Sleep Weight status									
InfANT (Australia) (Campbell et al., 2013)	Cluster RCT	SCT	542	Maternal & Child Health Centre 6 sessions over 15 mths (dietitian)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	↓SSB (at 9mths) ↓ sweet snacks — savoury snacks — FV	— — — — — —	— — — — — —	— — — — — —	No effect on BMI z-score	
NOURISH (Australia) (Daniels et al., 2014)	RCT	SCT & Reciprocal relationship between feeding practices & infant feeding behaviour	698	Child Health Clinic 2 sessions over 3 mths (dietitian & psychologist)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	↑ autonomy encouragement	↑ eating behaviours	—	—	—	—
Well Baby Group Care (USA) (Machuca et al., 2016)	Non-randomised observational comparison group	SCT & Stages of Change	Intervention = 47 Control = 140	Health Centre 11 sessions over 18 mths (health centre staff & dietitian)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	—	—	—	—	—	90% less likely to be OW/obesity compared to controls
First Steps for Mommy and Me (USA) (Taveras et al., 2011)	Non-randomised controlled trial	—	Intervention = 60 Control = 24	Primary care Individual coaching + 4 group sessions over 6 mths (Health educator)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	— Responsive to satiety cues — breastfeeding — maternal health behaviours	Solids at 6mths: 57% intervention vs 82% control	—	—	—	—

^aRCT=Randomised Controlled Trial

^bSCT= Social Cognitive Theory

^cFV=Fruit and Vegetable intake; OW=overweight; PA=Physical activity; PSE=Parental Self-efficacy; SSB=Sugar-sweetened Beverage intake; TV=Television viewing

While the results of these programs are encouraging, the anticipatory guidance in respect to responsive feeding practices and other autonomy promoting parenting practices are only the first step in preventing childhood obesity. It seems appropriate that as the child grows, particularly as the child starts to exert their independence around eating and other behaviours, additional support for parents is needed. Therefore, interventions targeting parents of children across all preschool ages, including as a follow-on to the programs for parents of infants, are also crucial. Indeed, many interventions for parents of young children are specifically designed for the 2-5 year-old age-group, and these interventions are now discussed.

2.4.2.2 Interventions targeting parents of children 2-5 years

Twenty-four parent programs, whose main objective was the prevention of obesity in children aged 2-5 years, were identified from the literature. These 24 interventions were evaluated in 29 published papers (Table 2.3). Of the 29 studies, 13 were randomised controlled trials, and the remaining 16 were pilot/feasibility studies using non-randomised intervention and control groups, or had a pre-test/post-test study design, without a control group. Across all of the trials, participant numbers ranged from 16 to 1,816 (although most had between 50 and 200 participants). Only 10 studies reported either six- or 12-months post intervention follow up data.

Table 2.3

Group interventions targeted at parents of children 2-5 years

Intervention (Country)	Theoretical Framework ^b	Type of Study ^a	N	Age	Setting and Length	Type of Program (delivered by)	Parenting Practices, Parental Self-efficacy (PSE) and/or child behaviours targeted ^d					Intervention Effects ^d					
							Parenting Practices / PSE	Diet and/or eating	PA	EM Use	Sleep	Data Collected	Parenting Practices / PSE	Diet and/or eating	PA	EM Use	Sleep
Active Play (England) (O'Dwyer et al., 2012)	Socio-ecological Model (Re, SE, SR)	RCT	77	Mean 3.7 yrs	Sure Start Children's Centres 10 weeks	Family group program (Professional play workers; Education sessions delivered by researcher)	Y	Y	Y	Y	Pre & post	↑↑	↑↑	↓↓			
Active Play @Playgroup (Australia) (Weber et al., 2014)	None stated	Pre-post	174 parents (16 playgroups)	0-5 yrs	Supported playgroup venues 10 weeks	Active play resources for parents & children (trained playgroup staff)	Y	Y	Y	Pre & post	↑	↑	↓	week day			
CHILE (USA) (Davis et al., 2016)	Socio-ecological model (BC, SE, SS)	Cluster RCT	1816 children (16 preschools)	2-5 yrs	Head Start Preschools 2 years	Multi-component including family events & newsletters	Y	Y	Y	Pre & post + twice during							
CHILE (USA) (Cruz et al., 2016)	Socio-ecological Model (BC, SE, SS) & Psychological / Organisational Empowerment Theory	Pre-post	648 children (16 preschools)	Mean 3.5 yrs	Head Start preschools 12 months (including 6-week group program)	(CHILE team members & health professionals)	Y	Y	Y	Pre & post	↑↑	↑↑	↑↑	SE (offer healthy food)	↑↑ PA	↑ offering FV	— screen
Communities for Healthy Living (CHL) (USA) (Davison et al., 2013)	Family Ecological Model (BC, SE, SS) & Psychological / Organisational Empowerment Theory	Pre-post	154	Mean 3.5 yrs	Head Start preschools 12 months (including 6-week group program)	Multi-component incl. group parent program (Peer facilitators & experienced group moderator)	Y	Y	Y	Pre & post	↑↑ SE (offer healthy food)	↑↑ PA	↑ offering FV	— screen	↓ energy intake	↑↑	↓

Intervention (Country)	Theoretical Framework ^b	Type of Study ^a	N	Age	Setting and Length	Type of Program (delivered by)	Parenting Practices, Parental Self-efficacy (PSE) and/or child behaviours targeted ^d					Intervention Effects ^d						
							Parenting Practices / Knowledge / PSE	Diet and/or eating	PA	EM Use	Sleep	Data Collected	↑small or non-significant increase ↓small or non-significant decrease ↑↑/↓↓ significant effect — no effect	Parenting Practices / Knowledge / PSE	Diet and/or eating	PA	EM Use	Sleep
Eat Healthy, Stay Active (USA) (Herman et al., 2012)	SLT (OL, SE, SS) & “theories of communication, empowerment & engagement”	Pre- post	438	3-5 yrs	Head Start preschools	Preschool nutrition/PA curriculum; Nutrition education for parents (trained ECEC staff)	Y	Y	Y	Y	Pre & post	↑↑ knowledge (parents & staff combined results)	↑↑	—	—	—	—	↓
Family@play (Australia) (Hinkley et al., 2015)	SCT (BC, RD) & Family Systems Theory	RCT	16	2-3 yrs	University venue 5 weeks	Group parent program (trained facilitator, not part of research team; qualifications not stated)	Y	—	—	Y	Pre & post	↑ Parent perceptions of adverse effects of EM — PSE to limit EM use — PSE to support PA (not reported)	—	—	—	—	—	↓
Family-based Hip-Hop to Health (USA) (Fitzgibbon et al., 2013)	SCT (BC, OL, SR (child)) & SDT (Intrinsic Motivation – child sessions)	Cluster RCT	146 children (4 preschools)	3-5 yrs	Head Start preschools 14 weeks	Family group program (facilitator not stated – possibly the researchers)	Y	Y	Y	Y	Pre & post + 1- year follow-up	None measured	—	—	↑	—	—	—
Fit WIC (USA) (McGarvey et al., 2004)	SCT (OL, SE, SR (child))	NonRT	186	2-4 yrs	WIC child health centres 12 mths	Parent group program (Nutritionist)	Y	Y	Y	Y	Pre & post	↑↑ active play with child ↑↑ offering water — planning & eating meals together	—	—	—	—	—	—

Intervention (Country) (Study Reference)	Type of Study ^a	Theoretical Framework ^b	N	Age	Setting and Length	Type of Program (delivered by)	Parenting Practices, Parental Self-efficacy (PSE) and/or child behaviours targeted ^d					Intervention Effects ^d						
							Parenting Practices/ Knowledge / PSE	Diet and/or eating	PA	EM Use	Sleep	Data Collected	Parenting Practices/ Knowledge / PSE	Diet and/or eating	PA	EM Use	Sleep	BMI
Growing Healthy Study (USA) (Lumeng et al., 2017)	Cluster RCT – 3 arms	SCT (BC, OL, Re, SE, SR (child)) & Experiential Learning	697 (6 classes)	Mean 4.1 yrs	Head Start Preschools 1 year	Group parent sessions (Nutrition educator)	Y	SR FV SSB variety	Y	Y	Y	Pre & post	— Parent Nutrition SE — NKn	↑ SR — FV ↓ SSB — variety	—	—	—	↓
Growing Right Onto Wellness (GROW) (USA) (Barkin et al., 2018)	RCT	SCT & Sociocological model (goal setting; problem solving)	610	3-5 yrs	Community recreation centre 12 weeks	Family-based skills building sessions (“interventionist”)	Y (but only knowledge specified)	Y	Y	Y	Y	Baseline + 3, 9, 12, 24, 36 mths	—	↓ energy intake	—	—	—	—
Health with the Family (USA) (Barkin et al., 2012)	RCT	SCT (BC, SR)	106	2-6 yrs	Community recreation centre 12 weeks	Family group program (Spanish-speaking trained facilitator)		Y	Y	Y	Y	Pre & post + 3 mths follow up						↓

Intervention (Country)	Theoretical Framework ^b	Type of Study ^a	N	Age	Setting and Length	Type of Program (delivered by)	Parenting Practices, Parental Self-efficacy (PSE) and/or child behaviours targeted ^d					Intervention Effects ^d					
							Parenting Practices / Knowledge / PSE	Diet and/or eating	PA	EM Use	Sleep	Data Collected	Parenting Practices / Knowledge / PSE	Diet and/or eating	PA	EM Use	Sleep
Healthy Children Healthy Families (HCHF) (USA)	SCT (BC, OL, SE, SR (child)) & "socio-ecological perspective"	Pre-post	210	3-11 yrs	Community venue 8 weeks	Parent group program (Trained para-professional educator)	Y	Y	Y	Y	Y	Pre & post	— Parent eats with child ↑ Child decides how much to eat ↓ ED food less available ↑ Fruit offered & available	↑ FV ↑ low fat dairy ↓ SSB	↑	↓	↑ small or non-significant increase ↓ small or non-significant decrease ↑/↓/↔ significant effect — no effect
(Dickin et al., 2014)																	
HCHF (USA)		Pre-post	85				Y	Y	Y	Y	Pre & post	↑↑ encourage balance & variety ↓↓ ED snack availability ↑↑ Fruit availability ↑ modelling, involvement, teaching — Non-resp. parenting	↑ low fat dairy	↑			
(Otterbach et al., 2018)																	
Healthy Living (USA)	SCT (OL)	Pre-post	33	3-5 yrs	Community health centre 9 months	Group parent education (Trained community health)	Role-modelling (walking)	Y	Y	Y	Pre & post + 6-mths follow-up	↑ walking ↓ SSB — bottled vs tap water ↑ 1% fat milk ↓ 2% fat milk	↓ SSB — bottled vs tap water ↑ 1% fat milk ↓ 2% fat milk				—
(Bender et al., 2013)																	

Intervention (Country) (Study Reference)	Type of Study ^a	Theoretical Framework ^b	N	Age	Setting and Length	Type of Program (delivered by)	Parenting Practices, Parental Self-efficacy (PSE) and/or child behaviours targeted ^d					Intervention Effects ^d						
							Parenting Practices/ Knowledge / PSE	Diet and/or eating	PA	EM Use	Sleep	Data Collected	↑ small or non-significant increase	↓ small or non-significant decrease	↑/↓/↔ significant effect — no effect	Diet and/or eating	PA	EM Use
HENRY (UK) (Willis et al., 2014)	Pre-post	SCT (OL, SE, OL, SE)	60	0-5 yrs	Community venues	Family group program	Y	Y	Y	Y	Y	Pre & post + 8-weeks follow-up	↑↑ PSE ↑ family meals	↑ FV ↓ cakes	↑	—	—	—
HENRY (UK) (Willis et al., 2016)	Pre-post		624	0-5 yrs	8 weeks	(HENRY staff or trained children's centre staff)	Y	Y	Y	Y	Pre & post	↑↑ PSE	↑ positive eating behaviours	↑	↓			
Home Sweet Home (USA) (Knol et al., 2016)	Pre-post	SCT (BC, OL, Re, RD, SE, SR) & Home Food Environment Model	47	3-5 yrs	Community venues	Group parent education	Y	Y	Y	Y	Pre & post	— family meals	↑ ME ↓ "red light" foods					
Make a Move (USA) (Nemud & Samra, 2017)	RCT	SCT (BC, EX, OL, Re, SE)	27	3-5 yrs	Head Start Centre 4 weeks	Group lessons/activities with guided discussion (Community nurse)	Y				Pre & post	↑↑ healthy eating knowledge ↑↑ PA attitude / behaviour — healthy eating attitude / behaviour — PA knowledge						
MEND 2-4 (Australia) (Skouteris et al., 2016)	RCT	SCT (OL, SE, SR, SS)	201	2-4 yrs	Community venues 10 weeks	Family group program (trained child health nurses, childcare workers etc)	Y	Y	Y	Y	Pre & post + 6- & 12-mths follow-up		↑ FV ↓ snacks ↑ satiety responsive ↓ neophobia	—	—	—	—	—

Intervention (Country)	Theoretical Framework ^b	Type of Study ^a	N	Age	Setting and Length	Type of Program (delivered by)	Parenting Practices, Parental Self-efficacy (PSE) and/or child behaviours targeted ^d					Intervention Effects ^d					
							Parenting Practices / Knowledge / PSE	Diet and/or eating	PA	EM Use	Sleep	Data Collected	Parenting Practices / Knowledge / PSE	Diet and/or eating	PA	EM Use	Sleep
NEAT (USA) (Horodynski et al., 2004)	SCT (BC, OL, SE, SR (child), SS)	NonRT	32	12-36 mths	Early Head Start preschools 3 classes	Group nutrition education (Nutrition educator)	Y	Y				Baseline + 6 mths follow up	↑ toddler feeding knowledge	—			
NEAT (USA) (Horodynski & Stommel, 2005)		NonRT	96	11-25 mths	Early Head Start preschools 6 mths	Group nutrition education (Trained nutrition instructors)	Y	Y				Baseline, 4 weeks post + 6-months follow-up	↑ nutrition knowledge ↑ PSE (both groups)	— toddler self-regulation			
NEAT: Raising Healthy Eaters (USA) (Harvey & Coleman, 2008)	SCT (BC, EX, OL, RD, Re, SE)	Pre-post	24	2-5 yrs	Early Head Start preschools 8 lessons	Group nutrition lessons / discussions (University family & consumer science educators)	Y	Y				Pre & post	↑ knowledge ↑ PSE ↑ meals without TV				
Parent Training (USA) (Slusser et al., 2012)	SCT (BC, SR, SE (child)) & Satter's Division of Responsibility in Feeding	RCT	121	2-4 yrs	Community venues 7 weeks	Parent group program (social worker)	Y	Y	Y	Y	Y	Baseline & 1-year follow-up					↕
Parents and Tots Together (USA) (Haimes et al., 2016)	SCT (BC, SE, SS) & SCF	RCT	96	2-5 yrs	Community health centres 9 weeks	Family group program (trained facilitator – qualifications etc not stated)	Y	Y	Y	Y	Y	Pre & post + 9-months follow-up	— PSE ↓ restrictive feeding — pressure to eat	—	—	—	—
Parents and Tots Together (Canada)		RCT	48	2-5 yrs	Early Years centres		Y	Y	Y	Y	Y	Pre & post + 9-months follow-up	↑ PSE (managing aggressive behaviour)	—	—	—	—

Some of the programs were part of a multi-component intervention (for example, complementing a preschool program or delivered in tandem with a community health promotion), but they have been included in Table 2.3 if the parent group program was a major part of the overall intervention. One such intervention was the Child Health Initiative for Lifelong Eating and Exercise (CHILE) program. It focussed on both micro and macro level systems, whereby five levels of influence were considered (individual, interpersonal, organisational, community, and public policy) (Davis et al., 2013). The program was delivered to parents, teachers, and children at Head Start preschools in rural communities in USA (Cruz et al., 2016; Davis et al., 2013). While the central component of this program was the preschool nutrition and PA curriculum (organisational level influences), the family influences (i.e. interpersonal level) were also targeted via materials sent home, and family healthy eating and PA events (Davis et al., 2013). The program demonstrated some success in increased PA at home in preschool children (Cruz et al., 2016), but after two years there were no differences in BMI z-scores between intervention and control groups (Davis et al., 2016).

Communities for Healthy Living (CHL) employed a similar socio-ecological model to CHILE, but with a family ecological framework (Davison et al., 2013). CHL was a multi-component obesity prevention intervention underpinned by the Family Ecological Model and empowerment theories (Davison et al., 2012). The 6-week parent program was primarily focussed on parent networking and family conflict resolution skills, and was supplemented by a child program at the preschool, a community health campaign, and family events (Davison et al., 2013). A 2009-2011 CHL pilot study resulted in significant intervention effects in child outcomes and parental self-efficacy, and the study authors credited this success to the Community-Based Participatory Research model (Davison et al., 2013). The authors also linked improvements to parenting practices to the increased empowerment resulting from the parent involvement in intervention design (Jurkowski et al., 2014). There was an increase in parental self-efficacy to promote healthy lifestyle behaviours, which the study authors linked to “positive changes” in food and PA parenting (Jurkowski et al., 2014). The “positive changes” in parenting outcomes included a marginal increase in the provision of fruit and vegetables and a significant increase in support for PA (Davison et al., 2013). However, because of the multi-component nature of the CHL program, it is difficult to attribute the positive outcomes to any one component. In

addition, only one of the six group parent sessions directly targeted obesity related behaviours (nutrition). Other topics included media literacy, family conflict resolution, and leveraging of community resources (Davison et al., 2013).

The following sub-sections discuss the remaining interventions targeting parents of children aged 2-5 years. Sub-section 0 provides an overview of interventions that targeted sleep behaviours in children. Unlike the other obesity-related behaviours (eating, physical activity, and screen time), sleep is rarely included in obesity prevention interventions, so this potential gap is explored here. The interventions mentioned in this section are then covered in more detail in section 2.4.2.2.3, with other interventions targeting parenting practices.

Section 2.4.2.2.2 discusses interventions that focus on nutrition and/or physical activity education to parents. Given that education alone is unlikely to elicit behaviour change (National Cancer Institute, 2005), it is prudent to compare the intervention components and outcomes of “educational” interventions.

Section 2.4.2.2.3 reviews the six interventions that targeted a range of parenting practices with the aim of encouraging and supporting parents to use appropriate practices. These types of interventions also tend to target parental self-efficacy. Parenting practices and parental self-efficacy are central to this thesis, so it is particularly important to identify which practices were targeted, how the program delivered the parenting messages, and whether there was any change to parenting practices targeted.

Finally, section 2.4.2.2.4 covers the interventions that aimed to improve child self-regulation, either directly or via parenting practices.

2.4.2.2.1 Interventions targeting sleep

Previous reviews have identified that the majority of obesity-prevention interventions target the diet and/or physical activity domains, some target screen time, but few include sleep (Ash et al., 2017; Skouteris et al., 2011). Ash and colleagues (2017) reported that only 16% of all family-based interventions (across a variety of settings, and all age groups up to 17 years) targeted all four obesity-related behaviours. A further review by these researchers found only five of the 15 family-based interventions targeting parents of 2-5 year-olds, and delivered in the community, included sleep (Parent Training, Mind, Exercise, Nutrition...Do It! 2-4, Parents and

Tots Together, Growing Right Onto Wellness, and My Parenting SOS) (Agaronov et al., 2018). Of the 24 interventions identified for the current review, these same studies were the only programs that targeted all four obesity-related behaviours.

Parent Training incorporated “regular sleep” as a key message in the two modules that covered “consistent daily routines” (Slusser et al., 2012). One of the Mind, Exercise, Nutrition ... Do It! (MEND) 2-4 workshop sessions, “Encouraging healthy habits”, discussed “rules, routines and tantrum management” and covered the “MEND 2-4 sleep guidelines” (Skouteris et al., 2010). The Parents and Tots Together (PTT) program aimed to support parents to create a bedtime routine by devoting one of the nine program sessions to the importance of family routines (Haines et al., 2012). Growing Right Onto Wellness (GROW) devoted a whole session to “Sleep Matters”, although their key messages appeared to be focussed on why sleep is important and how much sleep children need, rather than sleep parenting practices (Po'e et al., 2013). Finally, My Parenting SOS, has only been published as a study protocol (Ward et al., 2011). However, based on the protocol paper, it appears that one of the sessions was devoted to “Sleep habits” with key messages around creating bedtime routines that include quality time between parent and child (Ward et al., 2011). For the evaluated interventions, sleep outcomes were either not measured (Barkin et al., 2018; Skouteris et al., 2016; Slusser et al., 2012), or there was no intervention effect on child sleep behaviours (Haines et al., 2016; Walton et al., 2015). Each of these interventions (excluding Parenting SOS) are reviewed further in section 2.4.2.2.3.

Finally, another intervention that included sleep took a broader view and aimed to increase parent health literacy (Fleary et al., 2013). The intervention, developed using the Bioecological Model, focussed on teaching parents about the links between health behaviours and disease, and the link between stress and mental wellness (Fleary et al., 2013). The pilot program used experiential techniques to increase participant knowledge (for example, practicing portion sizes, developing sleep schedules, and discussing strategies in respect to child behaviours). The results of this small trial included increases in parental knowledge in respect to diet/nutrition, PA and sleep, and the relationship between sleep and health (Fleary et al., 2013). However, this study did not have a control group and there was minimal intervention effect on parenting practices or child behaviours post-intervention (Fleary et al., 2013).

2.4.2.2.2 Nutrition and/or physical activity education interventions

For many of the interventions, the primary focus was on educating parents around food and nutrition, with less emphasis on parenting practices or providing support for making behavioural changes. Some of these programs did attempt to apply Social Cognitive Theory to behaviour change strategies used in the intervention. Some interventions specifically focussed on parental role-modelling. However, there were minimal intervention effects observed in respect to parenting practices, child behaviours, or BMI. Unfortunately, most of the interventions were also small pilot trials without a control group and without any long term follow-up of results. Despite the limitations in respect to study design or participant numbers, it is evident from the published results from these interventions that educating parents on healthy eating or active play, even when barriers and strategies to change are discussed, is not enough for long term behaviour change.

Healthy Kids, Healthy Futures

Healthy Kids, Healthy Futures was a multi-component program that included a group parent education program as well as early childhood staff training, and a community-based PA program for families (Agrawal et al., 2012). The parent program consisted of 4 x 90-minute education sessions that included “strategies for energy in, and strategies for energy out” (p. 194). Comparison of pre- and post-program questionnaire results showed no change in parent knowledge or attitudes, although there was a significant improvement in respect to intentions toward providing healthier food, smaller portions and supporting children to engage in PA with their friends. The study did not have a control group but it should also be noted that this was a long running multi-component obesity prevention initiative (3 years at the time of publication), and only a small amount (n=35) of pilot data was available for the evaluation. (Agrawal et al., 2012)

Eat Healthy, Stay Active!

A program that resulted in decreases in BMI scores for both parents and children was the Eat Healthy, Stay Active! program (Herman et al., 2012). The intervention

used a healthy eating and PA curriculum to educate Head Start⁷ staff, parents, and children. The parent group education sessions aimed to teach parents about obesity and chronic disease prevention by covering the nutrition basics, shopping on a budget, and integrating PA into daily life. The conceptual model developed for this program proposed that increased parental knowledge and improved attitudes around nutrition and PA would lead to the adoption of healthy eating behaviours and appropriate levels of PA. However, because neither parenting practices nor child behaviours were measured, and there was no control group, linking this model with the positive results in respect to BMI outcomes is problematic. (Herman et al., 2012)

Active Play

Active Play was an intervention aimed at increasing PA and reducing screen time via a 10-week family group program (O'Dwyer et al., 2012). Each 60-minute session included a 20-minute educational workshop for the parents (while children took part in separate activities), and 40 minutes of group (parents and children) active play. The education session topics included PA and screen time guidelines, development of fundamental movement skills, importance of MVPA, overcoming barriers to perceived risks of play, and ways to limit screen time. A socio-ecological model was used to design the intervention, with the home environment as the main focus. The families were recruited from Sure Start Children's Centres in a low-socioeconomic area of England, and the intervention was evaluated using a cluster randomised controlled trial (4 groups with around 30 families in both the intervention and control arms). There was a significant intervention effect on both child and caregiver PA and sedentary activity, measured via accelerometers. Although parent education was a major aspect of the intervention, the study authors also used a number of behaviour change techniques, including goal-setting, feedback, and rewards. They also provided support between sessions via text messages to reinforce the key program messages, which would likely have been important factors in the program's favourable post-intervention outcomes. However, the study authors acknowledged that the main

⁷ Head Start programs are aimed at low income and disadvantaged families in USA. They are based in child care centres, preschools and schools and provide programs that support the health of the child and family. <https://www.acf.hhs.gov/ohs/about/head-start>

limitations were the high level of parental engagement required (particularly at home). (O'Dwyer et al., 2012)

Family@play

The Family@play intervention was focussed on family influences in respect to screen time (Hinkley et al., 2015). The program had the primary aim of reducing EM use in 2-3 year-old children via an intensive parent education and support program. In this intervention, Family System Theory was used to focus on change strategies that targeted issues related to family dynamics. Families at the sessions discussed the activities to be undertaken at home, and the group discussed strategies to deal with possible challenges. A number of behaviour change techniques were used, including goal-setting, planning, and monitoring, and text messages provided support between sessions. However, the high level of parent commitment required appeared to be a barrier to attendance, as only six families in the Family@play intervention group completed the 6-session program, and feedback from those participants indicated that the number of sessions was excessive (Hinkley et al., 2015).

Make a Move

An intervention delivered to Head Start parents of children aged 3-5 years that used Social Cognitive Theory constructs to elicit behaviour change was the Make a Move program (Nerud & Samra, 2017). The program, evaluated in a small randomised controlled trial (N=10), consisted of four weekly sessions delivered by a community nurse. The sessions were educational but also included group discussions in respect to strategies around availability and accessibility of healthy food, limiting discretionary food and beverages, family PA and decreasing screen time. The intervention had a positive effect on parental knowledge of healthy eating (but not attitude or behaviours), and parental attitude and behaviours in respect to PA (but not knowledge of the benefits of PA). The incongruous results for PA knowledge appear to be due to limitations in the instruments used to measure the PA knowledge variables, rather than the effectiveness of the program. However, it should be noted that the behaviours were parent-report and based on Likert-scale items, rather than measure of time spent engaging in PA. (Nerud & Samra, 2017)

Nutrition Education Aimed at Toddlers

A pilot study of the Nutrition Education Aimed at Toddlers (NEAT) program (N=32 parent-child dyads), that provided “lessons” on healthy eating and feeding practices, found no differences in the dietary outcomes between the intervention and control groups (Horodynski et al., 2004). Despite post-intervention improvements to parental knowledge and feeding practices, this was not maintained at 6 months post intervention, which the study authors attributed to the brevity of the intervention (Horodynski et al., 2004). A further study (N=96) added home visits by preschool staff to reinforce program messages, and also reported improvements to parental knowledge, but no intervention effect for feeding practices or toddler self-regulation (Horodynski & Stommel, 2005). A parenting practices component was then added to the intervention (“Raising Healthy Eaters” curriculum), and a further pilot trial conducted (Harvey & Coleman, 2008). The difference between the Raising Healthy Eaters program and the earlier pilot trials appears to be a more robust use of SCT. The intervention linked a number of SCT constructs with specific program components; for example, reciprocal determinism was applied by facilitating discussions around personal barriers and facilitators to change (Harvey & Coleman, 2008). A pilot test with 24 participants resulted in increased nutrition knowledge and confidence around feeding practices, and increased number of times meals were eaten without the TV. However, this small pilot trial did not have a control group, and the results regarding child behaviours have not been published (Harvey & Coleman, 2008).

Health with the Family

Healthy eating, PA and decreasing screen time were targeted at *Salud Con La Familia* (Health with the Family), a group program where parents and children attended sessions together (Barkin et al., 2012). The intervention was delivered in Spanish and aimed to educate the Latino-American participants on culturally appropriate parenting practices and food choices that encourage healthy eating and PA. A component of the program included group activities designed to build social networks while learning and practicing parenting skills. While parenting practices were incorporated into the curriculum, the focus appeared to be on teaching (for example, sessions included “a presentation on parenting styles” and “a presentation on the relationship between heart rate and PA”). There was less emphasis on goal-setting

and strategies associated with addressing barriers. However, there were improvements in BMI in the children at 3-months follow up. (Barkin et al., 2012)

Active Play@Playgroup

Active Play@Playgroup, a PA pilot program delivered in Supported Playgroups in New South Wales, aimed to increase staff and parent knowledge around PA guidelines (Weber et al., 2014). This program, aimed at disadvantaged families, many of whom did not speak English, was tailored to the target groups and leveraged the supportive environment of playgroup (Weber et al., 2014). It was successful in increasing parental knowledge and parent time spent in active play with their child (Weber et al., 2014). This program was discussed in further detail along with other interventions delivered in the SPG setting in section 2.4.1.

Healthy Living

The Healthy Living program was a small pilot study, targeting low-income Mexican families in urban California (N=33 mother-child dyads) that focussed on observational learning in children via parental role-modelling (Bender et al., 2014). The intervention was delivered in two phases. The first phase consisted of four parent group “lessons” that promoted healthy drinks (water and low fat milk), and PA with children (specifically walking), followed by a parent-child activity (drinking milk or dancing). The second phase occurred over six months with a monthly activity, including a trip to grocery store, trip to a fast food restaurant, cooking class, trail walk, and a trip to park. Outcome measures focussed on child SSB consumption and mother step counts, and BMI for both mothers and children. There were some promising results post-intervention in terms of a decrease in child SSB intake and increase in milk and water consumption, which were maintained at 6 months post-intervention. The number of steps recorded by the mothers improved post intervention but reverted to pre intervention levels after 6 months. Despite the fact that promising results were not maintained (and there was not a comparison group), the participants commented favourably on the social support aspects of the intervention. (Bender et al., 2013)

Fit WIC

In the Fit WIC childhood overweight prevention program, the main strategy was to encourage parental role-modelling of healthy behaviours (McGarvey et al., 2004). The program ran for a year with group education sessions every two months, and

resulted in a significant improvement in some parenting practices (McGarvey et al., 2004). However, in addition to the limitations of using a non-validated parent-report survey, it is difficult to attribute results directly to the group sessions as the program included an individual session with a nutritionist every six months, and reinforcement by other community services (including unrelated parenting classes). Despite this, it does demonstrate the importance of using a multi-pronged approach that includes reinforcing of program messages through means other than didactic education (McGarvey et al., 2004).

Conclusion

As noted by the Make a Move study authors (Nerud & Samra, 2017), the education of parents in healthy eating for their children, and resulting increase in parent knowledge, does not necessarily result in translation to feeding practices, particularly in a brief intervention. However, many interventions did incorporate strategies to assist parents in making behavioural changes, and to encourage healthy behaviours in their children. Despite this, intervention effect was generally minimal, particularly longer term (in studies where a follow-up evaluation was published).

2.4.2.2.3 Interventions targeting parenting practices

This section discusses interventions with a stronger focus on parenting skills and practices. The review of these interventions explores the premise that intervention impact on child behavioural outcomes is stronger when parenting practices are targeted. In addition, strategies used for parental behaviour change, and the intervention impact on parenting practices, in the programs in this section are discussed.

Some program developers used an existing parenting program as a starting point to their intervention, adding healthy lifestyle education and behaviour change techniques to develop an obesity prevention program. The parenting program used had often already shown evidence of efficacy in respect to parenting practices around general child behaviour challenges. Mind, Exercise, Nutrition...Do It! (MEND) 2-4 (Skouteris et al., 2016) was developed using principles from the Triple P parenting program (Sanders, 2012), Parents and Tots Together (PTT) (Haines et al., 2012) used the Chicago Parenting Program (Gross et al., 2007) as its foundation, and Parent Training (Slusser et al., 2012) was an intervention developed from the UCLA

Parenting Program (Semel Institute for Neuroscience and Human Behavior, 2018). Although Health Exercise Nutrition for the Really Young (HENRY) was not based on an existing parenting program, it was developed using general parenting principles by a paediatrician and parenting educator (Roberts, 2015). The Healthy Children, Healthy Families: Parents Making a Difference! (HCHF) curriculum was developed in conjunction with parenting and nutrition educators, and advocated “firm and responsive” parenting through four “keys to success” practices: role modelling, supporting children, offering choices within limits, and “shaping the home environment” (Lent et al., 2012). These programs are now discussed in more detail.

Mind, Exercise, Nutrition...Do It! 2-4

MEND 2-4 workshops were based on the “4Cs model of parenting (causes, consequences, consistency and copying)”, and supported parents in implementing behaviour change techniques in respect to identifying barriers, problem-solving and goal-setting (Skouteris et al., 2010). The program was run at community health and child health venues in Victoria, Australia, over 10 weeks and evaluated in a randomised controlled trial across 11 sites (N=201 parent-child dyads) (Skouteris et al., 2016). As discussed in section 0, the intervention targeted the four obesity-related behaviours. The emphasis in this program was on healthy snacks (fruit and vegetables) and active play. Children were also directly involved in the program, as part of each session involved parent-child active play and then children attended a further (concurrent) session while parents took part in a group skill development and discussion session (Skouteris et al., 2010). Primary outcomes measured were in respect to child eating behaviours, with PA, screen time and BMI also measured (Skouteris et al., 2016). However, there was no intervention effect on activity behaviours or BMI, and the improvements in vegetable intake and satiety responsiveness post-intervention were not sustained at follow-up (Skouteris et al., 2016). These results may speak to the need for ongoing reinforcement of program messages and support for parents in implementing those messages.

Parents and Tots Together

Haines and colleagues used a “Social Contextual Framework” to develop Parents and Tots Together (PTT), a program aimed at parents of children aged 2-5 years (Haines et al., 2012). The framework considered the various influencers of behaviour

in terms of the social context of the program participants: socio-demographic characteristics, individual and interpersonal factors, neighbourhood environment, and psychosocial factors (social norms and supports and self-efficacy/skills around parenting and feeding). The strategy employed by the intervention was for each of the nine weekly sessions to focus on a general parenting topic and link it to a weight-related topic. For example, the general parenting topic “Stress management” was linked to the weight-related topic “Family-based physical activities”. “Sleep: creating a bedtime routine” was one of the weight-related topics, but in contrast there were three sessions centred on food, and two on PA. There was also one session dedicated to setting TV viewing limits, and a session focussed on problem solving in respect to all child health behaviours, with a final wrap-up session, providing a strong emphasis on skills in respect to appropriate parenting practices. (Haines et al., 2012)

Two separate pilot randomised controlled trials of the PTT program were conducted in USA (N=96) and Canada (N=48). In the USA trial, there was a decrease in restrictive feeding practices, but no change in pressure to eat or parental self-efficacy (Haines et al., 2016). After the Canadian PTT trial, there was a decrease in the use of food as a reward, but not at 9 months follow up, and no intervention effect was found for the parenting practice of limiting SSBs and snacks, or in parental self-efficacy for recognising child satiety cues (Walton et al., 2015). There was also limited intervention effect on the measured outcomes across all child behaviours and parent factors from either the US (Haines et al., 2016) or Canadian (Walton et al., 2015) studies. Researchers in both trials speculated that the lack of intervention effect may be attributed to the emphasis on parenting rather than “weight-related messages”, and that the intervention was too brief (Haines et al., 2016; Walton et al., 2015).

Parent Training

The Parent Training intervention targeted parents as role models of healthy eating and encouraged parental self-monitoring (Slusser et al., 2012). However, the program content appeared to promote some potentially out-dated parenting strategies (for example, the use of “time out” as a discipline strategy, “ignoring” bad behaviour, and giving “commands” to children). In addition, the program was culturally-specific to the Spanish-speaking Mexican-American families, and was facilitated by a social worker rather than a health professional. There were improvements child BMI

outcomes but no parent or child behaviours were measured in the study. (Slusser et al., 2012)

Growing Right Onto Wellness

Growing Right Onto Wellness (GROW) was a 3-year intervention, evaluated using a randomised controlled design with 610 parents with a 3-5 year-old child (Barkin et al., 2018). The intervention focussed on parental skills in nutrition, PA and parenting. As noted in section 0, the program targeted all obesity-related behavioural domains, including sleep (Po'e et al., 2013). It consisted of three phases: 1) intensive three months of either small group discussion or individual coaching; 2) nine month of maintenance phase, with phone calls from a motivational coach; and 3) two-year sustainability phase with monthly GROW activities at neighbourhood community centres (Barkin et al., 2018; Po'e et al., 2013). GROW used constructs from SCT, including SMART goal-setting, self-monitoring and problem solving as part of the behaviour change techniques used in the group discussions and individual coaching. There was no intervention impact on child BMI (despite a reduction in obesity prevalence after the first phase), or on child time spent in sedentary or physical activities. However, there was a reduction in mean daily energy intake and an intervention effect for use of the community centre for PA. (Barkin et al., 2018)

Health Exercise Nutrition for the Really Young

The Health Exercise Nutrition for the Really Young (HENRY) intervention targeted parenting skills, parental self-efficacy, and emotional wellbeing (Willis et al., 2014). Increasing the confidence of parents to make healthy lifestyle changes and giving them “a sense of empowerment” was a key aim of the HENRY program (Willis et al., 2014). This was achieved over the 8-week program via group discussions and activities that built skills and strategies for parental challenges in respect to child behaviour, healthy meals and portion sizes, eating as a family, and activity (Bryant et al., 2018; Willis et al., 2014). The sessions focussed on practical strategies as well as emotional well-being, and parents built their own “toolkit” of materials to support the key messages (Bryant et al., 2018; Willis et al., 2014). One of the objectives of the HENRY program was to decrease TV viewing time, and the larger of their two studies did report improvements in the percentage of children meeting viewing guidelines from pre- to post-intervention (Willis et al., 2016). Although the HENRY program

reported significant increases in parental self-efficacy in two separate trials, neither had a control group (Willis et al., 2014; Willis et al., 2016).

Healthy Children, Healthy Families

The Healthy Children, Healthy Families: Parents Making a Difference! (HCHF) was an education program (curriculum) that was a component of the Collaboration for Health, Activity and Nutrition in Children's Environments (CHANCE) program (Lent et al., 2012). CHANCE also included community partnerships to provide healthier environments for children (Lent et al., 2012). HCHF aimed to increase participant self-efficacy through discussions, role-plays, tasting of healthy recipes, and active games to play at home with children (Lent et al., 2009). Although the HCHF intervention was focussed on nutrition and PA education, it provided parents with strategies to use authoritative parenting practices, and make changes to the home environment to support the implementation of the healthy eating messages (Dickin et al., 2014; Lent et al., 2012). The intervention designers focused on environmental factors (for example, food and PA availability and accessibility) and personal factors (self-efficacy, observational learning, and reinforcement) (Agrawal et al., 2012). There was minimal change to parenting practices, but intentions for healthy eating and support of PA increased after the completion of the 4 week parent program (Agrawal et al., 2012).

Although the results of the trial showed improvements in some of parenting practices and child behaviours, a limitation of this study was that the evaluation consisted of a parent-reported "behaviour checklist" using 5-point Likert scales, and there was no control group (Dickin et al., 2014). A second pilot study with nine groups, found similar results (Otterbach et al., 2018). In this study, there were improvements in the use of responsive parenting practices, particularly parent-reported encouragement of healthy eating, increased availability of fruit, and decreased availability of energy-dense snacks and fast food (Otterbach et al., 2018). However, this study had a pre-post design, so it was also limited by not having a control group.

Conclusion

Most of the programs in this section based their intervention design on either an existing parenting program, or general positive parenting principles. They targeted barriers to using appropriate parenting practices through problem-solving and group discussions around strategies and common parenting issues. Some Social Cognitive

Theory principles, including monitoring and goal-setting were used to increase parental self-efficacy and support sustainable behaviour change. However, there were significant gaps in the evidence in respect to the measuring and/or reporting of intervention impact on specific parenting practices or parental self-efficacy. The reporting of child behaviour outcomes was also limited. Despite this, the programs in this section, appeared to be generally more successful than the “education” programs discussed in the previous section (2.4.2.2.2). In general the intervention design was also more robust, with four of the six programs using a randomised controlled trial and all but one evaluating the program at least once after 2-3 months post-intervention.

2.4.2.2.4 Interventions targeting child self-regulation via parenting practices

Given the importance of parents in the development of self-regulation in young children (Joussemet et al., 2008), interventions that target this as a strategy for obesity prevention are now discussed. The interventions in this section were designed to support self-regulation in children via parenting practices, although Growing Healthy Study also included a component that targeted the children directly (Miller et al., 2012).

Growing Healthy Study

The Growing Healthy Study targeted low-income families of preschoolers attending Head Start programs, and combined an obesity prevention intervention with an existing program that targeted child behavioural problems (Miller et al., 2012). The obesity prevention intervention targeted fruit and vegetable intake, SSBs, and screen time, and consisted of six preschool nutrition education lessons and eight parent sessions aimed at building knowledge and self-efficacy. The behavioural program, delivered by a mental health specialist, also consisted of both child and parent components. Parents attended 14 group sessions and the children took part in classroom sessions that taught self-regulation strategies (Lumeng et al., 2017). The focus of the parent sessions was on techniques to managing child’s behaviour in ways that did not involve food (Lumeng et al., 2017; Miller et al., 2012). Child behavioural and emotional self-regulation was reported by the preschool teachers via a “modified 60-item version of the Social Competence and Behavior Evaluation” tool (Lumeng et al., 2017). However, despite the 3-arm randomised controlled trial design, and an improvement in child self-regulation, there were no significant intervention effects for any of the dietary or PA behaviour outcome measures (Lumeng et al., 2017).

Home Sweet Home

Home Sweet Home focussed on mindful eating as a strategy for supporting self-regulation (Knol et al., 2016). Program topics included role-modelling of healthy eating and activity behaviours, healthy and unhealthy food availability/accessibility, food preparation skills, and eating together as a family. Education of parents on mindful eating was also a major component of the program. A number of SCT constructs, including self-efficacy, observational learning, and behavioural capability, were mapped to each “lesson/educational component”. There were significant improvements in mindful eating by the adults, and in limiting availability and accessibility of sweet/salty snacks and SSBs. However, there was no change in the availability and accessibility of fruit and vegetables, and only a slight improvement in role modelling of healthy eating and PA, and in the use of sweet/salty snacks as rewards. Based on the information in the published paper, there appeared to be an inherent assumption that a brief mindful eating intervention would not only translate to effective role modelling of healthy eating behaviours to children, but would also lead to a development of the same behaviours in the child. Unfortunately, there was no longer term follow-up of intervention outcomes, and the study did not include a comparison group. (Knol et al., 2016)

Family-based Hip-Hop to Health

Family-based Hip-Hop to Health program (Fitzgibbon et al., 2013), which added parent sessions to the long-running Hip-Hop to Health Jnr program (summarised in Appendix B), was a 14-week program that included topics on the family environment and parenting skills. The study authors of the Family-based Hip-Hop to Health program (Fitzgibbon et al., 2013) stated that the parent program used a theoretical framework based on SCT, Health Belief Model and SDT (as per the original Hip-Hop to Health Jnr. preschool program (Fitzgibbon et al., 2002)). The SDT constructs of self-regulation and intrinsic motivation were used to design strategies for the preschool curriculum (Fitzgibbon et al., 2002). The preschool program focussed on the importance of providing children with choices related to food and PA, including repeated exposure to unfamiliar foods in a non-coercive environment (Fitzgibbon et al., 2002). The study authors posited that this would “enhance children’s sense of control and thus increase intrinsic motivation for trying new foods and physical activities” (Fitzgibbon et al., 2002, p. 292). However, in the Family-based Hip-Hop to

Health paper, there was no discussion by the study authors in respect to how this theoretical framework was applied in the family-based program, which targeted the parents, rather than the children (Fitzgibbon et al., 2013). There was a downtrend in BMI z-scores in the children but this was not sustained after one year. In addition, only 38% of the parents in the intervention group attended at least one session (Fitzgibbon et al., 2013). It is also difficult to draw conclusions about the effectiveness of the parenting component on child behaviour outcomes as the separate child preschool program consisted of three lessons per week of nutrition education and physical activities during the same 14 weeks as the parent program (Fitzgibbon et al., 2013). While this potentially confounded the results, the study authors noted that the low program attendance by the parents, and cultural beliefs around body size, influenced the outcomes (Fitzgibbon et al., 2013).

Strategies for Effective Eating Development

The Strategies for Effective Eating Development (SEEDS) intervention was a recent randomised controlled trial with a goal to teach parents and children about hunger and satiety cues, and to teach parents how to support their children to try novel foods (Hughes et al., 2016). An evaluation of the intervention was recently published, after the development of the intervention for this thesis. However, it is described here for completeness.

The program content of SEEDS was informed by SDT in respect to responsive feeding practices and the development of child self-regulation (Hughes et al., 2016). SDT was used to identify responsive feeding practices to be included in the curriculum, which was aimed at teaching parents and children about hunger and satiety cues (Hughes et al., 2016; Hughes et al., 2020). As such, this program was only focussed on eating behaviours, not autonomy promoting parenting across all obesity-related behavioural domains. SDT also “provided guidance for developing an experiential learning approach for parents that would maximise participant motivation and buy-in” (Hughes et al., 2020, p. 225). Although the study authors did not discuss self-efficacy, their application of SDT by “inviting the learner to apply the new content to his or own situation and asking the learner to decide what information to take away and use” (Hughes et al., 2016, p. 407) seemed to be aligned with this construct, which is more clearly part of Social Cognitive Theory. The intended outcomes included a decrease in the use of rewards and pressuring the child to eat, and an increase in PSE and

knowledge in respect to responsive feeding practices and appropriate mealtime structure (Hughes et al., 2016). Although the program was designed to cater for a diverse population, this initial trial targeted low-income Hispanic mother-child dyads, and the program was delivered mostly in Spanish (Hughes et al., 2020). Results post-intervention were positive in respect to several of the food parenting subscales measured (Hughes et al., 2020).

Conclusion

Programs that have some focus on self-regulation were discussed in this section due to the strong association with healthy child lifestyle behaviours. However, in reviewing the published papers, there was limited evidence of a robust application of parenting practices that support the child development of self-regulation. Two of the interventions targeted children directly with a curriculum designed to develop self-regulation in respect to food. Another program focussed on self-regulation in the parent via mindful eating on the assumption that this would impact child behaviours via role modelling. Only SEEDS (Hughes et al., 2020) focussed specifically on responsive feeding practices that are designed to increase child self-regulation. Responsive feeding has been a key component of interventions for parents of infants. These feeding practices have also been included in the parenting strategies encouraged by some interventions for parents of children aged 2-5 years in this review. However, SEEDS seems to place the strongest emphasis on parent's understanding of child satiety cues in this age group. Results of the SEEDS pilot were promising, so the approach used in this program is an important contribution to obesity prevention research.

2.4.2.3 Measurement of parenting practice outcomes

Few of the 29 studies discussed in this review measured parenting outcomes, even those targeting parenting practices as a major aspect of the program. Table 2.4 summarises the specific parenting practices measured across the 33 studies. However, the interventions with a strong emphasis on parenting practices in program content often did not measure those parenting variables in their studies (for example, MEND 2-4, PT, Fit WIC, HCHF, Raising Healthy Eaters). Five other studies measured nutrition knowledge (Agrawal et al., 2012; Harvey & Coleman, 2008; Herman et al., 2012; Horodyski & Stommel, 2005; Lumeng et al., 2017), and one measured knowledge of PA guidelines (Weber et al., 2014). Only CHL measured parenting

practices in respect to screen time (limiting screen time, TV during dinner and TV in the bedroom) (Davison et al., 2013), although Raising Healthy Eaters also measured the number of meals without the television in the background (Harvey & Coleman, 2008). None of the studies evaluated parenting practices in respect to sleep routines or activities. Finally, the health literacy intervention (Fleary et al., 2013) did focus on parenting practices, but the authors described them as “skills” and did not provide specific information about the parenting practices, so they have not been included in Table 2.4.

Table 2.4

Studies Measuring Specific Parenting Practices or Home Environment Factors as Intervention Outcomes

Intervention name (Country) (Study Reference)	Feeding Practices				Home Food Environment				Physical Activity Parenting			
	Responsive feeding ¹	Restrictive Feeding	Pressure to eat	Food as a reward	Family Meals ²	Healthy or unhealthy food availability	Television on during meals	Role-modelling	Active with child	Support for Physical Activity	Role-modelling	
Active Play @Playgroup (Australia) (Weber et al., 2014)									✓			
Communities for Healthy Living (CHL) (USA) (Davison et al., 2013)							✓			✓		✓
First Steps for Mommy and Me (USA) (Taveras et al., 2011)	✓											
Fit WIC (USA) (McGarvey et al., 2004)					✓				✓			
Healthy Children Healthy Families (HCHF) (USA) (Dickin et al., 2014)	✓		✓		✓	✓					✓	
Healthy Living (USA) (Bender et al., 2013)												✓

Intervention name (Country) (Study Reference)	Feeding Practices				Home Food Environment				Physical Activity Parenting			
	Responsive feeding ¹	Restrictive Feeding	Pressure to eat	Food as a reward	Family Meals ²	Healthy or unhealthy food availability	Television on during meals	Role-modelling	Active with child	Support for Physical Activity	Role-modelling	
HENRY family program (UK) (Willis et al., 2014)					✓							
Home Sweet Home (USA) (Knol et al., 2016)					✓							
NOURISH (Australia) (Daniels et al., 2014)	✓											
Parents and Tots Together (USA) (Haines et al., 2016) (Canada) (Walton et al., 2015)		✓	✓	✓								
Raising Healthy Eaters (USA) (Harvey & Coleman, 2008)							✓					
Strategies for Effective Eating Development (SEEDS) USA (Hughes et al., 2016)	✓				✓							

1. Responsive feeding practices includes “child decides”, offering choices etc
2. Family meals includes parent eating with child, consistent mealtimes etc

2.5 SUMMARY AND IMPLICATIONS

The foundations for life-long, healthy behaviours need to be built in early childhood. One of the six key areas for action identified by the WHO to tackle childhood obesity is to provide guidance and support for young children to develop healthy behaviours in respect to diet, PA and sleep (World Health Organisation, 2017). The way autonomy and healthy behaviours develop in young children is highly dependent on the sociocultural home environment, including parenting styles, parental role modelling and parental knowledge and skills (Berge, 2009; Knol et al., 2016; Lindsay et al., 2006). In children under five years, before the influence of school and peers, parents potentially have the most impact on the developing child. As such, a number of systematic reviews have concluded that interventions that involve parents are likely to be the most effective in supporting healthy obesity-related behaviours in young children (Brown et al., 2007; Golley et al., 2011; Laws et al., 2014; Skouteris et al., 2011). However, to date, many obesity prevention programs targeting children under school age have targeted child food intake or PA at childcare centres or preschools, with minimal parent involvement. In addition, although ineffective emotional and behavioural self-regulation has been linked with increase obesity risk (Aparicio et al., 2016), there are few interventions that directly target the development of self-regulation in young children via the use of autonomy promoting parenting practices (Miller et al., 2012).

This chapter included a review of interventions delivered to groups of parents of young children in a community setting. Twenty-eight interventions meeting that criteria were identified, with four targeting parents of infants and 24 aimed at parents of children aged 2-5 years. However, although some were evaluated in randomised controlled trials, most were short pilot studies without a control group, and with no long term follow up of outcomes. In addition, most programs were mainly focussed on eating behaviours and/or PA. Some included screen time, primarily TV viewing. Only four interventions targeted all four obesity-related behaviours, and those four were the only programs to target sleep behaviours. In respect to parenting, most interventions targeted one or more parenting practices (generally role-modelling or feeding practices) but there was a stronger emphasis on knowledge in many of the interventions.

Although parenting practices were a central focus of many of the interventions in this review, parenting variables were often only measured to a limited degree, or not at all, in the published trials. For example, the MEND 2-4 protocol paper listed several parenting variables to be measured (Skouteris et al., 2010), but these results have not been published (Skouteris et al., 2016). Where parent variables were measured, the only intervention effects generally reported were in regard to knowledge of guidelines, or intention to change behaviours. More often, the trials focussed only on BMI or child behaviours, but there was generally minimal intervention effect on these outcomes. Where there were improvements to some behaviours, they were often not sustained where outcomes were evaluated via longer term follow-up.

Most of the interventions were designed using a conceptual framework based on constructs either from socio-ecological models or from Social Cognitive Theory. Some did not specify a theoretical framework in the published protocol or evaluation paper, but applied constructs from one or more of these theories. In particular, the concept of parental (or caregiver) self-efficacy was part of the theoretical framework for many of the intervention reviewed, but self-efficacy was more often used as part of the behaviour change techniques, through gradual skill-building via training, role-playing, hands-on cooking sessions, and/or home activities (Dickin et al., 2014; Haines et al., 2016; Harvey & Coleman, 2008; Hinkley et al., 2015; Horodynski & Stommel, 2005; Lumeng et al., 2017; O'Dwyer et al., 2012).

Not all of the interventions that included parental self-efficacy as part of their theoretical framework measured it as a study outcome. Of the eight studies (six interventions) that did report parental self-efficacy outcomes, three reported a significant intervention effect: Henry (2 trials) (Willis et al., 2014; Willis et al., 2016) and CHL (Davison et al., 2013). Three other studies reported a non-significant increase: PTT (Canada) (Walton et al., 2015), NEAT (trial 2) (Horodynski & Stommel, 2005), and Raising Healthy Eaters (Harvey & Coleman, 2008). The Growing Healthy Study (Lumeng et al., 2017) and PTT (USA) (Haines et al., 2016) reported no intervention effect. Family@play (Hinkley et al., 2015) and Healthy Living (Bender et al., 2014) did not report parental self-efficacy in the results, even though it was included in the methodology as one of the outcomes to be measured.

Two interventions used Self-Determination Theory (SDT) in their theoretical framework: the Family-based Hip-Hop to Health (Fitzgibbon et al., 2013) and

Strategies for Effective Eating Development (SEEDS) (Hughes et al., 2020). However, Family-based Hip-Hop to Health added a parent group program to the preschool-based Hip-Hop to Health Jnr program, and it is the preschool intervention that was developed using SDT (Fitzgibbon et al., 2002). Although many of the other interventions in this review aimed either directly or indirectly to increase parents use of autonomy supporting practices (for example, encouraging responsive feeding practices or support for PA), SDT was not explicitly used as a base for the theoretical frameworks.

Finally, the majority of interventions in this review required parents to attend sessions at a time and place determined by the program providers, usually at a preschool, childcare centre, or child health clinic. Although participants were often recruited at these venues, and so the parents may visit the venue regularly, the programs were not integrated into existing group meetings when parents were already in attendance. Despite this, as evidenced by the InFANT intervention (Campbell et al., 2013), existing parent groups may be an ideal setting for an obesity prevention program. Parent groups, including playgroups, already provide opportunities for parents to learn from, and support, each other in their roles as parents (Harman et al., 2014; Lunn et al., 2016; McShane et al., 2016; Strange et al., 2014). There have been some interventions delivered at Supported Playgroups in Australia, but the community playgroup setting has yet to be fully explored as a setting for healthy lifestyle interventions targeting parents.

This thesis will focus on gaps in the current intervention research by developing and evaluating an intervention: 1) in the community playgroup setting; 2) using a theoretical framework that centres on Self-Determination Theory and autonomy promoting parenting practices; 3) that targets all four obesity-related behaviours; and 4) the intervention impact on autonomy promoting parenting practices and parental self-efficacy.

Chapter 3: Focus Groups

This chapter describes methods and results of the focus group study that informed the development of the intervention (described in the following chapter). This chapter is an edited extract from a paper authored by the PhD candidate, and published in December 2019:

Fuller, A. B., Byrne, R. A., Golley, R. K., & Trost, S. G. (2019). Supporting healthy lifestyle behaviours in families attending community playgroups: parents' perceptions of facilitators and barriers. BMC Public Health, 19(1), 1740. <https://doi.org/10.1186/s12889-019-8041-1>

Section 3.1 provides an overview of the study design, including the conceptual framework, recruitment methods, data collection and data analysis. Section 3.2 reports the results of the focus groups, including the themes in regard to facilitators and barriers to autonomy promoting parenting practices and the parent preferences for a playgroup intervention. Section 3.3 discusses the results and the implications for the development of the intervention.

3.1 METHODOLOGY

3.1.1 Study design

A qualitative focus group methodology was selected to explore research questions one and two (section 1.2.2). Therefore, the aims of the focus groups were to 1) identify the barriers and facilitators for parents in respect to using autonomy promoting parenting practices, and 2) determine what parents would find acceptable in terms of content, delivery mode and timing of an intervention in a playgroup setting.

Data was collected via focus groups because it was expected that the group discussion would provide richer data than individual interviews (Carey & Asbury, 2016), as shared experiences and understandings encourage participants to openly discuss their challenges as parents (Parker & Tritter, 2006). Convenience sampling was used, whereby parents within an identified playgroup willing to participate in a focus group were recruited into the study.

3.1.2 Conceptual framework

As discussed in section 2.3.1, Family Systems Theory (Berge, 2009), Social Cognitive Theory (SCT) (Bandura, 1986), and Self-Determination Theory (Ryan & Deci, 2000, 2017b) all have a place in obesity-prevention interventions that target parents. SCT is a valid and robust theory for behaviour change, and its wide use in health interventions, particularly the construct of self-efficacy, is testament to that (National Cancer Institute, 2005). FST, and other systems-based frameworks, target the socio-economic factors, family dynamics and the home environment. However, FST elements of the child’s developmental environment form an incomplete picture, as they take a broad view rather than focus on specific parenting practices. According to SDT, the satisfaction of the need for autonomy (self-determination) is important for the development of healthy behaviours in children, and parents play a crucial role in their use of autonomy promoting parenting practices (Joussemet et al., 2008). However, parents need to have the confidence, knowledge, and skills in respect to autonomy promoting parenting practices in order to use them. The conceptual framework for this thesis, therefore, encompassed facilitators and barriers with respect to parent’s knowledge and skills around autonomy supporting parenting practices (behavioural capability) and their confidence to use them regularly (self-efficacy). As an additional aim of the focus groups was to understand the playgroup setting, facilitators and barriers to delivering an intervention at a community playgroup was added to the conceptual framework. The conceptual framework incorporating SDT, SCT and the playgroup environment is in *Figure 3.1*.

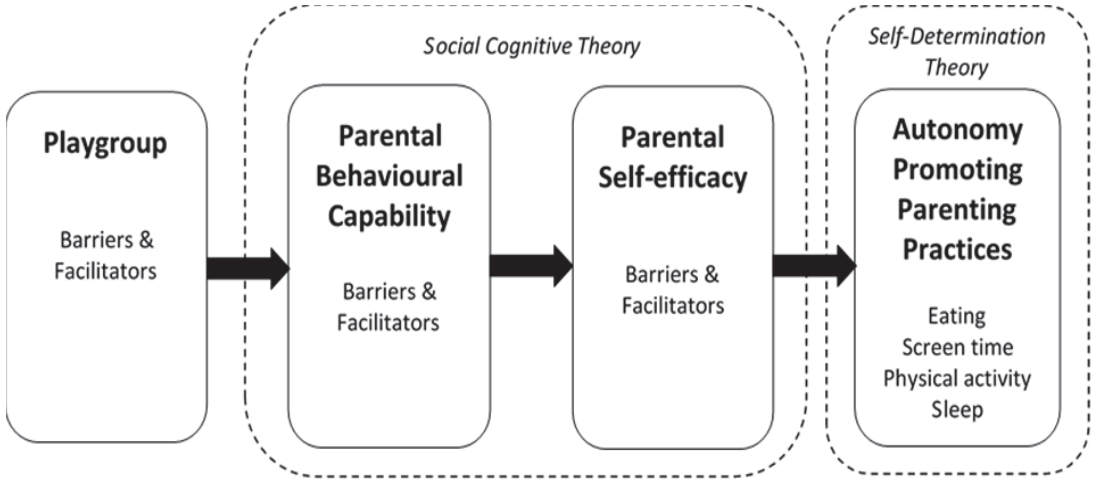


Figure 3.1. Conceptual framework for the focus groups

3.1.3 Recruitment and consent

Community playgroups operating in the greater Brisbane metropolitan area were invited to participate in the research project via a newsletter from Playgroups Queensland (PGQ). The newsletter stated that focus groups were being conducted to gather information on what parents would like in a program aimed at supporting parents at playgroup, and that the discussions would focus on parenting around child eating, active play, screen time and sleep. Seven playgroups expressed an interest in taking part in the focus groups, and five of these were recruited for the focus groups. The other two playgroups expressed their interest after the focus groups for the other five had been conducted, and were not required as it was deemed that no further insights would be gained from conducting further focus groups. All parents attending playgroup on the day of the focus group were invited to participate and provide informed consent. Participants were provided with an information sheet about the study and also given a verbal explanation of why the focus groups were being conducted before each discussion commenced. Approval to conduct the focus groups was obtained from Queensland University of Technology Human Research Ethics Committee. Reference No. 1700001031 (Appendix C).

3.1.4 Data collection

Focus groups were conducted in May 2018 by the PhD candidate and a PhD supervisor (RB). The discussions were guided by the topic guide (Appendix D), which included questions around what parents enjoyed about coming to playgroup, where they accessed information about healthy child behaviours, barriers to encouraging healthy behaviours, and strategies they used to influence healthy behaviours in their child/ren. Parents were asked about behaviours around eating, screen time, active play and sleep. They were also asked whether they would be interested in a healthy lifestyle program and to consider how it might work at their playgroup. This included discussing options for the number, timing and length of intervention sessions, and the preferred characteristics of a potential facilitator. Participants also completed a survey that measured demographic characteristics (age, relationship to their children at playgroup, children's age, work status, education, and whether they were born in Australia).

The focus group questions were not intended to duplicate what is already known from the literature in terms of effective parenting. Rather, the aim was to gather

participant views around barriers and facilitators in respect to effective parenting practices. There was no attempt to gain a consensus or even to determine the majority opinion, because “an apparent conformity of view is an emergent property of the group interaction, not a reflection of individual participants’ opinions” (Sim, 1998, p. 345). As such, the aim was to elicit and explore as many different issues and challenges the parents face, including what support they would like around the development of positive lifestyle behaviours in their children. The aim was also to explore strategies and other facilitators around autonomy promoting parenting practices.

All focus groups were conducted on site, during playgroup time, and were audio recorded and transcribed verbatim by the PhD candidate. RB took notes in respect to general impressions, and noted when participants left (and returned) to the group. Children were participating in their usual playgroup activities within sight of their parents taking part in the focus group or under the supervision of other adults. The PhD candidate and RB debriefed after each focus group, and additional reflections were documented. The debrief after the first focus group also considered whether the data obtained addressed the research questions and how the next group moderation could be improved. No changes to the topic guide were made, however the order in which the topics were raised varied slightly in each focus group according to how the discussion progressed.

3.1.5 Analysis

Qualitative content analysis (deductive and inductive) was used to analyse the focus group data, using NVivo 12 (QSR International Pty. Ltd.). The aim was not to search for underlying meanings via latent content, or produce results that are highly interpretive. Rather it was to take the words of the participants at “face value” (Bengtsson, 2016) in order to identify recurring themes that encapsulated the parenting priorities of the participants, and to develop an intervention that met the expressed needs of parents at playgroup. By focusing on the manifest content, trust was placed in the participants’ words to provide rich data for intervention development in respect to intervention format, mode of delivery and content (Graneheim et al., 2017).

The main categories of the coding matrix and initial codes were deductively determined from the conceptual framework (*Figure 3.1*) and research questions. Although a deductive approach was used to develop the main categories and the a priori codes, the overall analysis of the focus group data was both deductive and

inductive. Immersion in the data by the primary researcher (as moderator and transcriber) shaped some of the a priori codes. The main categories were parental behavioural capability, parental self-efficacy and autonomy promoting parenting practices, and the generic categories were the theoretical facilitators and barriers within each main category (Elo & Kyngäs, 2008). The PhD candidate and RB independently coded one of the transcripts and the coding frame was updated to reflect shared understandings of codes. During coding of all of the transcripts by the PhD candidate, a more inductive approach was used to develop sub-categories and to further refine the coding frame based on the data. These sub-categories and the associated codes were the specific facilitators and barriers discussed by the participants. Playgroup environment codes were developed inductively from the transcripts, and grouped as facilitators or barriers to an intervention delivered in this setting.

3.2 RESULTS

3.2.1 Participant characteristics

Five playgroups agreed to take part in a focus group, which ranged in length between 40 and 60 minutes. The number of participants in each focus group varied from four to seven. Twenty-eight of the 30 participants were mothers. The median age of the children was 24.0 months (IQR = 12.0 months). Other characteristics of the participants are shown in Table 3.1.

Table 3.1

Demographic Characteristics of the Focus Group Participants

Variable	Participants (N=30)		
	n	%	
Relationship to child/ren	Mother	28	93.3
	Father	1	3.3
	Grandmother	1	3.3
Age of parent/carer	Under 30 years	4	13
	30 – 35 years	11	37
	36 years or older	15	50
Education	University education	15	50
	TAFE or trade	12	40
	Secondary school	3	10
Employment status	Not in paid employment	15	50
	Part-time employment	12	40
	Full-time employment	3	10
Born in Australia	Yes	23	77
Number of children per parent/carer at playgroup	One	20	67
	Two	9	30
	Three	1	3
Age of child at playgroup (N=41)	Under 24 months	10	24
	24 – 35 months	17	42
	36 – 47 months	7	17
	48 – 60 months	7	17

3.2.2 Facilitators and barriers to autonomy promoting parenting practices

Participants talked openly about their positive experiences as well as the many challenges around parenting of young children. Topics that were consistently raised in the discussions included issues around food refusal, electronic media, and child sleep. In general, parents were less concerned about their child's level of PA as most perceived that their child was active enough. Two main themes emerged in relation to facilitators of autonomy supporting parenting practices: 1) Parents are confident in their knowledge but want strategies; and 2) Support from peers at playgroup is highly valued. Two main themes emerged in relation to barriers to autonomy supporting parenting practices: 1) Parents feel a lack of empowerment to influence child preferences; and 2) Stress, tiredness or lack of time can make parenting a challenge.

3.2.2.1 Facilitator Theme 1: Parents are confident in their knowledge but want strategies

Participants were generally confident that they had the knowledge around healthy behaviours for young children. Parents reported that they were confident that they knew what their child should (and should not) be eating. Although specific guidelines were not discussed, they were also aware that screen time should be limited, that PA is important for health, and that children need a certain number of hours of sleep each night. However, despite this awareness, parents indicated that they struggled to apply that knowledge. They wanted guidance on how to translate their knowledge into effective strategies. Parents specifically requested help with their child's "fussy eating".

"I would ideally like to encourage a healthy diet ... encouraging is one thing, having it actually happen is another thing." Parent, FG2

"It's just the iPad and he loves it. But I've found, I regret introducing it, but again, I love it sometimes, because it really is, like it helps with keeping him busy for half an hour. But it has made me lazier. I think. Because I just think, do you know what, just take that so I can get this done." Parent, FG3

Across all focus groups, parents expressed strong beliefs about what constituted a healthy diet. The importance of vegetables, in particular, was a common discussion point. The main focus was on the evening meal, and the importance of eating everything on the plate. Some parents reported offering rewards or bribes of highly palatable, energy dense, foods (generally chocolate or dessert) to encourage the child to finish the meal.

"You'll get a treat if you eat your food. I think that's fine, if it gets him to eat his food." Parent 1, FG1

"If they've eaten well all day, I don't mind if they have a little bit of sugar, as long as they go to sleep." Parent 2, FG1

"I have tomato sauce on the side to help it go down." Parent, FG4

Other common strategies were "hiding" vegetables within the meal, or only providing food the parent knows the child will eat.

"I don't really have a challenge as such. I think you need to do a little hiding vegetables in food." Parent 1, FG1

“...you do the hidden stuff...” Parent 2, FG1

“It takes a lot of time, this whole eating healthy thing because you gotta hide it.” Parent 1, FG1

Some parents felt these tactics were good strategies to encourage adequate nutrition, whereas others were aware that the use of bribes was not ideal.

“If you give them too much [confectionary as a bribe] you feel guilty. Because you know it's wrong.” Parent, FG4

Several parents talked about offering novel foods multiple times to their child in order to develop a liking for that food.

“[My child] went through a fussy stage. I just kept providing the same stuff and not giving alternatives. And eventually he got over that. But for two years, he wouldn't eat certain textures, he wouldn't eat mixed foods. But I just kept providing the same stuff.” Parent, FG1

“I just put it on the plate and she eats, like, four bits of sweet corn, but at least it's on there.” Parent, FG2

Parents discussed struggles in respect to restricting the use of screens, particularly iPads®. Some parents commented that they used diverting strategies to minimise screen time, such as suggesting the child go outside to play or engaging in an activity with their child. Other parents hid the electronic devices or put a schedule on the fridge to limit screen use to certain times. Two parents of infants said they would try to avoid introducing screens as long as possible. However, although most parents across the groups were aware that screen time should be limited, the majority mostly discounted this advice, either because they felt the guidelines were unnecessarily restrictive, or because they found screens a useful parenting aid. Many parents felt that screens were unavoidable in certain situations, generally in respect to using them to occupy their child in order to shower or do household chores without having to worry about their child's safety. Some parents also commented that screens were useful to “calm” their child before bed or when they were overly active.

“You don't want kids around you in the kitchen, when you're cooking. So, for them to sit down, they're sitting there they're calm, they're watching TV. I don't think it's such a bad thing. I mean people make it out, TV is really bad for them, but we do need it.” Parent 1, FG3

“If they’re overtired ... to make him sedate. ‘Come on, you can watch some telly now. Or you can have the iPad’, which I don't usually allow, but if I'm at that stage where he just needs to stop because he's going crazy, he'll easily have 5, 6, 7 hours normally active per day.” Parent, FG1

Some parents also felt that iPads® were necessary because children need to be familiar with them before starting school. Most agreed that, as long as the app on the iPad was educational, it mitigated the potentially negative aspects of screen use.

“They do need some screen time because the reality is that so much of the world is that these days. So if they don't use it at all, then they fall behind other children, I think.” Parent, FG3

Parents did not discuss sleep recommendations or why sleep was important. They did not state they disagreed with sleep guidelines, just that they struggled to influence the amount of sleep their child received. A number of parents mentioned challenges around getting children to sleep, night waking, and early rising. The limited success of strategies they had tried was also discussed in the groups, as well as strategies that were counterproductive, such as rocking a child to sleep, or strapping them in a car seat.

“My problem's not getting them to bed, it's the time he wakes up. And he wakes up during the night.” Parent, FG1

“I don't know what more information I could have done with – I read everything. It didn't help.” Parent FG4

“Mine just cry. Mine just bawl. If I put them into bed, yeah, if I lay down, they go straight to sleep. But they just bawl if I leave the room.” Parent FG3

“I've got one that does, and one that doesn't.... she won't nap unless she's in the car. Strapped in.” Parent FG3

“I just would rock her to sleep all the time.” Parent, FG4

Despite the child behaviour challenges expressed by the parents, there were also comments that suggested they had self-confidence in most areas of parenting. A number expressed a confidence to assess parenting information and then making a decision with respect to a particular issue based on their own values and situation. Words such as “common sense” and “instinct” were used multiple times across the groups.

“I sort of take bits and pieces from various people and books and things and just kind of make a bit of a collage of what's best for him and for me” Parent, FG5

3.2.2.2 Facilitator Theme 2: Support from playgroup peers is highly valued

Although the frustrations and stress of parenting were a focus of the group discussions, this was tempered to a large degree by a general outlook of optimism and a belief that their parenting challenges were temporary. This attitude was facilitated by the support received from their playgroup peers, including older parents or grandparents attending the playgroup, and an attitude that “we are all in it together”. While there was some mention of mothers’ groups for infants, and support received from family and friends, the predominant source of support was from other parents at playgroup. In fact, receiving support from their peers was identified as a major reason for attending playgroup.

“I think also sharing stories, talking to other mums and sharing what's happened during the week, and then going hey, you're not the only one.” Parent, FG1

“What we all bring is different experiences and different ways of doing things, so you can talk to someone about what they do and then that might work for you and someone else might have something different to offer, so that’s what’s good about a group environment.” Parent, FG4

“It's great to meet people on the same wavelength.” Parent, FG2

“You’re not swimming upstream alone.” Parent, FG4

“...as a first-time mum you come here, and I have two little girls, and you come here and unload to other parents, ‘Ah yeah, they drive me crazy. My girls are changing their clothes 50 times a day’ and so someone will go, ‘Yeah, I know.’” Parent, FG5

With respect to specific guidance on child behavioural issues, parents expressed some faith in government web sites and parenting sites that they trusted, such as Raising Children Network (raisingchildren.net.au). Some also mentioned “Dr Google”, Facebook parent groups, or parent blogs, but they had lower levels of trust in this information.

“I think sometimes the research isn't realistic with the day to day kind of thing.” Parent FG1

“It's hard to know what's true and what's not, because the internet is full of rubbish.” Parent FG3

The source of information most valued was advice from other mothers, especially those at playgroup. The mothers also talked about the benefits of being able to observe other parents interacting with their child at playgroup. This included observing older children, to gain an insight into what to expect when their own child reached that developmental stage.

“I don't usually look at websites, but if I see something that one of you are doing, well that's good, I'm going to copy that.” Parent, FG1

“I struggled a lot for a long time, but the supportive network at playgroup was good, where you looked to everyone for ideas and different approaches.” Parent, FG4

“If I have a question, I ask everyone else, ‘Does your kid do this?’” Parent 1, FG2

“Just tell people, ‘Oh, maybe if you tried this, this would actually help you, I found this helpful for me’. Where it's not really reading up on internet, that could help you with that. It's basically mum to mum saying, ‘Look, if you do this maybe this will help’.” Parent 2, FG2

“...always really interesting to talk with other parents about ways that they have tackled or handled that, if that's been an issue for them...” Parent FG5

3.2.2.3 Barrier Theme 1: Parents feel a lack of empowerment to influence child preferences

A potential barrier to parental self-efficacy to implement supportive parenting practices was the parent's perception of the child's preferences with respect to food and activity. A number of parents made statements, including comparisons between siblings, that indicated they believed their child's preferences were fixed, and that this reduced the amount and type of influence that they had over their child.

“We know that we should maybe bring a little bit more veggies or that, but we're also limited to what they will take.” Parent, FG3

Some parents who felt their child would benefit from additional PA appeared to be constrained by their perceptions about their child's lack of interest or enjoyment of active play.

“I’d just like him to do it himself. Just, you know, go, ‘I’m going to go outside and play’. He’s not one of those, but he’s never been one of those kids...”

Parent, FG3

Parents also generally expressed a low level of self-efficacy with respect to implementing strategies to enforce bed times and to influence the amount of child sleep. They considered child sleep issues essentially out of their control, so that even if they were aware that their child did not get enough sleep, they did not feel they could do anything about it.

“You can recommend a certain amount of sleep, but you can’t make that happen necessarily. So sometimes, it’s like, oh that’s great I’m glad you recommend that (laughter) but good luck with that (laughter). I don’t know how that’s going to happen.” Parent, FG4

“It’s hard because kids, some kids, just don’t want to sleep. I know a lot of people’s kids that just don’t want to sleep really.” Parent, FG1

3.2.2.4 Barrier Theme 2: Stress, tiredness or lack of time can make parenting a challenge

Throughout all of the focus group discussions, the parents made comments that demonstrated various feelings of stress and frustration in respect to day to day parenting.

“You know that they should be eating their veggies, but they refuse. And, yeah, just being rejected, and rejected, and rejected.” Parent, FG3

“The reality is you’re just too exhausted. You’re just surviving... I’ve always loved cooking and I’ve noticed over the last few years, I don’t enjoy it nearly as much as I used to, and it’s just simply, I still do it with this air of, ‘Oh, it’s another job to do.’ That’s unfortunate because I’m just tired and I’m just stretched.” Parent, FG5

A number of parents commented that they were aware that their emotions influenced their behaviour in moments of stress. They wanted to be the best parent possible, so they strived to curb behaviours they believed were detrimental to supportive parenting. Parents stated that the many demands on them as parents over the course of the day made it difficult to “cope” or deal with challenges as they arose, particularly at the end of the day.

“I find myself yelling at him. And then I'm like, ‘why am I yelling and I'm telling him not to yell?’ I'm just over it. I don't care anymore (laughter).”
Parent, FG1

“I find that I need help with my emotions, I think, rather than my kids. It's like, I'm so patient, inside I feel like I- But when I get frustrated I tend to cry and it's like I have to leave because I'm like- By the end of the day I'm just like, oh my god. Sometimes, it just, you feel like you've been shouting all day.” Parent, FG3

Some parents expressed feelings of guilt and inadequacy.

“You feel like the worst mother in the world.” Parent, FG1

“We all kind of know the do's and don'ts, and we all know when we do it and don't do it and we feel the guilt for not doing them if we're not doing them.”
Parent, FG5

“[child] doesn't respond well to ... shouting, but he's quite sensitive as well. ... You can see sometimes he sort of goes like that, [hands over ears] and I go oh, I got to stop doing this. But sometimes it's just so hard...” Parent, FG3

Parents also expressed not having enough time, or being too tired to use supportive parenting practices.

“And [the parent websites] got all these mums, that got all these activities, every day and they do this and they do that. And I'm just like, I need some chill time for myself too. I mean who cleans their houses?” Parent FG3

“Cause you just, you still have to find time for everything else in a day - like, you still have to be inside to get dinner ready. So when I try to leave mine, even out the back, it's like two minutes and I'm, "Where are they? What are they doing?" Parent FG2

Parental tiredness in the evening may also be a genuine factor for parents of children who take a daytime nap, but then are not tired enough to go to bed at a time considered reasonable by the parent.

“The twins are just all over the place with their sleep. Because they're between needing- Well, they probably do still need a nap, but then if they nap, they don't want to go to bed till 10 o'clock at night. And then by 9 or 10 o'clock at night, it's not fun putting them to bed, because I'm exhausted. You're just at the end of your tether.” Parent, FG3

3.2.3 Parent preferences for a playgroup intervention

Participants were initially sceptical when asked whether a program for parents might work at their playgroup. Many stated that they either did not want to attend a program at all, or could not imagine it fitting into the noise and “chaos” of playgroup. In addition, they were not in favour of a program run outside of playgroup time (for example, in the evening) without the children in attendance. There were four main themes that were identified from the data analysis: 1) We come to playgroup for support and social interaction, 2) We don’t want to be “educated” about parenting, we just want support, 3) Child interruptions and distractions are unavoidable, and 4) I would be interested in a parent program, but I don’t attend playgroup every week.

3.2.3.1 Theme 1: We come to playgroup for support and social interaction

The community playgroup environment is relaxed and relatively unstructured, whereby neither adults nor children are obliged to take part in any specific activities. Parents did not want to lose that aspect of playgroup. Overwhelmingly, parents and carers attend playgroup for social interaction and to receive support from other parents, so there was some concern that any formal program would negatively impact this.

“This is probably one of the few places where I can come, and I can just leave him, because there's nowhere he can go, there's little he can destroy, and I can just either sit on the steps by myself and stare at nothing, or talk to other mums.” Parent, FG5

“If it was half an hour of a two-hour playgroup, that would be better than longer. Then you still get what you want out of the playgroup side of it.” Parent, FG1

However, despite these reservations, many parents were generally positive about an intervention that supported parents being delivered at playgroup.

“I think you’re on the right track with integrating it, if that’s what you’re trying to pursue, within the framework of something that’s already happening, and that people like us are going to be at anyway. That way, if someone does want to take advantage of whatever is happening it’s not going to a thing to do it.” Parent, FG4

3.2.3.2 Theme 2: We don't want to be "educated" about parenting, we just want support

In addition to being concerned that a playgroup intervention might undermine the playgroup environment, parents were also clear that they did not want to be told what they should be doing. Rather, they wanted support and validation as a parent, as well as some useful strategies for dealing with challenging situations.

“And probably what would be more helpful, for people that are already coming to things like playgroup, and are already seeking the best for their kids, is more of the support for the parents. Like, just being a sounding board, rather than-- it's great to know that information, but I think a lot of it's already, we know, like know that stuff. Like we know we shouldn't be bribing, we know that they should be sleeping more than they are, and probably it's more the support to help us get the best of our own situation.” Parent 1, FG3

“But I think that's then for us, to help us by saying right, your kids are struggling to eat this, but it is okay. Help us cope with things.” Parent 2, FG3

“I'd definitely rather talk about strategies rather than the do's and don'ts.” Parent, FG5

In keeping with the theme of valuing peer support, parents also expressed a preference for a parent to facilitate an intervention. When asked if they would prefer a health professional or a trained parent, there wasn't a clear preference for either, but there was unequivocal agreement that the facilitator must be a parent who understands their parenting challenges.

3.2.3.3 Theme 3: Child interruptions and distractions are unavoidable

A fundamental feature of a playgroup is that the parent/carer and child attend together. While parents are responsible for their own child, there is an unspoken expectation that other adults will take an interest in all of the children; to supervise, intervene in child disputes, or soothe an upset child, where needed. Although children attending playgroup can, and do, mostly engage in group play with minimal supervision, parents stated that children will often interrupt adult conversations.

“At any moment, my child's gonna run out and want me.” Parent 1, FG2

“With the kids, it's really impossible to sit down and have a full conversation.” Parent 2, FG2

“Every conversation's distracted.” Parent 3, FG2

A number of parents indicated that a flexible intervention, where attendees could “dip in and out” could mitigate any child interruption issues. In addition, it was suggested that making topics stand alone, so that parents could attend particular topic/s of interest to them, would potentially free up non-attendees to supervise the children of those who were attending on a particular day. When it was put to the focus groups that an option might be a formal “child minding” arrangement with child activities, almost all participants were against this idea unless it fit in with the usual environment and flow of the playgroup.

“You could possibly do a rotating thing. A couple of mums might be happy to miss one session or something. If they weren’t interested, they could go out, ... some kind of special activity that was organised for that time, just for half an hour. I mean with a few people to look after the kids.” Parent 1, FG1

“Some parents might miss out because they have to supervise the kids.” Parent 2, FG1

“I think it still needs to be someone here just for names. No one can come in external.” Parent 3, FG1

3.2.3.4 Theme 4: I would be interested in a parent program, but I don’t attend playgroup every week

Not all parents attend playgroup consistently, and the attendance numbers vary each week, depending on personal preferences, other commitments, weather, and child illness. However, another advantage of the “stand alone” topics concept that was put forward by some parents was that they could then make a particular effort to attend playgroup on the days when a topic they were interested in was being addressed. There were mixed opinions about how often a program should run, ranging from every week to every month. The underlying theme was that an intervention would need to be flexible to take into account the irregular attendance of some parents.

“Yeah, that’s not a bad idea [referring to suggestion of once a month], because at least you’re not like, ‘Oh, my god, I’ve got that again this week.’” Parent 1, FG1

“Maybe fortnightly might be better just to have more momentum and in case, like, I didn’t come last week, and so if that was your week [of the month] of doing a session, I would miss it.” Parent 2, FG1

3.3 DISCUSSION

The objective of this focus group study was to gain an understanding of the barriers and facilitators to autonomy supporting parenting practices with respect to obesity-related behaviours in children. A conceptual framework focussed mainly on the parental support domain of Self-Determination Theory, but with additional constructs of parental self-efficacy and behavioural capability from Social Cognitive Theory. Parents openly discussed barriers related to encouraging healthy behaviours in their children, and appeared to lack confidence (self-efficacy) to use some autonomy promoting parenting practices. They generally felt they had sufficient knowledge around child healthy lifestyle behaviours, and displayed some knowledge around appropriate parenting practices. However, they provided insights into the challenges of parenting, and the difficulties in engaging in autonomy supporting practices in the moment of feeling stressed, overwhelmed, tired or time restricted. Participants also provided insights into the barriers and facilitators to an intervention for parents in a community playgroup setting, and their preferences for mode of delivery.

Consistent with the results from other studies (Jarman et al., 2015; Petrunoff et al., 2014), managing child food refusal through the use of non-responsive feeding practices, such as hiding vegetables, using food bribes, or only providing foods they know their child will eat, was common (Martin-Biggers et al., 2015). The use of non-responsive feeding practices has been linked to a decrease in child self-regulation and satiety responsiveness (Eneli et al., 2008; Francis & Susman, 2009). In addition, the anxiety and frustration around food refusal also impacts on the maternal emotional state (Mitchell et al., 2013). In the current study, most parents felt bribing children with chocolate, for example, was justified because it meant the child ate their vegetables, or finished their main meal. However, some expressed the view that, although they used this strategy, they knew it was not ideal. In moments of stress, parents reported using parenting practices that were counter-productive to what they felt they “should” do. Food parenting practices are not always used consistently across multiple contexts (Loth et al., 2018). Loth et al. (2018) identified situational factors such as parental stress, time constraints, and schedule changes in a recent qualitative analysis using ecological momentary assessment. The use of dessert or chocolate as an incentive, and parent’s feelings of guilt about doing so, is also widely reported amongst parents of young children (Campbell et al., 2007; Tucker et al., 2006).

Parents discussed similar trade-offs with respect to their parenting practices around their child's screen time. Limiting screen time is a challenge for many parents for a range of reasons, many of which relate to its appeal as a babysitter (Hesketh et al., 2012). Parents talked about iPads®, iPhones® and hand-held computer games being particularly useful to occupy or distract their child due to their portability and convenience outside the home (Bentley et al., 2016). Parents felt guilty for using electronic media in this way, because they believed screen time should be restricted for children. However this attitude was undermined by the parallel belief that iPads® and computers are not only ubiquitous, but also necessary for children to master before starting school.

For most parents, PA was not a high priority as they felt their child was sufficiently active. Other studies have found that parents of young children often believe that children are inherently active, (Hennink-Kaminski et al., 2018; Hesketh et al., 2012). This is a potential barrier for an intervention aiming to increase PA in young children (Hennink-Kaminski et al., 2018; Hesketh et al., 2013), and is supported by research that found parents feel that the PA guidelines apply to “other” families (Bentley et al., 2015). Conversely, some parents described their child as “not active” and stated their belief that their child's preference for sedentary play was fixed, and they were powerless to influence this preference. Another barrier to increasing PA was the need to supervise the activity, either at a park or when the child was playing in the backyard at home. Parents in another qualitative study also cited safety concerns in terms of children needing to be supervised in a public location (Hesketh et al., 2012).

Parents felt frustrated about bed time and sleep, and believed that this was out of their control. They discussed strategies they had tried, mostly with limited success, or which impacted on themselves or their family in other ways. Consistent with other studies, parents cited daytime naps, and a spouse arriving home from work late and wanting to spend time with their children, as reasons for inconsistent bedtimes (Martin-Biggers et al., 2015).

Playgroups are an important source of social support and friendship for parents, especially for those who are socially isolated (Hancock et al., 2015; McShane et al., 2016), and they provide parents with a sense of belonging and validation as a parent (Hancock et al., 2015; Harman et al., 2014). All parents endorsed the importance of the social support they received at playgroup. They discussed the benefits of being

able to talk about their parenting challenges in an environment where the other parents understood, could offer genuine support, and also suggest strategies that might help with specific issues. An intervention program that leverages this supportive environment and enables parents to share and discuss positive and responsive parenting practices therefore may be effective (Martin-Biggers et al., 2015).

Parents were supportive of a program that could help them deal with the challenges of parenting, but they did not want to lose the social and informal aspects of playgroup. As such, an intervention would need to be brief, flexible and supportive. It would need to be delivered by someone they could relate to, and whom they felt would understand their parenting challenges. They commented that conversations with other parents are often interrupted by their child, or that they may be distracted by what their child is doing. However, they also indicated that they were accustomed to having disrupted conversations, so the presence of children may not be a barrier to effective implementation.

A strength of this study was the use of focus groups to explore the views of parents, allowing them to build on the views and experiences of the other parents during the discussions (De Decker et al., 2012). Another strength was the use of Social Cognitive Theory and Self-Determination Theory as conceptual frameworks. A deductive approach was taken initially in this study but then a more inductive approach was used to refine the codes and themes that emerged from the focus group discussions. This flexible analysis method enabled the research questions and aims of the study to be fully explored without being constrained by the conceptual framework.

A limitation of the study is that focus group data can only represent the views of the study participants, which may not reflect the views of a wider group of playgroup parents (Liamputtong, 2013). Even though we reached a saturation of opinions and preferences, focus groups cannot provide information about the prevalence of those opinions across the entire playgroup community (Liamputtong, 2013). Further, the playgroups that expressed an interest in taking part in the focus groups were all located in metropolitan areas of mid to high socio-economic advantage. As such, the results may not fully apply to playgroups and parents in lower socio-economic areas or to those located in regional cities or rural areas of Queensland. Another limitation of focus group data is that there may be some social desirability attached to the responses (Bellows et al., 2008). This may occur, for example, when a parent may not want their

parenting challenges to be subject to judgment by other parents, or they may just conform to the general consensus of the group's opinion (Liamputtong, 2013). This potential limitation was mitigated by the fact that the parents in each group had already established supportive and non-judgmental relationships.

3.3.1 Conclusion

Parents provided insights into the challenges of parenting, and the difficulties in engaging in autonomy supporting parenting practices when feeling stressed, overwhelmed, tired or time restricted. The inclusion of parental self-efficacy in the conceptual framework as an influencer of autonomy supporting parenting practices was consistent with the focus group outcomes. However, for this study, behavioural capability (knowledge and skills) was less of a factor, although parents wanted information on strategies. Childhood obesity prevention interventions targeting parenting practices related to healthy lifestyle behaviours thus need to be implemented in a way that supports parents, increases parental self-efficacy, and decreases parental stress. This should include practical strategies for using autonomy supporting parenting practices. Finally, the community playgroup environment is mostly unstructured, often noisy, and conversations are frequently interrupted by the needs of the children. As such, any obesity prevention program implemented in this setting would need to be light touch, flexible, and where possible, facilitated by a peer.

Chapter 4: Intervention Design

This chapter describes how the intervention was designed using the Intervention Mapping (IM) framework (Bartholomew et al., 2016). The focus of this chapter is on steps 1 to 4 of the framework. Steps 5 and 6 (implementation and evaluation planning) are discussed briefly in this chapter, but covered in detail in Chapters 5 and 6.

Section 4.1 describes the study design. Section 4.2 provides an overview of the first IM step, the needs assessment and logic model of the problem. Section 4.3 discusses Step 2, the logic model of change; section 4.4 discusses how IM Step 3 was applied in the development of the intervention delivery methods and strategies, and section 4.5 describes IM Step 4, the development of the intervention components, including providing detail of the intervention content. Section 4.6 briefly describes the methods for Steps 5 and 6, the implementation and evaluation plan for the intervention pilot trial. Finally, section 4.7 summarises the key aspects of the intervention and briefly discusses the use of the IM protocol and how the program delivery mode and methods is novel in respect to childhood obesity prevention interventions.

4.1 STUDY DESIGN

The intervention was developed using the Intervention Mapping (IM) framework (Bartholomew et al., 2016). The IM protocol uses both evidence and theory as a foundation for health intervention planning and provides a systematic, step-by-step, approach (Kok et al., 2004). The six steps of the IM protocol are 1) conduct a needs assessment to create a logic model of the problem; 2) create a logic model of change based on the program outcomes and objectives; 3) design the intervention, including the behaviour change strategies; 4) develop the program materials, messages and resources; 5) develop an implementation plan; and 6) develop an evaluation plan (Bartholomew et al., 2016). The IM process has been used frequently as a framework for intervention design in obesity prevention or treatment interventions (G. Ball et al., 2017; Mann et al., 2015; Stea et al., 2016; Taylor et al., 2013). The protocol provides a clear pathway from the intervention goals and objectives to the intervention messages by addressing the determinants of the health problem. It uses both theory-informed behaviour change methods, and evidenced-based strategies, as part of the intervention

design. However, the theories, methods and strategies of the IM framework are not prescribed. Rather, the protocol is flexible enough to allow the intervention developer to choose the most appropriate methods and behaviour change strategies for the intervention objectives, target population, and setting.

4.2 STEP 1 – NEEDS ASSESSMENT AND LOGIC MODEL OF THE PROBLEM

Step 1 of the IM process involves conducting a needs assessment, creating a logic model of the health problem, describing the target population and setting of the intervention, and stating the program goals (Bartholomew et al., 2016). A qualitative approach was used in this study for the needs assessment. It included identifying research gaps via the literature review (Chapter 2:), and analysing the results from focus groups with the target population (Chapter 3:). The target population was parents of children under the age of 5 years attending community playgroups. Playgroups targeted in this study were those associated with Playgroup Queensland (PGQ). As such, linking and collaborating with the PGQ organisation was a crucial part of the needs assessment. Staff from PGQ were also consulted as part of an intervention planning day (detailed in section 4.4.1).

4.2.1.1 Literature review

The IM process begins with articulating the health problem to be addressed via the intervention (Bartholomew et al., 2016). For the current study, the health problem was the unhealthy development of child obesity-related behaviours. One of the aims of the literature review was to investigate the influence of parenting practices on the development of child obesity-related behaviours, and to propose a theoretical framework. Self-Determination Theory (SDT) was selected in respect to parental influences on child behavioural development, and Social Cognitive Theory (SCT) was identified as key for parental behaviour change. Further detail on how the theories were integrated into a conceptual framework is in section 3.1.2. As discussed in Chapter 2:, autonomy promoting parenting practices are important to the healthy development of child self-regulation and obesity-related behaviours (Joussemet et al., 2008). In all four child behaviour domains: eating, PA, screen time and sleep, there are both general and specific parenting practices that may reduce the risk of childhood obesity and obesity later in life. Examples of general parenting practices are the setting of limits and providing consist household routines (Anderson & Whitaker, 2010).

Examples of domain-specific parenting practices are responsive feeding practices (Frankel et al., 2018), providing support for PA (Trost & Loprinzi, 2011), and encouraging appropriate and regular bedtime activities (Mindell et al., 2015). This aspect of the literature review was used to inform the intervention content and is discussed further in section 4.5.1.

4.2.1.2 Target group and setting assessment

Community playgroups associated with PGQ were targeted for the intervention. Several meetings were held with key staff at PGQ to understand the target population (parents attending playgroup) and the community playgroup setting. Children, ranging in age from infants up to 5-years-old, attend playgroup with their parent or carer, and the focus of playgroups is on play-based activities that support children's development, socialisation, and early learning (Playgroup Queensland, 2019a). One of the aims of the meetings with PGQ was to gain further understanding of the playgroup environment in terms of the potential feasibility of an intervention delivered in the community playgroup setting. During the meetings, PGQ were enthusiastic about the general concept of a program for parents, but were unsure how it might be feasible in the informal playgroup setting. Focus groups were planned to undertake an in-depth needs assessment of the feasibility and acceptability of a healthy lifestyle program at community playgroups.

4.2.1.3 Focus groups

As detailed in Chapter 3:, focus groups were conducted with parents attending playgroups in metropolitan Brisbane. The aim of the focus groups was to 1) identify the barriers and facilitators for parents in respect to using autonomy promoting parenting practices around the child behavioural domains of eating, screen time, physical activity and sleep, and 2) determine what parents would find acceptable in terms of content, delivery mode and timing of an intervention in a playgroup setting. The main themes that emerged from the focus group data analysis have been discussed in Chapter 3. In summary, the focus group results indicated that a program delivered to parents at playgroup was potentially feasible and acceptable. Parents did not want to be "educated", but would like practical strategies to support them to use appropriate parenting practices in the context of obesity-related behaviours. The focus groups also provided an increased understanding of how an intervention might fit into the unstructured, noisy, and busy playgroup environment. For example, it was apparent

that the intervention would need to be brief, flexible, and informal. Finally, focus group parents mentioned some specific topics they would like covered in a program, including “fussy eating” and strategies to reduce the use of screens. These results informed the intervention design and are discussed in sections 4.4 and 4.5.

4.2.1.4 Logic model of the problem

A logic model of the problem of the unhealthy development of child obesity-related behaviours was created from the literature review and focus group results (Figure 4.1). The logic model was developed from right to left, whereby evidence supports the premise that obesity risk is increased where child obesity-related behaviours are inappropriate (Mihirshahi & Baur, 2018). Examples of the behaviours are listed in Figure 4.1. The obesity-related behaviours in children are influenced by parenting practices that are not autonomy promoting (Rhee, 2008). Some specific examples most relevant to the target population are also listed in Figure 4.1. The theoretical behavioural determinants of those behaviours were identified as a lack of parental self-efficacy and/or behavioural capability, and are discussed in further detail in section 4.3.3.

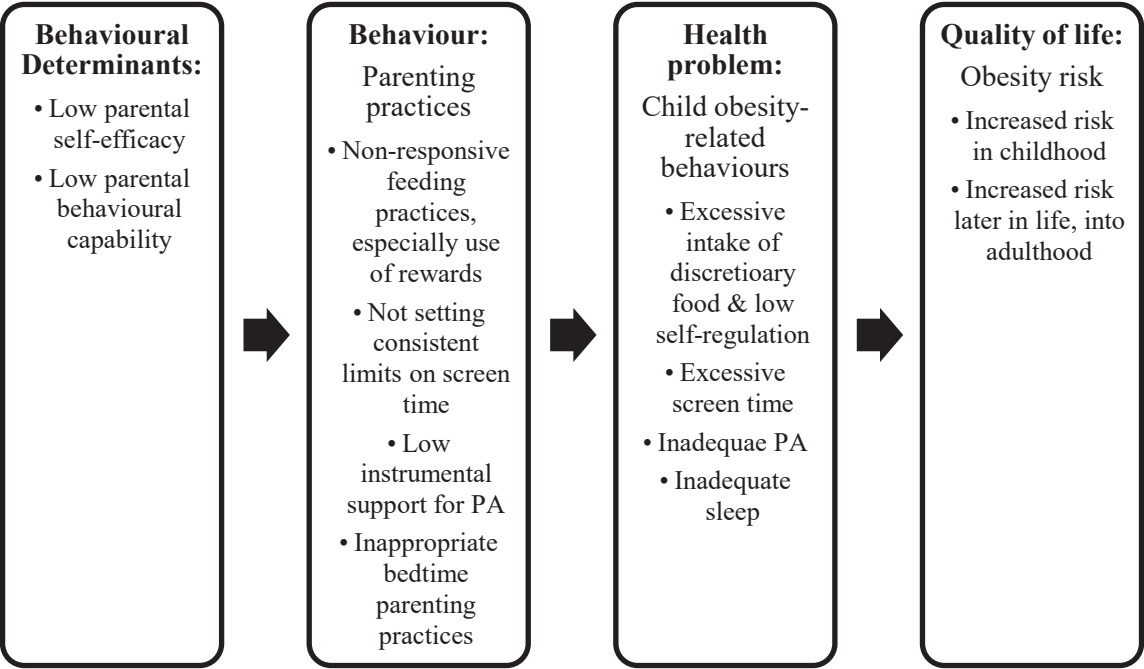


Figure 4.1. Logic model of the problem

From the logic model of the problem, it was decided that the goal of the intervention would be to increase parental self-efficacy and behavioural capability

(parenting skills) in respect to autonomy promoting parenting practices associated with the four obesity-related child behavioural domains.

4.3 STEP 2 – LOGIC MODEL OF CHANGE

The second step in the IM process commenced with stating the behavioural outcomes of the intervention, and then creating a logic model of change (Bartholomew et al., 2016). A logic model of change shows what change is required to address the health problem, and illustrates the proposed causal pathway for the behavioural outcomes (*Figure 4.2*).

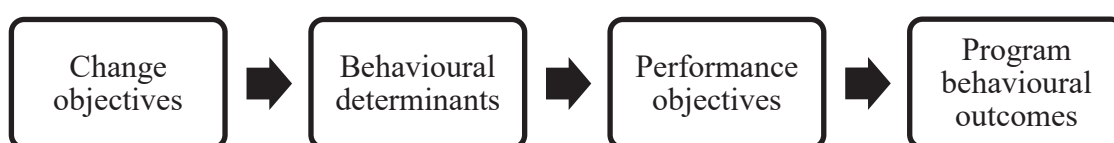


Figure 4.2. Logic model of change (adapted from Bartholomew et al., 2016)

4.3.1 Program behavioural outcomes

The desired behavioural outcome was an increase by parents in the use of autonomy promoting parenting practices in respect to 1) child eating, 2) physical activity, 3) screen time, and 4) sleep. As such, there were four program behavioural outcomes for the intervention.

4.3.2 Performance objectives

Performance objectives for each behavioural outcome were identified. These “sub-behaviours” are the actions that the program participants are intended to make as a result of the intervention (Bartholomew et al., 2016). The performance objectives are specific examples of parenting practices that are consistent with the behavioural outcomes, and were informed by the evidence from the literature review (detailed in section 2.3.3). Performance objectives were developed for the behavioural outcome in each parenting practice domain (Table 4.1). Although the literature review identified other performance objectives (parenting practices) that could be applied to each of these behavioural outcomes, only the parenting practices that were consistent with the challenges expressed in the focus groups were prioritised for this intervention.

Table 4.1

Program Behavioural Outcomes and Associated Performance Objectives

Program Behavioural Outcomes	Performance Objectives
Use autonomy promoting (responsive) feeding practices	Parent provides a variety of healthy meal options Parent offers novel foods multiple times Parent does not pressure child to eat Parent does not use discretionary foods as rewards or bribes
Use autonomy promoting physical activity parenting practices	Parent provides opportunities for active play Parent provides active alternatives to screens Parent plays with, or engages in physical activity, with child
Use autonomy promoting screen parenting practices	Parent provides limits and rules around use of screens Parent provides non-screen alternatives to TV and iPads®
Use autonomy promoting sleep parenting practices	Parent provides consistent bedtime routines Parent encourages bedtime activities that support sleep

4.3.3 Behavioural determinants

The next task in the IM process is to select behavioural determinants for the program outcomes (Bartholomew et al., 2016). Based on the literature review, the main behavioural determinants of the performance objectives were identified as the SCT constructs of behavioural capability, and (parental) self-efficacy. The analysis of the focus group results highlighted specific barriers to using autonomy promoting parenting practices consistent with both of these constructs, and are detailed in Table 4.2 as behavioural determinants of parenting practices.

Table 4.2

Behavioural Determinants to the use of Autonomy Promoting Parenting Practices as Identified via Focus Groups

Theoretical determinant	Behavioural Determinant
Parental Behavioural Capability	Lack of knowledge and/or skills*
	Parental tiredness or illness or lack of time
Parental Self-efficacy	Perceived need to use food as a reward
	Perceived need for screens
	Belief that child prefers to be sedentary
	Perception that child is active enough
	Belief that child sleep cannot be influenced
	Parental stress
	Feelings of guilt
	Perceived lack of time

* “Knowledge and skills” refers to knowledge and skill in respect to the use of autonomy promoting parenting practices (e.g. knowledge of the responsive feeding practice “parent provides, child decides”, and how to implement this). It does not refer to dietary guidelines or physical activity, screen time or sleep recommendations.

4.3.4 Change objectives

The final part of IM Step 2 is to construct matrices of change objectives by crossing the performance objectives with the determinants (Bartholomew et al., 2016). However, despite the advantages of the IM’s systematic approach, the process is time-consuming and can become unwieldy and unnecessarily complex if followed rigidly (Gray-Burrows et al., 2016). Generally, the outcome of this step is a matrix of change objectives and behavioural (and, in some cases, environmental) determinants for each performance objective (Bartholomew et al., 2016). However, where there are multiple performance objectives and multiple determinants, the result can be matrices of over one hundred change objectives (Gray-Burrows et al., 2016; Taylor et al., 2013). More importantly for this study, developing a definitive list of change objectives by crossing-matching each performance objective with every determinant may have undermined a key aspect of the intervention behaviour change methods – that the parents would decide on their own change objectives, according to their personal and family needs and priorities. As such, Step 2 of the IM protocol was modified for this

study, and change objectives were not specified in the development of the intervention. Instead, the barriers, listed as behavioural determinants in Table 4.2, were used in the intervention design to promote and encourage participants to meet the performance objectives. This is explained further in section 4.4.2.

4.4 STEP 3 – INTERVENTION METHODS AND STRATEGIES

Step 3 of the IM protocol is the selection of theory-informed intervention delivery methods and behaviour change strategies (Bartholomew et al., 2016). The intervention methods were informed by SCT, the “healthy conversations” concept, and peer-led models of delivery. These are explained in the following sub-sections. Intervention content was informed by SDT, and evidence from the literature review in respect to responsive parenting practices, and is described in section 4.5.1.

4.4.1 Intervention planning

In September 2018, an intervention planning day was held. The intervention planning team used the outcomes of Step 2 of the IM protocol as a basis for designing the intervention. The team consisted of the PhD candidate and four researchers, all of whom have extensive experience in intervention development, testing and dissemination:

- Professor Stewart Trost, BSc (Health Prom), MS, PhD, Associate Director of IHBI at the Queensland Centre for Children’s Health Research, and leader of the Children’s Physical Activity Research Group. His expertise includes community-based interventions to promote physical activity and prevent obesity in children. He was a member of the scientific committee for drafting physical activity and screen time recommendations for Australian children under five.
- Professor Rebecca Golley, BSc (Hons), BND, PhD, APD, Professor (Research) from the College of Nursing and Health Sciences at Flinders University, South Australia. Professor Golley is an Accredited Practising Dietitian, and her expertise includes child obesity and nutrition promotion intervention development and evaluation, behavioural nutrition, and food parenting.

- Professor Kylie Hesketh, BBSc (Hons), PhD, Australian Research Council Future Fellow, Institute for Physical Activity and Nutrition, Deakin University, Victoria. Her expertise includes the development of interventions targeting physical activity and sedentary behaviours in early childhood. She is a co-lead of the Melbourne Infant Feeding, Activity and Nutrition Trial (InFANT) Program.
- Doctor Rebecca Byrne, BMedSc, MNutrDiet, PhD, APD. Dr Byrne is a postdoctoral research fellow within the NHMRC funded Centre of Research Excellence in the Early Prevention of Obesity in Childhood. Her research interests include what and how young children are fed, understanding how eating behaviours develop, and improving the measurement of obesogenic behaviours. She worked on the NOURISH trial that evaluated an intervention providing anticipatory guidance to mothers regarding responsive feeding.

All members of the intervention planning team, except Dr Byrne, attended the planning day. Dr Byrne engaged with discussions prior to the planning day and provided further input and feedback after the planning day. The team discussed the key themes from the focus groups, particularly parental self-efficacy and how parents (mothers, in particular) feel about their parenting challenges, role as a parent, and tiredness/lack of energy. The reason for this focus was to move away from the more common intervention concept of teaching parents about healthy lifestyles and/or parenting, and to explore what playgroup parents wanted, what their priorities were, and what type of approach may benefit them the most in an intervention. As such, the following key points informed the planning:

- Parents are “stressed”, as they attempt to be the best parent possible, but with competing family and other demands on their time.
- Parents feel tired or lack the energy to complete all of the parenting tasks that they feel they “should”.
- Parents want strategies to deal with their “in the moment” challenges to get them through a perceived “crisis”.
- Parents feel guilty about some aspects of their parenting; they know what is “right”, but don’t always apply that knowledge.

- Parents feel that “nothing works” (for example, sleep challenges), and that some of their child’s behaviours are outside their control (for example, their child does not enjoy being active).
- Parents want alternatives to screens as “babysitters”, but they feel that the existing recommendations around screen time are not practical.

A major theme from the focus groups that also influenced the planning of the intervention was the concept of “support and guidance from playgroup peers”. During the focus groups, playgroup was portrayed as a place to share parenting experiences, to receive validation for “normal” parenting challenges, and to provide and receive social interaction and support to/from other parents. As such, this concept of “support” became a central theme of the intervention delivery.

The planning team also had to be cognisant that the parents did not want an intervention that negatively impacted on their enjoyment of playgroup. The intervention could not be seen to impact on the parents’ “playgroup time”. This also meant that a program that ran weekly, or for several months, was unlikely to be acceptable to parents attending playgroup (whether or not they attended the program). As discussed in the review of interventions in Chapter 2, a brief program in terms of the number and length of sessions, may not provide adequate intervention dose to impact the program goals. Therefore, additional resources, or “at home” activities, needed to be incorporated to increase intervention dose.

In addition, the informal and unstructured aspects of playgroup sessions that were important to the parents could not be undermined. Parents had also expressed doubt about how a program could work in the noisy playgroup environment with child distractions and interruptions. With these points in mind, the team brainstormed ideas, and developed a concept of intervention delivery that would have minimal impact on playgroup time and the normal running of the playgroup, but also maximise intervention impact. This essentially meant that an intervention would need to be delivered in brief intervals of time and have a discussion-based format. A review of the literature after the planning day identified the concept of “healthy conversations” (Barker et al., 2011) as appropriate for this proposed format. The concept of “signposting” to further information was also incorporated into the intervention design

to complement the brief intervention approach. The details of these delivery modes are discussed in the next sub-sections.

Once the general concepts of the program design had been agreed by the planning team, the ideas were presented to two staff members of PGQ:

- Penny Allen, Manager, Community Programs
- Maree Stanley, Officer, Research and Evaluation

During the discussion with PGQ, there was some further refinement of the intervention design. Sustainability of the intervention was also discussed. The focus group parents had expressed a desire for a parent peer to deliver the program. It was therefore agreed that a model, whereby a parent from each playgroup delivered the intervention, would increase the sustainability of the program for future trials and roll-out to playgroups outside of the intended Brisbane catchment area of the pilot trial.

4.4.2 Intervention format and delivery

4.4.2.1 Intervention overview

The program consisted of five sessions, run fortnightly over the 10 weeks of the school term. The first four sessions each covered one of the child health behaviours (eating, screen time, active play, and sleep), with a final session as a “wrap up”. It was decided to keep the program within a school term because, although playgroups are for children who have not yet commenced school, Brisbane community playgroups generally run during school terms only. As mentioned in the previous section, it was also decided that peer facilitation of small group conversations would be the main method of delivery, and that the concept of “healthy conversations” would be adapted for the intervention. These concepts are explained in sections 4.4.2.3 and 4.4.2.4. In addition, several SCT constructs were applied to support behaviour change, and are discussed in the next sub-section.

4.4.2.2 Social cognitive theory

SCT was used in the focus group conceptual framework and in identifying the theoretical determinants discussed in section 4.3.3. The theory was also applied in respect to the behaviour change techniques used during intervention delivery. According to SCT, behaviour change can occur when the person has self-efficacy, has an expectation that their efforts will create the desired outcome, and sets personal goals

that are achievable and realistic (McAlister et al., 2008; National Cancer Institute, 2005). Self-regulation is another key concept of SCT and includes using techniques such as setting goals, receiving feedback, self-reward, and the enlistment of social support (McAlister et al., 2008). The person also needs the behavioural capability (knowledge and skills) to implement the new behaviour (National Cancer Institute, 2005). Another construct of SCT is observational learning, whereby a person learns by observing the actions of others, in particular peers whom they can identify with (National Cancer Institute, 2005). All of these concepts were embedded into the intervention design and examples of how they were applied are in Table 4.3.

Table 4.3

The use of SCT in the Intervention Methods

SCT construct	How the construct was applied in the intervention method
Behavioural capability	Key messages were developed for each topic. The key messages were intended to be used to assist the facilitator in guiding the conversation in a way that the strategies and suggestions discussed were consistent with autonomy promoting parenting practices. In this way the knowledge of participants was potentially increased without the need to “teach” the concepts. When parents discussed their experiences in trying out the new strategies, they were congratulated on their efforts and encouraged to persist if the strategy didn’t work perfectly, thus building skills through practice.
Self-efficacy	Increasing the parents’ self-efficacy to use autonomy promoting parenting practices was embedded within every aspect of the intervention delivery methods. The group conversations were facilitated in a way that supported and encouraged parents to try out some of the strategies (parenting practices) discussed. The facilitator encouraged each parent to choose one thing to try, which increased the chance of “small wins” and thus build self-efficacy.
Observational learning	The facilitator encouraged parents to bring up any specific parenting challenges related to the topic, and for the group to then suggest a solution or a strategy that the parent might try. As part of this process, other parents sometimes provided examples that had worked for them, or that have worked for someone they know. This was particularly powerful where the suggestions come from parents of an older child. In this way, parents of younger children were “observing” autonomy promoting parenting of parents who had experiences with their own children at that age or developmental phase.
Self-regulation	The facilitator encouraged the setting of goals by asking parents to select a strategy to try at home and consider the barriers to achieving that goal. Parents shared with the group how that plan went, and received support and encouragement for their efforts. Goal-setting was included as part of the intervention methods within the “healthy conversations” strategy and is discussed further in section 4.4.2.4.

4.4.2.3 Peer Facilitator model

The parents at the focus groups were clear that they wanted a peer to deliver any intervention at playgroup. The peer-led delivery model has been trialled successfully in many health interventions (Webel et al., 2010). In a child feeding and nutrition education intervention, mothers of children aged 0-3 years were trained as peer educators to share information online with their friends, family and social media contacts over six months, via Facebook and email (R. Ball et al., 2017). The peer educators received training from the research team at a 2-hour workshop, and then received ongoing support from the team and the other peer educators via Facebook during the trial (R. Ball et al., 2017). Although the study only measured the experiences of the 28 educators (via group and individual interviews), the researchers concluded that peer education was feasible and acceptable (R. Ball et al., 2017). In addition, the results of a feasibility study prior to the trial found that 26 of the 34 mothers surveyed would be interested in receiving child nutrition information from a trained peer (Duncanson et al., 2014).

Peer facilitators were also used to deliver a breastfeeding class to expectant fathers in Western Australia (Kuliukas et al., 2019). The peer facilitators were fathers with a child under 3 years who had been breastfed for at least 3 months. The facilitators received 2 x 2-hour training sessions, and delivered a single 50-minute class to each group of fathers. They also had a social networking site to connect with the other peer facilitators. Ninety percent of the participants were satisfied with the format, facilitation and content of the classes, and valued the interaction with the other fathers. (Kuliukas et al., 2019)

4.4.2.4 “Healthy Conversations”

As mentioned in section 4.4.1, a review of the literature identified the “healthy conversations” concept as potentially acceptable and feasible for an intervention delivered to playgroup parents. This model has been used by health professionals in interventions to support women to make healthy lifestyle changes (Baird et al., 2014; Barker et al., 2011), and to support healthy gestational weight gain (Jarman et al., 2019). The concept was originally developed to train individual health practitioners in skills that would improve their consulting skills and make them more client-centred (Barker et al., 2011). However, the same methods are applicable to a group facilitation model.

The premise behind the “healthy conversations” is that, if an individual feels that they have control over their own lives, then they will be empowered to make changes to health-related behaviours (Barker et al., 2011). Self-efficacy and empowerment are key aspects to the feeling of control and the ability to set personal behaviour change goals (Black et al., 2014). During a “healthy conversation”, the practitioner asks open questions and uses active listening techniques to support the client to explore barriers and opportunities for healthy eating and physical activity (Barker et al., 2011). The practitioner also encourages the client to come up with their own solutions to their barriers to behaviour change, which will not only increase the possibility of behaviour change, but will also facilitate self-efficacy (Barker et al., 2011).

“Healthy conversations” as a technique for behaviour change does have some similarities to the Motivational interviewing principles of client-centred goal-setting, reflective listening, using open-ended questions, and client autonomy (Holli & Beto, 2014; Resnicow et al., 2006). Motivational interviewing is particularly useful where the client is ambivalent or resistant to personal health behaviour change. Importantly, motivational interviewing is a skill developed over time by experienced health professionals (Holli & Beto, 2014). It is very much personalised to the client, but does not involve providing advice or even making suggestions (Holli & Beto, 2014). Conversely, “healthy conversations” principles are more able to be applied in a group environment, facilitated by a non-professional with minimal training.

Family support and community development staff at Sure Start Children’s Centres in Southampton, UK, were trained in “healthy conversation” skills, with the aim that they would use those skills to support healthy lifestyle behaviour change in their clients (mothers) attending the Children’s Centre (Barker et al., 2011). They were trained in five competencies: A) identifying and creating opportunities to hold “healthy conversations”; B) using open-ended (“open discovery”) questions; C) reflecting on practice; D) listening more than talking; and E) supporting individually derived goal setting through SMARTER planning (Specific, Measurable, Action-oriented, Realistic, Timed, Evaluated, Reviewed).” (Black et al., 2014, p. 701).

Another intervention, that trained dietitians to use “healthy conversation” skills, aimed to support healthy gestational weight gain in pregnant women (Jarman et al., 2019). Rather than just providing advice on what the women “should” do, the dietitian focussed on the individual context of each participant. They encouraged the client to

set their own priorities for SMARTER goals for behaviour change. The randomised controlled trial with 70 pregnant women resulted in the women in the intervention arm feeling more supported by their dietitian. (Jarman et al., 2019)

4.4.2.5 How focus group findings and peer facilitation of “Healthy Conversations” were incorporated into the intervention design

A key outcome of the focus groups was that the parents would prefer that an intervention at playgroup be delivered by a peer. The parents wanted a facilitator who had young children of their own, and who could therefore relate to their parenting challenges and personal feelings of frustration, lack of time etc. PGQ staff also expressed agreement with this concept during the intervention planning day. As such, this was a crucial aspect of the intervention delivery design. Recruitment and training of facilitators is described in Chapter 5. Another key focus group outcome was that the intervention had to fit into the playgroup environment and could not take up a lot of time. This was achieved by the decision to have the peer facilitate two brief conversations (around 10-15 minutes each) in each session. In this way, minimal “playgroup time” was impacted.

The conversations occurred on two separate occasions during the 2-hour playgroup session, at times convenient to the parents at each playgroup. For example, the first conversation might take place while the children were sitting quietly together at a table having morning tea. The second conversation might take place half an hour later while the children were occupied with activities. In some playgroups, one or more parents or grandparents kept the children occupied while the majority of parents took part in the conversations. Due to the diversity of playgroups, facilitators were not provided with specific “rules” or guidance about the best time and location for each conversation. Rather, they were encouraged to assess the environment of the playgroup and discuss with the CPI and/or the parents about what would work best for that playgroup. Table 4.4 lists the themes that were outcomes of the focus groups with parents at playgroup (detailed in Chapter 3), and how they were incorporated into the intervention design.

In keeping with the “healthy conversations” concept, at the commencement of each conversation, the facilitator put a question to the group (conversation starter) to get the participants talking about the topic. The topics and conversation starter questions are detailed in section 4.5.1. During the conversations, the facilitator

encouraged the participants to discuss their parenting challenges in respect to the starter question, and encouraged the group to come up with some possible solutions to those challenges. At the same time, the facilitator guided the conversation in such a way that solutions were in line with the key messages for that topic, and that the conversation remained supportive of the views of all participants. The five competencies from the “healthy conversations” concept, described in section 4.4.2.4, were adapted for use in a group facilitation context. However, the SMARTER goals concept was not followed rigidly, in that the parents were not “taught” about specifically setting SMARTER goals. Rather, the concept was introduced in a simple, practical way via encouraging parents to “choose a strategy to try at home”, and to consider its practical application and the potential barriers to the change. The way the “healthy conversation” competencies were applied in the intervention is summarised in Table 4.5.

It was expected that a potential challenge for facilitators may be how to handle situations where parents advocated strategies that were not autonomy promoting. During focus groups, parents stated that they didn’t need or want “education” about child behaviours or parenting, and yet some comments were made that demonstrated lack of knowledge. This was particularly the case with feeding practices, during the discussion about “hiding vegetables” or using chocolate as a reward for eating vegetables. Some parents did not understand the longer-term implications of these practices. However, the facilitators were not health professionals and were not expected to be experts on health behaviours. To deal with this, the facilitator handbook provided a brief background to the reasons behind the key messages, and provided some suggested responses to comments or questions by parents. This is discussed further in section 4.5.1.

Table 4.4

Intervention Components Developed from the Focus Group Themes

Focus group theme	How the theme was addressed in the program design
Parents are confident in their knowledge but want strategies	The facilitator was given a “tool box” of strategies, but the emphasis was on the parents coming up with ideas as a group. The facilitator used the suggestions from the manual, or from their own experience as a parent, as needed.
Support from playgroup peers is highly valued	A central theme of the intervention was the leveraging of support from playgroup peers. The aim of the conversations was for the group to collectively come up with strategies to deal with specific parenting challenges raised by individual parents or the group. The facilitator aimed to foster a positive, supportive atmosphere during the conversations.
Parents feel a lack of empowerment to influence child preferences	The facilitator directed the conversations in a way that emphasised the concept of “parents make a difference”. Their “tool box” of strategies included ideas to challenge parent’s perceptions about not being able to influence child preferences. For example, a parent who felt that they were unable to influence their “sedentary” child to walk to the park was encouraged to consider what activities their child might like, such as dancing to music in the home.
Stress, tiredness or lack of time can make parenting a challenge	The ideas and strategies suggested by the facilitator were presented from a standpoint of “this may make your life easier”. For example, a suggestion for the parent who found it a nightly chore to encourage/bribe their child to eat their vegetables was to offer the vegetable multiple times without worrying about whether the child eats the vegetable. In this way, the autonomy promoting parenting practice was suggested from the standpoint of reducing parental stress.
We come to playgroup for support and social interaction (not to attend a formal program)	The intervention was delivered as two brief (10-15 minute) conversations. These conversations included any interested parents at playgroup on the day of each session. There was no pressure to take part, and the conversation was located in a suitable area away from the main activities of the playgroup, to reduce impact on the children or other adults.
We don’t want to be “educated” about parenting; we just want support	There was no overt “educating” of parents. While the facilitator aimed to deliver key messages that revolved around autonomy promoting parenting practices, this was done with the flavour of making life easier for the parent.
Child interruptions and distractions are unavoidable	As the intervention consists of brief, informal conversations, a parent could attend either or both, and, could “dip” in and out of the discussion if they had to leave to attend to their child. In addition, the facilitator emailed the participants after each session, summarising the suggestions that were discussed and providing links to more information on the session topic. In this way, any parent who missed all or part of the conversation due to having to attend to their child still had access to the information.
I would be interested in a parent program, but I don’t attend playgroup every week	The program was run over five sessions, with each session covering a different topic. Because the sessions and topics were “stand alone”, a parent could attend any or all of the sessions as it suited them. There was no need to have attended a previous session to get the full benefit of any session. The final session was a re-cap of the previous four sessions. Any parent who had not attended any or all of the previous sessions still benefited from the topic re-caps and the strategies discussed by the other parents. In addition, any parent at the playgroup could receive the email with links to the session topic each week, regardless of whether they had attended that week.

Table 4.5

The Adaptation of “Healthy Conversation Skills” Training Competencies into the Intervention

“Healthy Conversations” competency	How the competency is applied in the intervention methods
A. identifying and creating opportunities to hold “healthy conversations”	The scene was set for the opportunity to hold the “healthy conversations” by the scheduling of two conversations in each session. The facilitator assessed the best time and location at the playgroup for the conversations, to maximise the attendance by the parents.
B. using open-ended (‘open discovery’) questions	The facilitators were experienced and/or trained in the use of open questions. Facilitator training included practicing the use of open questions. They used open questions to encourage parents to talk about their own feelings and experiences in respect to the session topic. The conversation starter questions for each conversation (provided to the facilitator in the Facilitator Manual) were essentially “open discovery” questions, and the facilitators continued to use open questions during each conversation.
C. reflecting on practice	During the training, each topic was discussed in detail, and the trainee facilitators were encouraged to discuss their own experiences, provide opinions and perspectives and to ask questions. During this process, the facilitators reflected on their own use (or lack) of autonomy promoting parenting practices. This reflection was also part of their own preparation prior to each session. Facilitators were encouraged to “debrief” with the PhD candidate in respect to anything challenging that arose during a session and to connect with other facilitators.
D. listening more than talking	The role of the facilitator was to encourage the parents to discuss the topic, including their challenges and possible solutions. The aim was for the parents themselves to come up with those solutions, as the facilitator guided them to solutions that aligned with autonomy promoting parenting. During this process, the facilitator listened carefully to what each parent said, and summarised the important aspects of the conversations at the end of the session.
E. supporting individually derived goal setting through SMARTER planning	At the end of each conversation, and particularly at the end of each session, the facilitator encouraged each parent to pick one of the strategies that was discussed and which they felt may “work” for their family. As noted in the Facilitator Manual, the facilitator encouraged each parent to: <ul style="list-style-type: none"> • articulate what they will do and when they will do it; • describe what they hope the outcome will be; • ensure that the plan is feasible, realistic and potentially achievable; and • consider the barriers to implementing the plan and how they might overcome them.

4.5 STEP 4 – DEVELOPMENT OF INTERVENTION CONTENT

Step 4 of the IM process is to develop the content of the intervention and the associated messages and materials (Bartholomew et al., 2016). During this step, the session topics were developed, then the key messages and conversation starter questions. A facilitator manual was written that also provided prompts and suggestions to assist the facilitator during each conversation. For the pilot trials, the intervention was named the “Supporting Parents at Playgroup Program”.

4.5.1 Session topics and content

Each session was designed to cover one of the four obesity-related behaviours, while incorporating concepts associated with SDT’s critical dimensions of parenting (autonomy support, structure and involvement) across the program (Ryan & Deci, 2017b). Autonomy support includes offering meaningful choices to the child; structure includes providing limits and guidance; and involvement means being supportive, and investing time, attention and resources in the child (Ryan & Deci, 2017b). Evidence-based autonomy promoting parenting practices specific to each domain, with a focus on what focus group parents were most concerned about, formed the basis of each topic. From the focus groups, it was determined that the topics that would resonate with parents were “fussy eating”, alternatives for screens as “babysitters”, active play without parent involvement, and strategies for managing sleep issues. These preferences were integrated into the final topics and content developed for the intervention. Encouraging autonomy promoting parenting practices was the central theme of the intervention, but the information was presented from the perspective of supporting parents and reducing the stress in respect to many parenting challenges.

The topics and key messages covered in each session, and in each of the two conversations, are listed in Table 4.6. The following sub-sections describe the content delivered in each session. This information was included in the Facilitator Manual, and written in simple language in a way that the non-professional facilitators would understand and relate to. The intention was to give them some background to the topics and equip them with general knowledge and possible strategies for using autonomy promoting parenting practices. The manual also included some possible responses to parent comments. Some examples are provided in Table 4.7.

Table 4.6
 Overview of “Supporting Parents at Playgroup Program”

Session	Key message	Conversation starter question
1: Reducing stress at mealtimes		
Conversation 1: Food refusal and child hunger/fullness	“Parent provides, child decides”: Your job is to provide healthy meals and snacks; your child can then decide if they are hungry	We all know about healthy eating and what foods and drinks are good choices for children, but it’s so hard getting children to actually eat vegetables and the meals we would like them to eat. What things have you all tried? What was the outcome? How did it make you feel?
Conversation 2: Supporting child taste development	Offering new or disliked foods multiple (10-12) times helps children taste and accept (or even like) new foods	One of the biggest frustrations as a parent is that children turn their nose up at a new or disliked food. You put all that effort into preparing and cooking the meal, and then they say “yuck” without even trying it. What is everyone else’s experience?
2: Limiting screens without tantrums		
Conversation 1: Establishing rules and limits around screen time	Decide on family screen time rules and be consistent	When we talk about screen use in young children, this usually means TV, iPads® and games on phones and computers. These devices are so handy, but parents in the focus groups said there are times when they give them to their children when they didn’t really want to. What are some of the times you allow screens, but wish you didn’t?
Conversation 2: Alternatives to screens	Acknowledge barriers to screen rules and limits and plan ahead with a “tool box” of alternatives and strategies	In our earlier conversation we talked about deciding on family rules around iPads®, phones and TV. But we all know that it’s easier said than done! What are some alternatives – both active and quiet play – to these devices?
3: Supporting movement skills in children		
Conversation 1: Children and physical activity	Physical activity for young children is about movement. It does not have to involve structured or planned activities	When people think about physical activity, they often think of things like organised sports, going to the gym, walking, or an organised game. When you think about physical activity and your child – what does it mean to you?

Session	Key message	Conversation starter question
<p>Conversation 2: Overcoming barriers to active play</p>	<p>Parents make a difference – encourage and support your child to find what they like to do</p>	<p>Some children just seem to prefer quiet play to running around outside. Sometimes we'd like children to go outside to play so we can get things done. What are some of the barriers to active play for your child?</p>
<p>4: Bedtime activities and routines to support sleep</p>		
<p>Conversation 1: Creating a bedtime routine</p>	<p>A consistent bedtime routine can help children sleep</p>	<p>One thing that almost all parents have in common is challenges in respect to child sleep. At the focus groups, lots of mum's commented that they had tried everything, but nothing worked. Some parents had even sought help from professionals, but still didn't find that a great help. What are the challenges you face in respect to your child's sleep?</p>
<p>Conversation 2: Overcoming barriers to bedtime routines</p>	<p>Make the bedroom environment as "sleep friendly" as possible, and enlist the support of "significant others" in implementing sleep routines</p>	<p>What things might be counterproductive to sleep? (Or what activities are not a good idea within an hour or so before bedtime?)</p>
<p>5: Celebrating achievements</p>		
<p>Conversation 1: Wins with food refusal and child taste development</p>	<p>You know your child and your family better than anyone – be confident in yourself as a parent and in your ability to influence your child's behaviour</p>	<p>Back in Session 1, we talked about the importance of providing different foods to children and allowing them to choose what to eat. We also talked about the importance of being persistent in offering new foods to children because it takes time for them to accept new foods. For those of you who had challenges around "fussy eating" (food refusal) – what did you try? And what was the outcome?</p>
<p>Conversation 2: Wins with activity, inactivity and sleep</p>	<p>Keep up the good work, and be kind to yourself!</p>	<p>Over the last 3 sessions we covered lots of issues around screen time, physical activity and sleep. One of the things we talked about was saving screen time for when you really need it, and having a "tool box" of ideas to use instead of screens. What did you try? And what was the outcome? What is the most surprising thing that worked when you didn't think it would?</p>

Table 4.7

Examples of Suggested Responses to Parent Comments Included in the Facilitator Handbook

Session	Example parent comment	Suggested response
1: Reducing stress at mealtimes	<p>If I don't encourage my child to eat their dinner, they will only be hungry later.</p> <p>My children just screw up their nose and refuse to eat it – even a small amount.</p>	<p>Children are very in tune with their own hunger and fullness. Schedule regular times for meals and snacks. If they are hungry later, tell them that they can eat at snack/dinner time.</p> <p>The goal is to encourage your child to taste the food – they don't have to eat it. Did you know that even tasting can be scary for a child? So praise them for taking a risk (being brave!).</p>
2: Limiting screens without tantrums	<p>TV and iPads are really useful for calming my child before bed.</p> <p>Sometimes the TV or iPad is just the only thing that works – especially if we are out in public.</p>	<p>There's actually a lot of research that shows that children (or anyone) shouldn't use electronic devices within an hour before bed. It's harder to get to sleep. Even if children do still go to sleep when you want them to, they might not get quality sleep.</p> <p>That might be true. You can decide the situations when TV or iPads are appropriate for your child. The key is to have some ideas up your sleeve when you don't want to use the iPad.</p> <p>OR</p> <p>Yes, that is definitely a challenge – does anyone have any strategies they use in this situation? Anything that works for them?</p>
3: Supporting movement skills in children	<p>My child is too active – I need them to calm down – not do more physical activity.</p> <p>My child would rather be watching TV or playing with toys. They are not naturally active.</p>	<p>What is it about your child's behaviour that makes you feel they are "too active"? What more appropriate active play could you divert them to?</p> <p>Some children do need extra encouragement and support from parents to find the activities that they enjoy. For birthdays and Christmas, think about toys that support active play – quoits, balls (including foam balls that can be used indoors), plastic ten pin bowling sets, hoola hoops...</p>

Session	Example parent comment	Suggested response
4: Bedtime activities and routines to support sleep	Bedtime at my house is chaos!	Well the good news is that today we are talking about how a consistent bedtime routine (and bed time) greatly helps getting children to bed and to sleep. So, what are some things you would like to happen in your house leading up to bedtime? <i>[The idea here is to get the parent to identify some activities they currently do and to firm them up into a routine – so children know and expect what will happen at what time and in what order].</i>
	My children go to bed at different times	Being clear and consistent with the bed time for different ages in your family might help. Ensure the bedtime routine for the child going to bed first is consistent, unique and special for that child (e.g. the bedtime story doesn't include the older child – it is one on one time with mum/dad).

4.5.1.1 Session 1 – Feeding practices

The aim of this session was to encourage the use of autonomy promoting feeding practices. Parents at the focus groups talked about feeling guilty or frustrated as they tried to encourage healthy eating, including the time and effort it takes “hide” vegetables, or “bribe” their child to eat with chocolate or dessert. Therefore, a complementary aim of the session was to relieve that anxiety, stress and frustration around child feeding by encouraging parents to accept that some food refusal or fussiness is a normal part of child development. Responsive feeding practices, that allow the child to decide how much to eat of the food provided to them, support the healthy development of self-regulation (Hurley et al., 2011). Conversely, the use of rewards and bribes undermines self-regulation and increases risk of obesity (Powell et al., 2017). Children often need repeated exposure to a novel food (for example, vegetables) before they will consume the food (Anzman-Frasca et al., 2017). In addition, children should be encouraged to be curious and to experiment with a new food, including touching, smelling and tasting (without necessarily swallowing) (Satter, 2007). The key messages of Session 1 covered these concepts, and were integrated into the discussion by the facilitator from the perspective of strategies that could relieve some parental concern about their child’s intake, and “make life easier” for the parents.

4.5.1.2 Session 2 – Screen parenting

The aim of this session was to encourage parents to reflect on the use of screens (TV, iPads®, computer games) by their child. Guidelines state that, for children aged 3-5 years, sedentary screen time should be no more than an hour a day, and that screen time is not recommended for children under the age of 2 years (Department of Health, 2017). However, parents at the focus groups expressed the opinion that these guidelines are not practical or realistic. As such, this session was not intended to educate parents on the guidelines. Instead, it was to support parents deciding on appropriate rules and limits for their family, and consider strategies to address potential barriers to maintaining those limits.

Parents at the focus groups talked about wanting alternatives to using screens as “babysitters” or to calm their child. Therefore, the focus of the session was on the reduction of parenting stress through the consistent application of family rules around screen time. Parents were encouraged to develop a “tool kit” of alternatives that they

could use in a moment of “crisis”. Brainstorming of ideas and strategies to use in specific situations, and discussion of the benefits of being consistent in the application of rules and limits, were encouraged by the facilitator.

4.5.1.3 Session 3 – physical activity (active play) parenting

Parents have an important role to play in the encouragement and support of active play in young children (Trost & Loprinzi, 2011). However, parents at the focus groups talked about their children being either innately active, or preferring sedentary activities. They felt that they were effectively powerless to change this. For example, some parents of active children perceived that their child needed TV to “calm them down”; or that their child would not engage in active play alone. The aim of this session was to encourage parents to realise that they *can* influence their child’s level of activity, by supporting their child to enjoy active play, and by encouraging movement. While parents were encouraged to spend time in active play with their child, the group discussions also focussed on other ways for children to be active without parental direct involvement.

For parents of “overly active” children, the facilitator was instructed to encourage them to think of more appropriate or diverting activities for active play (for example, an alternative to jumping on the sofa). The facilitator was also instructed to emphasise that active play does not need to be structured, and does not necessarily require a lot of parent planning or play equipment. As with each of the other sessions, where a parent described a specific challenge in their family, the facilitator validated the parent’s experience, and suggested the group brainstorm suggestions for that situation. That parent could then consider whether any of the suggestions might work for them and consider trying them at home.

4.5.1.4 Session 4 – Sleep parenting

The aim of Session 4 was to encourage parents to consider implementing a bedtime routine that includes activities that are conducive to sleep (Allen et al., 2016; Henderson & Jordan, 2010). As with household routines in general, a consistent bedtime routine is likely to reduce the risk of obesity in children (Bates et al., 2018). Children’s sleep can be an emotive topic, so the facilitator was instructed to respect the diverse views of parents, including cultural differences in parental beliefs around bedtimes, co-sleeping etc. (Giannotti & Cortesi, 2009).

As with physical activity, parents at the focus groups expressed feelings of powerlessness when it came to influencing their child's sleep, and had often tried suggestions from sleep "experts", or from parenting websites, without success. This session aimed to reassure parents that they can influence their child's sleep patterns. Prompts were designed to encourage discussion about which pre-time activities may be more conducive to sleep (for example, a bedtime story) and which may prevent children falling (and staying) asleep (for example, iPads®, excessive excitement etc.). The sharing of ideas and what parents have tried (with and without success) was an important aspect of the sleep conversations.

4.5.1.5 Session 5 – Wrap-up

The final session of the intervention was designed to congratulate and further encourage parents who had tried some of the suggestions and strategies discussed at the previous four sessions. There was a re-cap of those sessions that served as a reminder for the parents who were able to attend one or more of the sessions, and provide a brief overview for parents who did not attend. As noted in the Facilitator Manual:

We want to focus on the positives, to celebrate their "wins". Not everything will have worked, especially the first time. The conversations may come back to the challenges parents are facing, so this is an opportunity to encourage those who faced those challenges in the past, but found a strategy that helped with that challenge, to "celebrate" that. Parents know their family better than anyone else. They will have found that some things work, that some things need more persistence, and that some things are not "right" for their family. Ultimately, we want parents to feel empowered to make those choices for themselves and their family.

The aim of this session was for parents to leave on a positive note with an increase in confidence as a parent to use autonomy promoting parenting practices. Importantly, we wanted parents to feel good about themselves as parents and to accept that not every strategy they try will "work", and to "be kind" to themselves in respect to the day-to-day challenges of parenting.

4.5.2 Signposting to additional online content

The principle behind the intervention delivery mode was for a "light touch" that fitted seamlessly into a playgroup environment and structure. As such, the face-to-face

aspect of the intervention was only around 20-30 minutes in total for each session. The technique of “signposting” to further information was used to increase the intervention dose and provide further support to parents outside of playgroup (Griffin et al., 2017; Nelson et al., 2013). The facilitator sent an email to the parents after each session. This email provided a summary of what was discussed at the session, including the strategies suggested by parents and the facilitator. Importantly, it also contained hyperlinks to evidenced-based internet resources as supplementary information to the topic. Appropriate and relevant resources from the Raising Children Network (Australia) Limited (<https://raisingchildren.net.au/>) were used, as well as resources from Australian Government websites. All key messages were to be delivered by the facilitators during the sessions by integrating them into the discussions. The online content was provided to support those key messages. The intention was that parents would access this additional information to increase their understanding of the autonomy promoting parenting practices discussed at the sessions, and to find additional tips and ideas around child eating, active play, limiting screens and bedtime strategies. Accessing the additional information could also support their intentions to meet the goals they had set for themselves.

4.6 STEP 5 AND 6 – IMPLEMENTATION AND EVALUATION PLANS

4.6.1 Implementation plan

An implementation plan was developed to test the intervention at playgroups in the greater Brisbane area with volunteer playgroup parent facilitators. A recruitment plan, including the recruitment of the volunteer facilitators, was developed, and is detailed in Chapter 5. A manual was developed to support the facilitators, and a training plan developed. Finally, a schedule of when each playgroup would receive each session of the intervention was developed.

4.6.2 Evaluation plan

The evaluation plan was developed to answer the research questions:

3. Is a child obesity prevention intervention for parents attending playgroup feasible and acceptable when delivered in the community playgroup environment?

4. Can a healthy lifestyle intervention targeting parents attending community playgroup be effective in increasing parental self-efficacy in respect to autonomy promoting parenting practices?
5. Can a healthy lifestyle intervention targeting parents attending community playgroup be effective in improving parenting practices that support healthy development of obesity-related behaviours in young children?

Process evaluation was conducted to evaluate the feasibility and acceptability of the intervention in the playgroup environment and of the peer facilitator model, and answer research question 3. Impact evaluation was conducted to evaluate the potential intervention effects in respect to autonomy promoting parenting practices and parental self-efficacy, and to provide some indication of the answer to research questions 4 and 5. The evaluation methods are discussed in Chapter 5 (Trial 1) and Chapter 6 (Trial 2).

4.7 CONCLUSION

The aim of the intervention design step of the study was to develop a playgroup intervention that targets parenting practices associated with obesity-related behaviours in young children (section 1.2.1). An IM protocol (Bartholomew et al., 2016) was used as the framework for the intervention design. The intervention was informed by the literature review (Chapter 2) and the outcomes of the focus groups with playgroup parents (Chapter 3). An intervention planning day with experienced intervention researchers, and led by the PhD candidate, resulted in a draft of the intervention methods. The intervention content was informed by the literature review (in particular SDT) and the focus group outcomes. These ideas were further developed by the PhD candidate, and the intervention delivery mode, methods and content were finalised. A Facilitator Manual was written, and a facilitator training session developed. Finally, implementation and evaluation plans that included developing the methods for a pilot trial were compiled. While the IM protocol was not followed rigidly, particularly in respect to the requirement to create matrices of change objectives, the systematic process and the logic models assisted in keeping the intervention design focussed on the program goals. The intervention is novel in a number of respects: the community playgroup setting, the peer facilitation model, the application of “healthy conversations”, the targeting of all four child obesity-related behaviours, the focus on supporting parents (rather than “educating”).

Chapter 5: Intervention Trial 1

The aims of the first intervention pilot were to: 1) assess the feasibility and acceptability of the “Supporting Parents at Playgroup Program” (described in Chapter 4); and 2) measure the potential impact of the intervention on autonomy promoting parenting practices and parental self-efficacy. This chapter presents the methods, results, and discussion for the trial. Section 5.1 provides an overview of the trial design, including the recruitment methods, evaluation methods, facilitator training and data analysis. Section 5.2 reports the results of the process and impact evaluation. Section 5.3 discusses the results in respect to the feasibility and acceptability, and impact of the intervention on parental self-efficacy and parenting practices. Finally, section 5.4 discusses the implications for a second intervention pilot with refinements to the intervention delivery and modifications to the evaluation plan.

5.1 METHODS

5.1.1 Study design

The study was conducted using a multiple cohort group randomised controlled trial (RCT) design. The intervention was delivered by a trained parent facilitator from each playgroup over the course of a 10-week school term. For playgroups in the first cohort, the intervention was delivered from April to June 2019. For playgroups in the second cohort, the intervention was delivered from July to September 2019. After baseline assessments of the study outcomes, playgroups were randomised into either the intervention or control arm. The randomisation schedule was independently generated using the “surveysselect” procedure in SAS (version 9.4). Playgroups randomised to the intervention arm received the intervention immediately, and the wait-list control condition groups were offered the program in the following school term. After all playgroups in the intervention arm had completed the final program session, participants completed the post-intervention assessments. The timeline for randomisation and data collection for process and impact evaluation is shown in *Figure 5.1*. The study was approved by the Queensland University of Technology Human Research Ethics Committee (1900000011) (Appendix E).

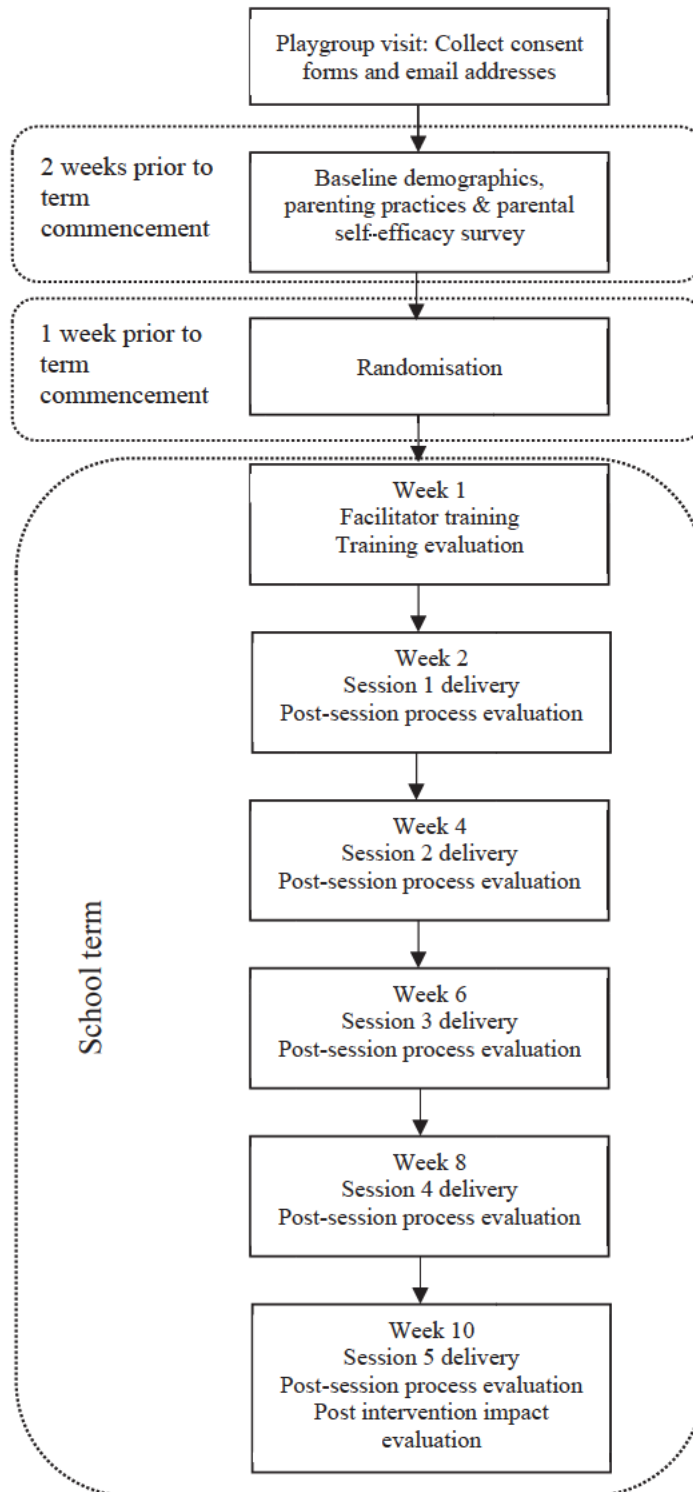


Figure 5.1. Trial 1 timeline for randomisation and data collection

5.1.2 The intervention

The “Supporting Parents at Playgroup Program” intervention is described in detail in Chapter 4. Briefly, the obesity prevention program was targeted at parents of children under the age of 5 years and delivered in Playgroup Queensland (PGQ) registered community playgroups. The intervention focused on parenting practices

associated with healthy lifestyle behaviours in young children. It consisted of five fortnightly sessions, delivered during a regularly scheduled playgroup meeting, by a trained volunteer parent facilitator from each playgroup. Each session comprised two brief group conversations around a specific child health behaviour topic. During the conversations, parents discussed parenting challenges in relation to the conversation topic and potential strategies to support healthy eating, active play, limited screen time and adequate sleep. Facilitators encouraged each parent to choose a strategy that had been discussed by the group to try at home, and to consider how they might overcome any barriers to implementing the strategy.

5.1.3 Participants and setting

Community playgroups were recruited from the greater Brisbane metropolitan area, within a radius of approximately 25km of the PGQ office. This urban geographical area was selected for practical reasons as it was anticipated to be a maximum reasonable distance for volunteer facilitators to travel to the training venue at PGQ. Playgroups were considered eligible to participate in the study if: 1) they were designated as a community playgroup by PGQ; 2) a parent was willing to serve as the facilitator for their playgroup, and 3) at least four parents were willing to take part in the study evaluation. Community playgroups that had taken part in the focus groups (Chapter 3), exclusively catered for specific population groups (for example, Indigenous families or families of children with a disability), or consisted primarily of parents who were unable to complete a survey in English, were ineligible. At the completion of the program, the volunteer parent facilitator received a \$100 gift card as a token of appreciation. All parents and carers attending the participating playgroup were free to take part in the intervention discussions, but only those providing written informed consent participated in the evaluation.

The primary contact person (CPI) from eligible playgroups were initially contacted by email or telephone by a PGQ staff member to explain the study and inform them of the requirements of the study, including the need for a parent to serve as facilitator. The CPI was asked to share this information with the parents at their playgroup, and then inform PGQ whether their playgroup would be interested in taking part in the study. For those who expressed an interest, the PhD candidate visited the playgroup to explain the study in greater detail and to answer any questions. During the visit, the CPI confirmed participation on behalf of the playgroup, and written

consent was obtained from the volunteer facilitator and the parents willing to participate in the evaluation.

5.1.3.1 Facilitator training

Parent facilitators completed a four-hour training session at the PGQ headquarters. The training took place during the first week of each term, so that the first session of the intervention could be delivered in Week 2. At the training, the facilitator role and tasks were explained, including that facilitators were expected to email links to further information on the session topic to the participants after each session. The concepts behind facilitating healthy conversations were explained, including the importance of listening to, supporting, and encouraging the discussion participants. The training also provided an overview of each session topic, and discussion around the challenges parents face and potential suggestions facilitators might provide to augment ideas generated during the group conversations. There was also time for several role-plays, during which facilitators practiced facilitating conversations with their peers. The agenda for the training session is in Appendix F. A Facilitator Manual was developed to support the facilitators in delivering the program. During the training session, the manual was discussed in detail, and the volunteer facilitators were encouraged to ask any questions about the program content or the running of the sessions.

5.1.4 Data collection

After the facilitator training, the attendees were asked to complete a training feedback survey. Baseline and post intervention surveys, and process evaluation surveys were administered to parent participants according to the timeline shown in *Figure 5.1*. Demographic information for parent participants was collected at baseline and was part of the baseline survey (Appendix K). The information collected, developed for this study, included the participant's age, education level, work status, relationship to their child/ren at playgroup, and the child/ren age and gender.

All evaluation surveys were administered on-line using the Research Electronic Data Capture (REDCap) platform (version 8.10.20). Facilitators and parents were sent an email via REDCap that contained a link to the relevant survey. Automatic reminder emails were sent from REDCap two days after each original email to those participants who had not completed the survey. For baseline and post-intervention surveys only,

participants who had still not completed the survey after the email reminder were followed up via further emails.

5.1.5 Process evaluation

5.1.5.1 Facilitator training acceptability

A facilitator post-training survey was developed for the study to determine whether the training location, time and length was acceptable to the facilitators, and whether they found the role play activities useful and enjoyable. Options of other training delivery modes were also included on the survey to gauge the trainee's preferences for online training in future studies. The survey is in Appendix G.

5.1.5.2 Feasibility and acceptability – facilitators

The facilitator feedback survey was used to record the number of parents participating in each of the two conversations, time spent on each conversation, whether the session key messages were delivered, and the total number of adults attending playgroup that week. The survey also included an open-ended question to record comments or suggestions about delivery of the program. The emailed link to the survey was sent to the facilitators immediately after each session. The wording on each survey included the session and conversation topics. An example of the survey for one of the sessions is in Appendix I.

5.1.5.3 Feasibility and acceptability – participants

Parent feedback surveys were completed immediately after each session and were used to obtain feedback on the individual sessions, including whether the parents were satisfied with the conversations, whether they enjoyed the session, and whether they found the suggestions made by the facilitator or the other parents useful. There was also an open-ended question for participants to provide any additional feedback or comments about any aspect of the session, or the program in general. The wording on each survey included the session and conversation topics. An example of the survey for one of the sessions is in Appendix J.

5.1.5.4 Accessing of online resources

Four items, developed for this study, were used to evaluate whether parents accessed the online resources recommended to them after each session. The items were included in the baseline and post intervention parenting surveys (Appendix K). Parents

were asked how often they searched online for information on-line around fussy eating, ideas for encouraging child physical activity, limiting screen time and sleep topics over the last month.

5.1.6 Impact evaluation

To explore the impact of the intervention on parenting practices and parental self-efficacy in relation to the four child behaviour domains (eating, screen time, physical activity, and sleep), a questionnaire was compiled from several previously validated scales. The measures are described in the following sub-sections, a summary is provided in Table 5.1. The full questionnaire, containing 69 items, can be found in Appendix K. It was estimated that it would take the study participants around 15-20 minutes to complete the questionnaire.

Table 5.1

Parenting Practices Scales for Feeding, Physical Activity, Screen Time, and Sleep included in the Parenting Survey

Scale	Number of items	Internal consistency (Cronbach's α)	Sample items
Feeding practices (Jansen et al., 2014)			
Reward for Eating	4	0.89 ^a	I use desserts as a bribe to get my child to eat his/her main course. (response options from "never" to "always")
Persuasive Feeding	6	0.73 ^a	If my child says "I'm not hungry" I try to get him/her to eat anyway. (response options from "never" to "always")
Physical Activity and Screen Time Controlling practices (Vaughn et al., 2013)			
Limiting or Monitoring of Screen Time	10	0.79 ^b	I have control over how much TV my child watches I tightly monitor the time my child plays computer games (response options from "strongly disagree" to "strongly agree")
Use of Screen Time to Reward/Control Child Behaviour	4	0.79 ^b	How often do you... ...offer TV, iPad or computer to your child as a reward for good behaviour? ...take away TV, iPad or computer time as a punishment for bad behaviour?

Scale	Number of items	Internal consistency (Cronbach's α)	Sample items
Physical Activity and Screen Time Supportive practices (Vaughn et al., 2013)			
Explicit Modelling and Enjoyment of Physical Activity	10	0.88 ^b	During a typical week, how often does your child... ...hear you say you are too tired to be active? ...see you doing, or going to do, something that is physically active?
Verbal Encouragement for Physical Activity	7	0.77 ^b	During a typical week, how often do you... ...send your child outside to play so you can get things done around the house? ...say things to encourage your child to spend less time being inactive?
Logistical Support for Active Play	4	0.65 ^b	During a typical week, how often do you... ...take your child to the park to play? ...try to get your child to play outside when the weather is nice?
Bedtime Routines (Henderson & Jordan, 2010)			
Consistency	5	0.88	For the past month, how often did your child perform the same activities in the hour before going to bed? (response options from “almost never” to “nearly always”)

a (Jansen et al., 2014)

b (Vaughn et al., 2013)

c (Henderson & Jordan, 2010)

5.1.6.1 Parent Feeding Practices

Non-responsive feeding practices were measured using the Reward for Eating and Persuasive Feeding scales from the FPSQ-28 instrument (Jansen et al., 2016). The FPSQ-28 has been validated with mothers of children aged 2-5 years to assess the effects of an intervention on feeding practices (Jansen et al., 2014; Jansen et al., 2016). Both scales selected for this study show good internal consistency: Cronbach's alpha for the Reward for Eating scale = 0.89, and 0.73 for the Persuasive Feeding scale (Jansen et al., 2014). Responses are recorded on 5-point Likert type scales, with endpoints ranging from “1=Never” to “5=Always”, with a higher score indicating a greater use of non-responsive feeding practices. The Reward for Eating subscale measures the use of food and non-food rewards by the parent to encourage child eating, and the Persuasive Feeding subscale includes items that address the verbal strategies

that parents use to convince their child to eat (other than offering rewards) (Jansen et al., 2016) (Table 5.1).

5.1.6.2 Physical Activity and Screen time Parenting Practices

Controlling and supportive parenting practices related to physical activity and screen time were measured using five scales from the physical activity and screen time parenting practices survey developed by Vaughn and colleagues (2013). Two scales measuring controlling parenting practices and three scales measuring supportive parenting practices model were included in the parenting questionnaire (Table 5.1).

The full survey (containing 147 items across 15 scales) had been validated using exploratory factor analysis in a study with 324 children aged 2-5 years old and their parents (Vaughn et al., 2013). All scales selected for the current study had good internal consistency (Vaughn et al., 2013) (Table 5.1).

Some minor wording changes were made to update references to technology, or for the Australian context. For example, where the original question referred to “TV, video, or movie time”, this was changed to “TV, iPad or computer”, and “video games” was changed to “computer games”. The examples provided in relation to family recreation of “going on bike rides together, hiking, ice skating” was changed to “going on bike rides together, walking, swimming”.

5.1.6.3 Bedtime Routines Questionnaire

The Bedtime Routines Questionnaire was developed and validated for caregivers of children aged 2-8 years (Henderson & Jordan, 2010). The full questionnaire consists of three scales, and the Consistency scale of 10 items relating to bedtime routine behaviours and bedtime environment, was used in this study. The scale was evaluated by Henderson & Jordan (2010) and demonstrated excellent internal consistency (Cronbach’s alpha 0.88) in that study. Although that study had some limitations due to the heterogenous sample of children, the scale demonstrated good preliminary evidence of reliability (Henderson & Jordan, 2010). However, the 10 items making up the Consistency scale in the original questionnaire were actually five items repeated for week-days and weekend days. As the children targeted in the current study were under the age of 5, and to reduce the number of items in the survey, the five items were used without the distinction between week-days and weekend days. The items asked parents how often they performed the same bedtime activities, in the same order, in

the same place, at the same time and by the same person. Responses were recorded on a 5-point Likert type scales with endpoints ranging from “1=Almost never” to “5=Nearly always”. (Henderson & Jordan, 2010)

5.1.6.4 Parental Self-Efficacy

A 15-item instrument measuring parental self-efficacy (PSE) for influencing child dietary intake, physical activity, sedentary behaviour and screen time was used for the PSE section of the survey (Norman et al., 2018). The instrument consists of three sub-scales: 1) PSE for promoting physical activity; 2) PSE for limiting intake of unhealthy foods, drinks and screen time; and 3) PSE for promoting intake of fruits and vegetables (Norman et al., 2018). The internal consistency of the total of all items evaluated by Norman and colleagues (2018) was good ($\alpha=0.87$). Sample questions and the internal consistency of the scales is show in Table 5.2.

Table 5.2

Parental Self-efficacy Scales included in Parenting Survey

Scale	Number of items	Internal consistency (Cronbach's α (Norman et al., 2018))	Sample items
PSE for promoting physical activity	5	0.81	How certain are you that you can... ...get your child to be physically active outdoors several times a week? ...by a good role mode by being physically active yourself several times a week?
PSE for limiting intake of unhealthy foods, drinks and screen time	5	0.79	How certain are you that you can... ...limit your child to eat takeaway twice a month at most? ...limit your child to watch TV, DVDs or play on the computer, smartphone 2 hours a day at most?
PSE for promoting intake of fruits and vegetables	4	0.77	How certain are you that you can... ...get your child to eat at least one serving of vegetables every day? ...be a good role model for your child when it comes to eating fruits?

The wording of two items that provided food examples were modified for the Australian context: “hamburger, sausage, pizza or kebab” was amended to “hamburgers, pizza or hot chips”, “Baklava” was changed to “cakes/biscuits”, “cookies” was changed to “biscuits”, and “sugar syrup” was changed to “cordial”.

5.1.7 Data analysis

5.1.7.1 Process evaluation

Descriptive statistics, using frequencies, were calculated for the acceptability and feasibility measures. Counts were used for number of times the key messages were delivered and for attendance data. Total counts and the proportion of participants in each study arm were calculated for the use of online resource data.

5.1.7.2 Impact evaluation

Descriptive statistics, including means, medians, and 95% confidence intervals were calculated for the parenting practices and parental self-efficacy measures. Between-group differences in pre to post changes in parenting practices were evaluated for effect size and statistical significance using general linear mixed models. Because scores for parental self-efficacy variables exhibited strong negative skewness, data were converted to ranks and between-group differences in change scores were evaluated using the Wilcoxon Rank Sum Test. All analyses were implemented in SAS (Version 9.4) using the MIXED or NPAR1WAY procedures. All analyses were conducted on an intention-to-treat basis, with missing post-test values conservatively imputed using the last observation carried forward method. Cohen's *d* was used to describe resultant effect sizes (Thalheimer & Cook, 2002). An effect size of less than 0.20 was considered small, 0.50 medium and 0.80 large (Cohen, 1992).

5.2 RESULTS

5.2.1 Playgroups recruited

The recruitment of playgroups and the flow of participants through each phase of the trial is depicted in *Figure 5.2*. Seventy-seven eligible community playgroups were located within a radius of approximately 25km of PGQ. Of this number, 10 were identified as being ineligible. Of the remaining 67 playgroups, nine playgroups agreed to participate, and five were randomised to the intervention and four to the wait list control condition. However, the nominated parent facilitator from just two of the five playgroups attended the required training and implemented the intervention.

There were 27 parents from five playgroups in the first cohort and 23 parents from four playgroups in the second cohort. Of the 50 parents providing consent to take part in the study evaluation, 35 (70%) completed the baseline survey. Of the 35 parents

who completed the baseline survey (intervention n=22, control n=13), 12 completed the post intervention survey (intervention n=6, control n=6).

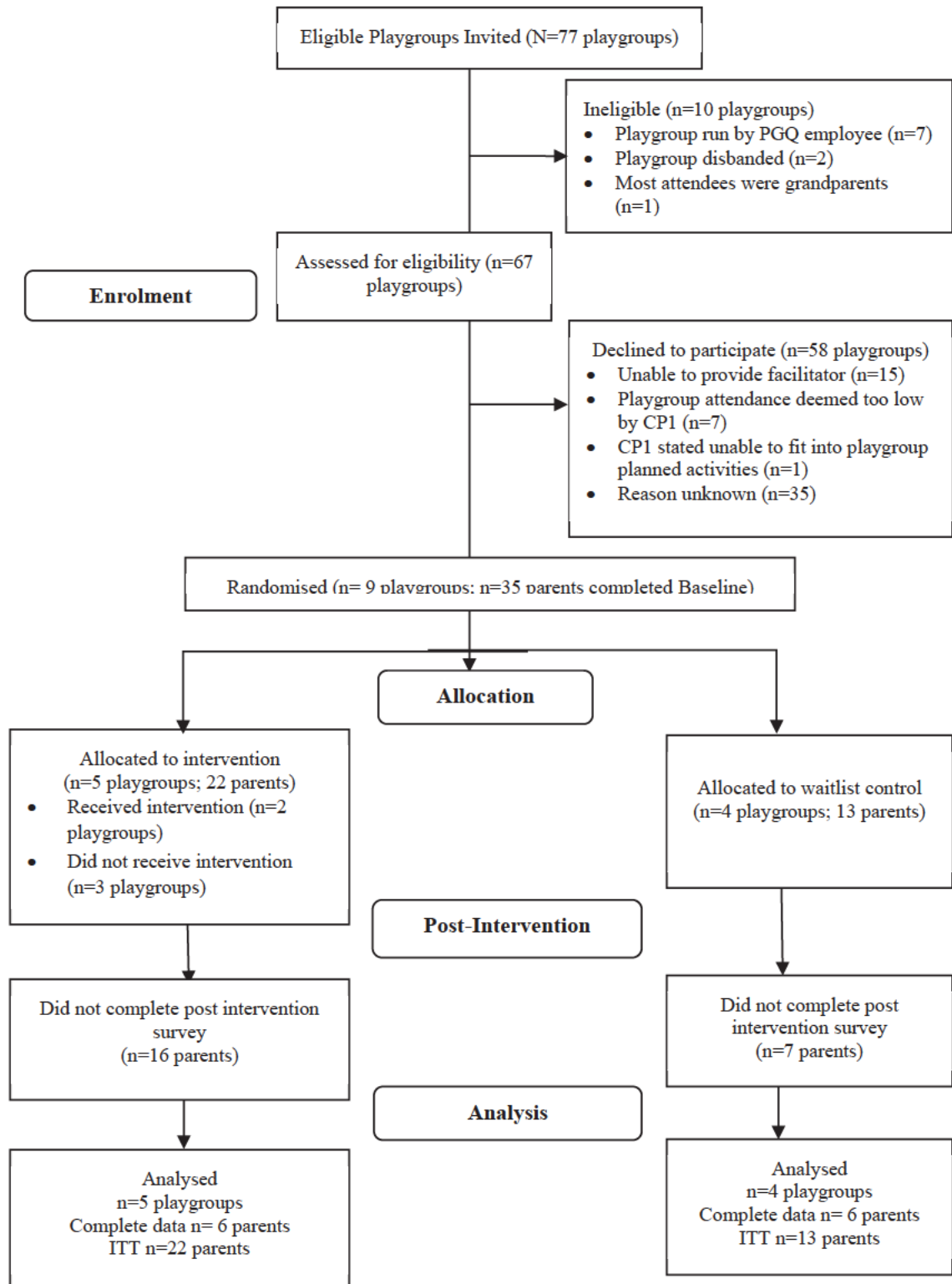


Figure 5.2. Trial 1 CONSORT diagram

5.2.2 Facilitator training

Of the five parents nominated by their playgroup to be the program facilitator, only two attended the required training to deliver the intervention. Two other facilitators elected to discontinue their involvement in the study and did not attend the training, and one facilitator was not able to attend training due to car problems. Both facilitators who completed the training rated the content and delivery mode to be acceptable. The survey items and responses are reported in Table 5.3.

Table 5.3

Facilitator Training Feedback Survey Results

	Facilitator 1	Facilitator 2
I feel equipped to deliver the program at my playgroup as a result of the training	5 = Strongly agree	4 = Agree
The duration of the training course was appropriate (4 hours)	5 = Strongly agree	4 = Agree
The location of the training was convenient	4 = Agree	3 = Neither agree nor disagree
The mode of delivery of the training was appropriate (face to face, in person)	4 = Agree	5 = Strongly agree
The practical role play activities were enjoyable	4 = Agree	4 = Agree
The practical role play activities aided my learning	4 = Agree	4 = Agree

Response categories ranged from 1 = “Strongly disagree” to 5 = “Strongly agree”

5.2.3 Parent participant characteristics

Thirty-five participants completed the baseline survey and their characteristics are summarised in Table 5.4. The majority of participants were mothers (80%), aged between 30 and 39 years (60%) and 80% were either university educated (49%) or educated at TAFE/trade level (31%).

Table 5.4
Demographic Characteristics of the Participants

Variable	Intervention group participants (n=22)		Control group participants (n=13)	
	n	%	n	%
Relationship to child/ren				
Mother	19	86.4	9	69.2
Father	1	4.5	3	23.1
Grandmother	2	9.1	0	0
Carer	0	0	1	7.7
Age of parent/carer				
Under 30 years	5	22.7	1	7.7
30 – 39 years	12	54.6	9	69.2
40 years or older	5	22.7	3	23.1
Education				
University education	8	36.4	9	69.2
TAFE or trade	8	36.4	3	23.1
Secondary school	6	27.2	1	7.7
Employment status				
Not in paid employment	16	72.7	3	23.1
Part-time employment	5	22.7	8	61.5
Full-time employment	1	4.6	2	15.4
Number of children per parent at playgroup				
One	12	54.5	10	76.9
Two	10	45.5	3	23.1
<hr/>				
Children at playgroup	n=32		n=16	
Male	16	50.0	8	50.0
Female	16	50.0	8	50.0
Under 2 years old	10	31.3	4	25.0
2 – 3 years	6	18.7	7	43.7
3 – 4 years	11	34.4	0	0
Over 4 years old	5	15.6	5	31.3

5.2.4 Process evaluation

5.2.4.1 Facilitator feedback

Both facilitators completed the feedback surveys after delivering each session, including how much time the group spent on each of the two conversations. The facilitators delivered the two conversations for all five sessions (20 conversations in total) as intended. Combining the results of the two playgroups across the five program sessions, eight of the 20 (40%) conversations were completed in the expected 10-15 minutes, with the remaining 12 (60%) lasting less than 10 minutes. The shorter conversations were more likely to occur during the second conversation of the session. The facilitators reported delivering the key message for the first conversation in all five program sessions. For one playgroup, the key message for the second conversation was delivered in all five sessions, but for the other playgroup, the key message was delivered in three sessions. Both facilitators reported encouraging the participants to identify a strategy to try at home in almost all sessions. Both facilitators indicated they experienced challenges getting the parents together for the conversations, keeping the conversation on topic, and that there were distractions from the children that impacted both their ability to deliver the session and for the parents to fully engage in the discussions. These comments are summarised in Table 5.5.

One facilitator provided some final positive words on her experience with the program:

Overall, I would say that even though we didn't always manage to stay on topic, participating in the project has been a very positive experience for our group. The fact that we're quite a small group, with fairly regular attendees, made it the ideal setting for a program like this. I think that any conversation whereby parents are sharing their experiences and encouraging each other along the way is a positive thing. I hope it has helped our group of introverts feel more confident in opening up to each other, which will foster an environment where further parenting conversations will continue to occur without necessarily using a framework to guide them. We also talked about compiling our own list of topics to discuss, so we'll see if this gets off the ground or not in future. Thank you again for including us in your study.

Table 5.5

Free-text Feedback Provided by Facilitators (n=2)

Session	Comments
1: Reducing stress at mealtimes	<p>“Was a very busy day and difficult to get people to stay together for conversation, so was a bit random, but good discussions.”</p> <p>“We joined both conversations together as that was what worked with the group today.”</p>
2: Limiting screens	<p>“We found it better to have one conversation again today, covering the topics back-to-back. Although we did get off track a bit here and there (still valuable discussion, just on another topic!). I opened with the suggestion that we might all find something practical to take away from the conversation and was able to conclude better this week. We didn't go around the group and verbalise our 'takeaway' suggestion/mission, but we did conclude with the thought that 'hopefully we've all got something we'd like to try'.”</p>
3: Supporting movement skills	<p>“This session was quite brief - I think it's something the group does quite well already. Nobody really had struggles to share, but were happy to chat about what's going well. We got off topic again this time, but the side conversations were around other parenting issues and were very worthwhile just the same.”</p>
4: Bedtime activities and routines	<p>“Hard to get objectives done as we were very busy with activities.”</p> <p>“We did a better job of staying on track this week. Everyone had something to add to the conversations, which was great. Once again, we rolled both conversations into one, but spent more time talking about topic 1 than 2.”</p>
5: Celebrating achievements	<p>“We gathered for one conversation, covering both topics, again this week. I reflected on what I'd tried and how it went, but unfortunately my child was very insistent that I come and play with her, so I was pulled away from the conversation mid-way through.”</p>

5.2.4.2 Participant feedback

Table 5.6 shows the number of parents attending playgroup on the day of the session and the number of parents and proportion who participated in each conversation. At Playgroup 1, the participation rates at the first conversation ranged between 33% and 44%, while participation rates for conversation 2 ranged between 33% and 75%. Playgroup 2 had 100% participation in all conversations except Session 3, which had a 60% participation rate.

Table 5.6

Attendance at Playgroup and at Each Session of the Intervention

	Session 1: Eating n	Session 2: Screens n (%)	Session 3: PA n (%)	Session 4: Sleep n (%)	Session 5: Wrap-up n (%)
Number of adults at playgroup					
Playgroup 1	Not recorded	6	9	9	8
Playgroup 2	Not recorded	7	10	7	8
Number of adults participating in conversation 1					
Playgroup 1	4	2 (33)	4 (44)	4 (44)	3 (38)
Playgroup 2	7	7 (100)	6 (60)	7 (100)	8 (100)
Number of adults participating in conversation 2					
Playgroup 1	3	2 (33)	4 (44)	4 (44)	6 (75)
Playgroup 2	7	7 (100)	6 (60)	7 (100)	8 (100)

The proportion of participants that rated the conversations as satisfactory or highly satisfactory across each survey item is presented in Table 5.7.

The majority of responders to the surveys were satisfied with all five sessions, with Sessions 2 (Limiting Screens) and 5 (Celebrating Achievements) receiving the highest satisfaction across all of the criteria measured. The session with the lowest satisfaction was Session 1 (Reducing Stress at Mealtimes). There were mixed results for how useful the parents found the discussion and suggestions for strategies made by the facilitator, ranging from 50% (Session 1) to 100% (Sessions 2 and 5) satisfaction. Some parents commented that some topics were not relevant to their family, but there was positive feedback about the facilitator. All written feedback received is in Table 5.8.

Table 5.7

Participant Satisfaction with Each Session

	Session 1 (mealtimes) N=8 % satisfied	Session 2 (screens) N=3 % satisfied	Session 3 (movement) N=3 % satisfied	Session 4 (sleep) N=5 % satisfied	Session 5 (re-cap) N=6 % satisfied
Overall, how did you feel after today's session?	63%	67%	100%	100%	83%
How useful was the group discussion during conversation 1?	50%	67%	33%	40%	67%
How useful were the suggestions made by the facilitator during conversation 1?	63%	100%	67%	80%	100%
How useful was the group discussion during conversation 2?	50%	100%	33%	60%	100%
How useful were the suggestions made by the facilitator during conversation 2?	50%	100%	67%	60%	100%
How much did you enjoy taking part in the conversation/s today?	50%	100%	33%	80%	50%

Table 5.8

All Free-text Feedback Provided by Parent Participants (n=3)

Session	Comments
1: Reducing stress at mealtimes	“The facilitator was great. Session was informal and relaxed.”
2: Limiting screens	No feedback provided
3: Supporting movement skills	“Subject matter not relevant to my child!” “Today's conversation really wasn't applicable to my child.”
4: Bedtime activities and routines	“[facilitator name] did a terrific job as facilitator. I think this program is very useful and could be rolled out to other groups and repeated each year.”
5: Celebrating achievements	“90% of this wasn't actually applicable to our group as the suggestions etc we all were already doing. Most of the 'course' appeared to be for an older age group of children and not actually applicable to ours!” “I think it should be rolled out wider. It was terrific comparing ideas and experiences.”

Three parents from the intervention playgroups reported searching online for information in relation to the session topics. Three parents out of the six who completed the Session 5 feedback survey indicated that they found the links to online resources after each session to be useful.

5.2.5 Impact evaluation

5.2.5.1 Parenting practices

The Cronbach's alpha coefficients for parenting practices scales were calculated at baseline for this study. Reward for eating had excellent internal consistency ($\alpha=0.90$). Most others were in the acceptable range: persuasive feeding ($\alpha=0.74$); modelling and enjoyment of PA ($\alpha=0.78$); verbal encouragement of PA ($\alpha=0.75$); logistic support for active play ($\alpha=0.73$); limiting or monitoring screen time ($\alpha=0.79$); use of screens to reward/control behaviour ($\alpha=0.84$). Internal consistency of bedtime routines ($\alpha=0.60$) was marginal.

Results of the ITT analyses for the parenting practices outcome measures are reported in Table 5.9. Sixteen (73%) of the 22 intervention group participants had missing post-intervention data. Seven (54%) of the 13 control group participants had missing data. For those participants, their responses at baseline were carried forward for the Last Observation Carried Forward (LOCF) analysis. Small-to-medium effect sizes in favour of the intervention were observed for explicit modelling and enjoyment of physical activity ($d=0.42$), verbal encouragement for physical activity ($d=0.37$), and use of screen time to reward/control child behaviour ($d=0.41$). There were no positive effects observed for feeding practices, logistic support for active play, limiting or monitoring screen time or consistent bedtime routines.

Table 5.9

Changes in Outcome Measure (from Baseline to Post-Intervention) Scores and Net Differences Between the Intervention and Control Groups for Parenting Practice Outcome Measures (Intention-to-Treat): n = 22 (intervention) n = 13 (control)

Description	Group	Baseline (95% CI)	Post intervention (95% CI)	Net difference (95% CI)	Effect size (Cohen's <i>d</i>)	P -value																																																																		
Reward for eating ^a	Intervention	2.1 (1.7 - 2.5)	2.1 (1.7 - 2.5)	-0.03 (-0.25 - 0.20)	0.09	0.81																																																																		
	Control	2.6 (2.1 - 3.1)	2.6 (2.1 - 3.1)				Persuasive feeding ^a	Intervention	2.7 (2.4 - 3.0)	2.7 (2.4 - 3.0)	0.10 (-0.17 - 0.37)	0.27	0.45	Control	2.9 (2.6 - 3.3)	2.8 (2.5 - 3.2)	Explicit modelling and enjoyment of Physical Activity	Intervention	3.6 (3.4 to 3.9)	3.8 (3.6 to 4.1)	0.17 (-0.12 to 0.45)	0.42	0.25	Control	3.9 (3.6 to 4.2)	3.9 (3.6 to 4.2)	Verbal encouragement for physical activity	Intervention	3.1 (2.7 to 3.6)	3.2 (2.8 to 3.7)	0.18 (-0.18 to 0.54)	0.37	0.31	Control	3.4 (2.8 to 4.0)	3.3 (2.7 to 3.9)	Logistic support for active play	Intervention	4.8 (4.2 to 5.3)	4.8 (4.3 to 5.4)	0.03 (-0.31 to 0.37)	0.06	0.86	Control	5.6 (4.9 to 6.4)	5.6 (4.9 to 6.4)	Limiting or monitoring of screen time	Intervention	4.4 (4.0 to 4.8)	4.5 (4.1 to 4.9)	0.10 (-0.31 to 0.51)	0.18	0.63	Control	4.6 (4.1 to 5.2)	4.6 (4.1 to 5.2)	Use of screen time to reward/control child behaviour ^b	Intervention	2.1 (1.7 to 2.6)	2.1 (1.7 to 2.6)	0.15 (-0.12 to 0.43)	0.41	0.26	Control	2.7 (2.1 to 3.3)	2.5 (1.9 to 3.1)	Consistent bedtime routines	Intervention	4.6 (4.3 to 4.8)	4.6 (4.3 to 4.8)	0.02 (-0.21 to 0.16)	0.10
Persuasive feeding ^a	Intervention	2.7 (2.4 - 3.0)	2.7 (2.4 - 3.0)	0.10 (-0.17 - 0.37)	0.27	0.45																																																																		
	Control	2.9 (2.6 - 3.3)	2.8 (2.5 - 3.2)				Explicit modelling and enjoyment of Physical Activity	Intervention	3.6 (3.4 to 3.9)	3.8 (3.6 to 4.1)	0.17 (-0.12 to 0.45)	0.42	0.25	Control	3.9 (3.6 to 4.2)	3.9 (3.6 to 4.2)	Verbal encouragement for physical activity	Intervention	3.1 (2.7 to 3.6)	3.2 (2.8 to 3.7)	0.18 (-0.18 to 0.54)	0.37	0.31	Control	3.4 (2.8 to 4.0)	3.3 (2.7 to 3.9)	Logistic support for active play	Intervention	4.8 (4.2 to 5.3)	4.8 (4.3 to 5.4)	0.03 (-0.31 to 0.37)	0.06	0.86	Control	5.6 (4.9 to 6.4)	5.6 (4.9 to 6.4)	Limiting or monitoring of screen time	Intervention	4.4 (4.0 to 4.8)	4.5 (4.1 to 4.9)	0.10 (-0.31 to 0.51)	0.18	0.63	Control	4.6 (4.1 to 5.2)	4.6 (4.1 to 5.2)	Use of screen time to reward/control child behaviour ^b	Intervention	2.1 (1.7 to 2.6)	2.1 (1.7 to 2.6)	0.15 (-0.12 to 0.43)	0.41	0.26	Control	2.7 (2.1 to 3.3)	2.5 (1.9 to 3.1)	Consistent bedtime routines	Intervention	4.6 (4.3 to 4.8)	4.6 (4.3 to 4.8)	0.02 (-0.21 to 0.16)	0.10	0.79	Control	4.4 (4.1 to 4.6)	4.4 (4.1 to 4.7)						
Explicit modelling and enjoyment of Physical Activity	Intervention	3.6 (3.4 to 3.9)	3.8 (3.6 to 4.1)	0.17 (-0.12 to 0.45)	0.42	0.25																																																																		
	Control	3.9 (3.6 to 4.2)	3.9 (3.6 to 4.2)				Verbal encouragement for physical activity	Intervention	3.1 (2.7 to 3.6)	3.2 (2.8 to 3.7)	0.18 (-0.18 to 0.54)	0.37	0.31	Control	3.4 (2.8 to 4.0)	3.3 (2.7 to 3.9)	Logistic support for active play	Intervention	4.8 (4.2 to 5.3)	4.8 (4.3 to 5.4)	0.03 (-0.31 to 0.37)	0.06	0.86	Control	5.6 (4.9 to 6.4)	5.6 (4.9 to 6.4)	Limiting or monitoring of screen time	Intervention	4.4 (4.0 to 4.8)	4.5 (4.1 to 4.9)	0.10 (-0.31 to 0.51)	0.18	0.63	Control	4.6 (4.1 to 5.2)	4.6 (4.1 to 5.2)	Use of screen time to reward/control child behaviour ^b	Intervention	2.1 (1.7 to 2.6)	2.1 (1.7 to 2.6)	0.15 (-0.12 to 0.43)	0.41	0.26	Control	2.7 (2.1 to 3.3)	2.5 (1.9 to 3.1)	Consistent bedtime routines	Intervention	4.6 (4.3 to 4.8)	4.6 (4.3 to 4.8)	0.02 (-0.21 to 0.16)	0.10	0.79	Control	4.4 (4.1 to 4.6)	4.4 (4.1 to 4.7)																
Verbal encouragement for physical activity	Intervention	3.1 (2.7 to 3.6)	3.2 (2.8 to 3.7)	0.18 (-0.18 to 0.54)	0.37	0.31																																																																		
	Control	3.4 (2.8 to 4.0)	3.3 (2.7 to 3.9)				Logistic support for active play	Intervention	4.8 (4.2 to 5.3)	4.8 (4.3 to 5.4)	0.03 (-0.31 to 0.37)	0.06	0.86	Control	5.6 (4.9 to 6.4)	5.6 (4.9 to 6.4)	Limiting or monitoring of screen time	Intervention	4.4 (4.0 to 4.8)	4.5 (4.1 to 4.9)	0.10 (-0.31 to 0.51)	0.18	0.63	Control	4.6 (4.1 to 5.2)	4.6 (4.1 to 5.2)	Use of screen time to reward/control child behaviour ^b	Intervention	2.1 (1.7 to 2.6)	2.1 (1.7 to 2.6)	0.15 (-0.12 to 0.43)	0.41	0.26	Control	2.7 (2.1 to 3.3)	2.5 (1.9 to 3.1)	Consistent bedtime routines	Intervention	4.6 (4.3 to 4.8)	4.6 (4.3 to 4.8)	0.02 (-0.21 to 0.16)	0.10	0.79	Control	4.4 (4.1 to 4.6)	4.4 (4.1 to 4.7)																										
Logistic support for active play	Intervention	4.8 (4.2 to 5.3)	4.8 (4.3 to 5.4)	0.03 (-0.31 to 0.37)	0.06	0.86																																																																		
	Control	5.6 (4.9 to 6.4)	5.6 (4.9 to 6.4)				Limiting or monitoring of screen time	Intervention	4.4 (4.0 to 4.8)	4.5 (4.1 to 4.9)	0.10 (-0.31 to 0.51)	0.18	0.63	Control	4.6 (4.1 to 5.2)	4.6 (4.1 to 5.2)	Use of screen time to reward/control child behaviour ^b	Intervention	2.1 (1.7 to 2.6)	2.1 (1.7 to 2.6)	0.15 (-0.12 to 0.43)	0.41	0.26	Control	2.7 (2.1 to 3.3)	2.5 (1.9 to 3.1)	Consistent bedtime routines	Intervention	4.6 (4.3 to 4.8)	4.6 (4.3 to 4.8)	0.02 (-0.21 to 0.16)	0.10	0.79	Control	4.4 (4.1 to 4.6)	4.4 (4.1 to 4.7)																																				
Limiting or monitoring of screen time	Intervention	4.4 (4.0 to 4.8)	4.5 (4.1 to 4.9)	0.10 (-0.31 to 0.51)	0.18	0.63																																																																		
	Control	4.6 (4.1 to 5.2)	4.6 (4.1 to 5.2)				Use of screen time to reward/control child behaviour ^b	Intervention	2.1 (1.7 to 2.6)	2.1 (1.7 to 2.6)	0.15 (-0.12 to 0.43)	0.41	0.26	Control	2.7 (2.1 to 3.3)	2.5 (1.9 to 3.1)	Consistent bedtime routines	Intervention	4.6 (4.3 to 4.8)	4.6 (4.3 to 4.8)	0.02 (-0.21 to 0.16)	0.10	0.79	Control	4.4 (4.1 to 4.6)	4.4 (4.1 to 4.7)																																														
Use of screen time to reward/control child behaviour ^b	Intervention	2.1 (1.7 to 2.6)	2.1 (1.7 to 2.6)	0.15 (-0.12 to 0.43)	0.41	0.26																																																																		
	Control	2.7 (2.1 to 3.3)	2.5 (1.9 to 3.1)				Consistent bedtime routines	Intervention	4.6 (4.3 to 4.8)	4.6 (4.3 to 4.8)	0.02 (-0.21 to 0.16)	0.10	0.79	Control	4.4 (4.1 to 4.6)	4.4 (4.1 to 4.7)																																																								
Consistent bedtime routines	Intervention	4.6 (4.3 to 4.8)	4.6 (4.3 to 4.8)	0.02 (-0.21 to 0.16)	0.10	0.79																																																																		
	Control	4.4 (4.1 to 4.6)	4.4 (4.1 to 4.7)																																																																					

^a higher scores represent the use of non-responsive feeding practices (Jansen et al., 2016)

^b higher scores represent increased use of parenting practices that may lead to an increase in screen time (Vaughn et al., 2013)

5.2.5.2 Parental self-efficacy

The Cronbach's alpha coefficients for parental self-efficacy scales were calculated at baseline for this study. PSE for promoting PA had acceptable internal consistency ($\alpha=0.78$), although internal consistency for PSE for limiting unhealthy food, drink, and screen time was marginal ($\alpha=0.65$). PSE for promoting fruit and vegetables had a coefficient of only 0.47. Cronbach's alpha for overall PSE was 0.77 (acceptable internal consistency).

Results of the ITT analyses for the parental self-efficacy are reported in Table 5.10. As with the parenting practices, missing data was handled on a LOCF basis. A small effect size in favour of the intervention was observed for overall PSE ($d=0.21$). This was driven largely by the small-to-medium effect size for PSE for promoting physical activity ($d=0.34$), with no positive effects observed for PSE for promoting intake of fruit and vegetables.

Table 5.10
Parental Self-Efficacy Median Scores of intervention and control groups at baseline and post-intervention (Intention-to-Treat): n=22 (intervention) n=13 (control)

Parental Self-Efficacy	Group	Baseline Median score* (IQR)	Post intervention Median score** (IQR)	Sum of Ranks**	Z-statistic	P-value	Effect size (Cohen's d)
Promoting intake of fruit & vegetables	Intervention	7.8 (6.3-9.4)	8.5 (7.6-9.8)	389.50	0.29	0.77	0.10
	Control	8.8 (7.8-10.0)	9.5 (8.0-10.0)	240.50			
Limiting intake of unhealthy foods, drinks & screen time	Intervention	7.4 (6.0-9.0)	7.7 (6.9-9.3)	381.50	0.56	0.57	0.19
	Control	7.2 (6.3-9.4)	8.0 (6.6-9.0)	248.50			
Promoting physical activity	Intervention	8.2 (5.9-9.0)	8.6 (7.4-9.2)	419.00	-1.00	0.32	0.34
	Control	9.6 (6.5-10.0)	9.0 (7.8-10.0)	211.00			
Overall	Intervention	7.8 (6.8-8.5)	8.1 (7.6-8.8)	411.50	-0.61	0.55	0.21
	Control	7.7 (6.8-9.7)	8.1 (7.6-9.5)	218.50			

*Items were scored on a 10-point Likert scale

**Sum of Ranks was based on pre to post change scores

5.3 DISCUSSION

The aim of this pilot intervention trial was to test: 1) the feasibility and acceptability of delivering the intervention using a volunteer parent facilitator from each playgroup; and 2) the potential impact of the program on autonomy promoting parenting practices and parental self-efficacy. The trial was conducted using an RCT design. This was a pilot trial, so a pre-test/post-test study design could have been used to test feasibility and acceptability of the intervention. In fact, many of the interventions reviewed in section 2.4 did use this study design, particularly when the avoidance of cross-contamination of the intervention across groups was problematic. For the current study, this would have had the advantage of increasing the amount of data for process evaluation compared to an RCT, as all playgroups and parent participants taking part could have provided feedback. However, a design using a control group provides a comparison for assessing the size of any intervention effect, and randomisation prevents selection bias, so the RCT design with multiple groups (playgroups) was selected for this trial (Campbell et al., 2000; Craig et al., 2013). The methodology used in this pilot also allowed the testing of the feasibility and acceptability of using the randomised design for future trials.

The results indicate that the volunteer parent facilitator approach is not feasible as few playgroups could meet the criteria of providing a parent volunteer to take part in the study. In addition to significant challenges around recruitment of playgroups, there were also issues around the ongoing commitment of parents who expressed an interest in being a facilitator, including attendance at training. Although the delivery mode of the intervention appeared to be feasible, as facilitators were able to complete all ten conversations in the program and in the required timeframe, the participation rates were inconsistent between the playgroups. Participation was much higher in one of the playgroups (100% at most sessions) compared to the other playgroup (less than 50% at most sessions). The program content was acceptable, as those who received the intervention found it satisfactory, and the facilitators were able to deliver at least one of the key messages at every session. However, there were challenges with evaluating the program, with a significant proportion of parent participants not completing the post-intervention evaluations. Nevertheless, within the limitations of the small sample size, there was some indication that the program had favourable

effects on PSE, particularly PSE for promoting physical activity, and some parenting practices.

5.3.1 Feasibility and acceptability

The low playgroup recruitment numbers and the withdrawal of facilitators prior to training indicated that the intervention is not feasible with a volunteer facilitator intervention delivery model. At least 15 of the 58 playgroups who declined to participate stated that none of the parents at their playgroup were willing to volunteer as a facilitator. Data was not collected on the specific reasons for this, but the playgroup parents may have had concerns around the time commitment, they may not attend playgroup regularly, may feel they don't have the skills, or fear they will fail in the role. In addition, the facilitators experienced some difficulties getting the group together for the discussions and keeping the conversation on topic, particularly in Playgroup 1. Although the facilitator training session was kept as brief as possible to minimise the time commitment for the volunteers, it may be that it was not adequate, particularly to comprehensively cover the "healthy conversation" concepts, and to discuss potential barriers around getting the group together for the conversations.

Based on the process evaluation results, one playgroup facilitator was more successful than the other in delivering the intervention as planned and had more parents at playgroup engage in the conversations. It may be that four hours of training is not enough time to effectively apply the knowledge and facilitation skills required to deliver the intervention. Further, the limitations associated with the briefness of the training session may be of more concern for some volunteer facilitators, depending on their prior work experience and skills. Other peer-led interventions with positive results in terms of practitioner confidence and participant satisfaction have employed more comprehensive training programs, delivered over several days (Black et al., 2014; Day et al., 2012). However, given that this level of training is unlikely to be feasible for the current intervention, the recruitment of peers with previous group facilitator experience may be a more viable option.

Playgroup can be noisy, busy and sometimes chaotic (Fuller et al., 2019). Despite the inherent challenges in delivering an intervention in such an unstructured environment, the conversations were delivered, and feedback from both parents and facilitators was mostly positive. Parents enjoyed the conversations, and the brief timeframes meant that some of the potential challenges around child distractions and

interruptions were mitigated. Although many of the study participants either did not participate in the conversation or did not provide feedback, the participation rates of the parents at playgroup on the day of each session were high, particularly at Playgroup 2 where nearly 100% of parents at playgroup on the day took part in the conversations.

These findings are consistent with previous studies in playgroups (Weber et al., 2014; Williams et al., 2018). The *smalltalk* intervention for mothers of toddlers, which aimed to “assist disadvantaged parents to provide their children with an enriched home learning environment”, was delivered by trained playgroup facilitators (Hackworth et al., 2018, p. 883). Although the *smalltalk* intervention was different to the current study in that it was delivered weekly during the full 2-hours of the playgroup meeting for ten weeks, there were similarities in the leveraging of social interaction and flexibility in how parents could engage with the program. The toddler version of the intervention resulted in increased parent verbal responsivity and home learning activities (Hackworth et al., 2017). This is in contrast to the more formal and structured infant version run in Maternal and Child Health community venues, which resulted in no statistically significant improvements (Hackworth et al., 2017). Another intervention where parents found the informal group discussion format to be useful was the Melbourne InFANT program (Lunn et al., 2016). These parents stated that it was beneficial being already familiar with the group members, and found suggestions made by other mothers to be useful (Lunn et al., 2016). The InFANT participants were particularly positive about the child feeding message “Parents Provide, Kids Decide” promoted at the program (Lunn et al., 2016). This is also a key message within the “Supporting Parents at Playgroup Program” intervention.

Finally, one of the objectives of the intervention was to encourage parents to obtain further information about the conversation topics by accessing the links sent after each session. By design, the conversations were brief and so could only address each topic in a relatively superficial manner. For parents to gain a deeper understanding of the content and apply the skills discussed by the facilitator, it was intended that parents access the additional information on each program topic. However, it is possible parents did not access the links to further information either because they did not receive/action the email or because they were not interested in the links. It is unknown whether the facilitators sent emails to participants after every

session as instructed, and it may be that sending links via email may not be an effective strategy.

5.3.2 Intervention impact

This study also aimed to examine the impact of the intervention on autonomy promoting parenting practices and parental self-efficacy related to healthy eating, limiting screen time, supporting physical activity, and establishing healthy bedtime routines. Considering the low recruitment rate, small sample size, and significant loss to follow up, the results of the impact evaluation should be viewed with caution. Nevertheless, there was an indication that the intervention had favourable effects on some parenting practices, particularly parental support for physical activity.

Given the high parental self-efficacy scores recorded at baseline, the relatively small changes observed for parental self-efficacy were not unexpected. However, there were small-to-moderate effect sizes observed for parental self-efficacy for promoting physical activity and limiting intake of unhealthy food and screen time, resulting in a small effect size for overall parenting confidence. The lack of change in parental self-efficacy perceptions related to children's fruit and vegetable consumption was also not unexpected. In our focus group study, parents expressed high confidence in their ability to get their children to eat "healthy food" (i.e. vegetables) (Fuller et al., 2019). However, these parents also discussed using non-responsive feeding practices such as offering rewards (Fuller et al., 2019). The items on the self-efficacy scale related to food parenting did not measure confidence in applying responsive feeding practices specifically, so a future study would need to evaluate parental self-efficacy using an instrument that was more sensitive to confidence in the use of responsive feeding practices.

5.3.3 Strengths and limitations

A strength of this study is the uniqueness of the community playgroup setting and the use of the "healthy conversations" concept for the discussions led by a volunteer parent facilitator. The intervention content and delivery mode were informed by focus groups conducted with community playgroup participants (Fuller et al., 2019) and leveraged the support provided by the other parents in the group (Lunn et al., 2016), and the existing social networks at playgroup (Strange et al., 2014).

Another strength was the use of an RCT study design with the inclusion of a control group. Many similar feasibility trials for obesity prevention programs have not had a control group, which greatly impacts on the internal and external validity of the results. In Chapter 2 (section 0), 29 group parent programs were reviewed, but only 12 included a control group in the evaluation (Table 2.3). Of the Australian playgroup programs reviewed in section 2.4.1, only the REFRESH program (Jancey et al., 2014) was evaluated using an RCT study design.

A limitation of this study was the low recruitment rate both in terms of the number of playgroups willing to take part, and the numbers of parents subsequently recruited in those playgroups. As discussed at the focus groups (Fuller et al., 2019), playgroup attendance can be erratic, with many parents not attending on a regular basis. This means that a single visit to recruit parents may miss many potential study participants who were not in attendance at playgroup on that day. The recruitment methods also required a minimum of four parents at the playgroup consent to take part in the study evaluation, and to complete the baseline survey prior to randomisation. This inadvertently placed a number of constraints on the recruitment of both playgroups and participants, which was exacerbated by having to finalise recruitment and conduct facilitator training in time for the program to commence at the start of the school term.

Another challenge was the poor response rates to the post-intervention surveys. The reasons for non-completion are unknown, but it is possible that the survey was perceived by participants as too long and burdensome to complete (Phillips et al., 2016). Multiple challenges to completing questionnaires have been documented (Griffin et al., 2019; Morgan et al., 2016). In the current trial, several reminder emails were sent to those who had not responded to the survey email but, as the only contact information collected from study participants was their email address, they could not be followed up by phone or text message. As such, it is likely that the response rate may have improved if participants could have been contacted by phone and/or sent text message reminders.

5.4 CONCLUSION AND IMPLICATIONS FOR FUTURE RESEARCH

The results indicate that the “Supporting Parents at Playgroup Program” intervention may be feasible and acceptable in the playgroup setting. However, the

volunteer parent facilitator model is not feasible. There are also aspects of the playgroup and parent recruitment, and data collection methods that can be modified to increase the sample size and reduce loss to follow-up. As such, a further trial, with some modification to the delivery mode, is needed before any conclusion about potential program impact on parental self-efficacy or parenting practices can be made.

The use of volunteer parent facilitators from each playgroup to lead the conversations and provide links to more information on each topic was an important and novel aspect of the intervention design. However, there were significant challenges with this approach, both in terms of recruitment of playgroups into the program, and the capacity of the facilitators to deliver the intervention as intended. The results of the process evaluation suggest that more training was needed to address the challenge of bringing the group together for the conversations. To address these concerns, the conversations could be led by appropriately trained external peer facilitators, including strategies to address barriers associated with the playgroup environment. In keeping with the results of the focus group study which emphasised the need for the facilitator to be a true peer (Fuller et al., 2019), the external peer facilitator would not be a researcher or clinician, but a fellow parent with training and experience in communications and group work facilitation. The parent would not need to have any affiliation with the playgroup. Rather their personal experience as a parent themselves, and an ability to relate to challenges around parenting young children would be part of the selection criteria for recruiting the facilitator. This external facilitator model would eliminate the pressure on playgroups to identify a volunteer parent to serve as a facilitator and potentially increase the number of playgroups willing to participate in the program. It could also help manage the challenges of bringing more parents into the conversation and keeping the conversations on topic.

To address the issue of non-compliance with the measurement protocols and missing data on the process and outcome evaluations, the frequency with which participants are asked to complete feedback surveys and the number or length of outcome measures included in the baseline and post-intervention surveys could be reduced. The use of phone or text message reminders in addition to emails may have improved compliance. Although most parents preferred online assessments, providing an option of a paper-based survey may also reduce the amount of missing data.

To determine if these strategies would be successful in improving the feasibility and effectiveness of the intervention, without compromising the acceptability of the brief conversation-based intervention, a second pilot trial of the “Supporting Parents at Playgroup Program” was implemented and is described in the next chapter.

Chapter 6: Intervention Trial 2

The aims of the second intervention pilot were to: 1) assess the feasibility and acceptability of the “Supporting Parents at Playgroup Program” delivered by external peer facilitators; and 2) measure the impact of the intervention on parental self-efficacy related to promoting fruit and vegetable intake, limiting intake of unhealthy foods, drinks and screen time, and promoting physical activity. As discussed in the previous chapter (Section 5.4), there were several learnings from Trial 1 that resulted in modifications to the intervention delivery mode and evaluation plan. The main changes that were implemented as a result of the outcomes of the first trial were as follows:

- The requirement of providing a volunteer parent to serve as a facilitator and attend training was removed. The conversations were delivered by trained external peer facilitators experienced in group facilitation. The external facilitators completed the same training as the volunteer parents, and the topics and key messages remained unchanged.
- The length of survey was reduced by removing the parenting practice items from baseline and post-intervention survey, reducing the expected time to complete the survey from around 15-20 minutes down to around 5 minutes.
- Parents from participating playgroups could be enrolled into the study either before or after randomisation, as long as enrolment occurred prior to the first intervention session. Participant recruitment was enhanced by re-visiting the playgroups and using paper-based consent forms and baseline surveys.
- Compliance with the measurement protocols was improved by using phone and text message reminders to complete the surveys, in addition to email.

Section 6.1 provides an overview of the design of the second pilot trial, including the recruitment, evaluation, and data analysis methods. Section 6.2 reports the results of the process and impact evaluation, and Section 6.3 discusses the results in respect to the feasibility and acceptability of the intervention, and its impact on parental self-efficacy and the accessing of online resources by the study participants.

6.1 METHODS

6.1.1 Study design

The study was conducted using a multiple cohort group randomised controlled trial (RCT) design. After baseline assessments of the study outcomes, playgroups were randomised into either the intervention or control arm. The randomisation schedule was independently generated using the “surveysselect” procedure in SAS (version 9.4). Playgroups randomised to the intervention arm received the intervention immediately, and the wait-list control condition playgroups were offered the program in the following school term. The intervention was delivered by two trained external peer facilitators over a 10-week school term from October to December 2019. The program ran fortnightly, with some playgroups receiving their first session in Week 1 and others in Week 2 of the term. After all playgroups in the intervention arm had completed the final program session, participants completed the post-intervention assessments. The timeline for recruitment, randomisation and data collection for process and impact evaluation is shown in *Figure 6.1*. A variation to the original ethics approval (reference no. 1900000011) (Appendix E) was obtained from Queensland University of Technology Human Research Ethics Committee. The variation was required because the intervention was delivered by an external peer facilitator instead of a volunteer parent facilitator from each playgroup (detailed in section 6.1.2).

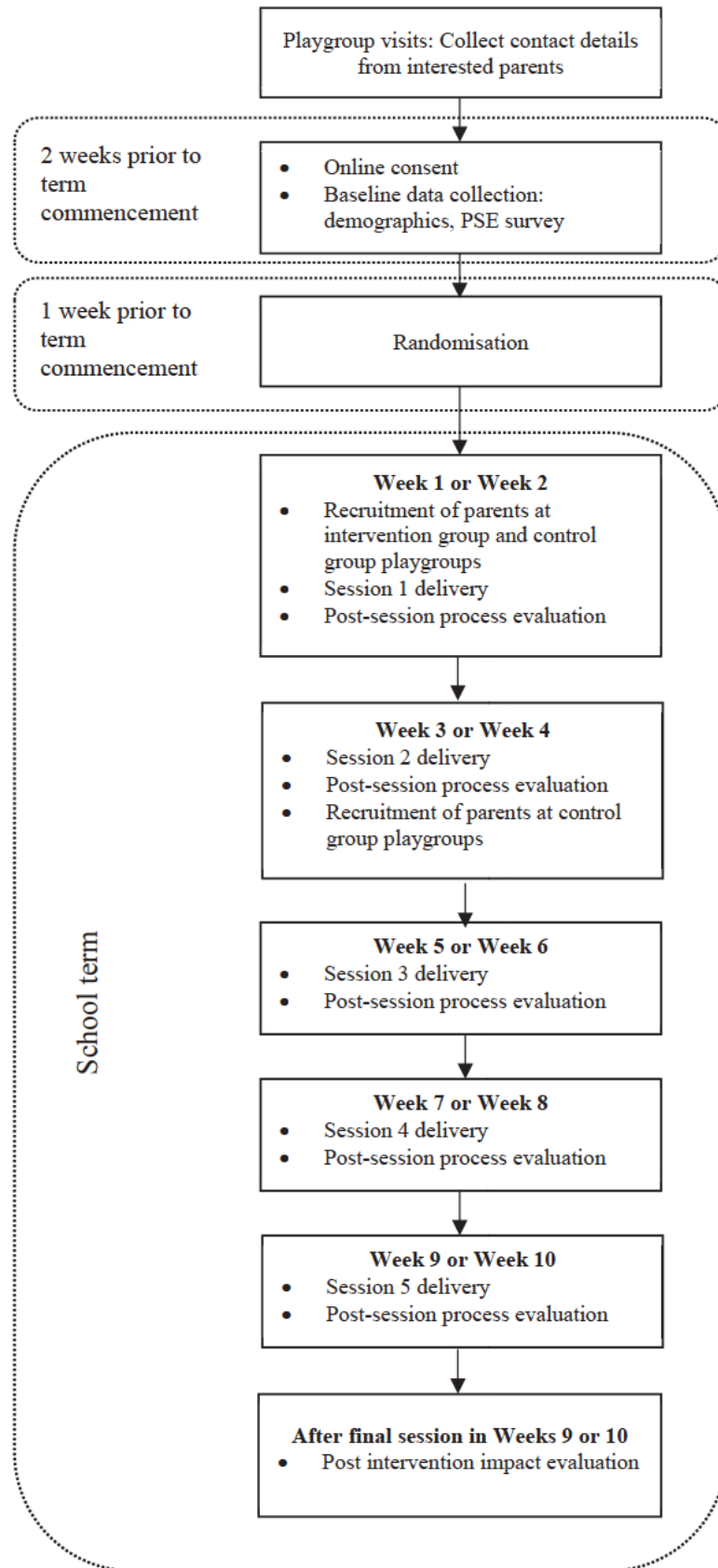


Figure 6.1. Timeline for recruitment, randomisation, and data collection for Trial 2

6.1.2 Facilitator recruitment and training

The peer facilitators were recruited via an advertisement placed on the Queensland University of Technology jobs web page and the Seek job website. The selection criteria required that the applicant have:

- Excellent personal and communication skills.
- Recent experience in group work facilitation.
- Demonstrated understanding of the challenges related to parenting young children.
- Flexibility to travel to playgroups on weekday mornings using own transport.
- Flexibility to attend training (1 x 4hr session) and provide formal and informal feedback on the experience of being a facilitator and on the program itself.

The two applicants selected for the facilitator position were not trained researchers or health professionals. The facilitators completed a single four-hour training session, which followed the same format used to train the volunteer facilitators in Trial 1, but with more discussion around the playgroup environment and its potential challenges. The training addressed the program topics, and the steps required to deliver each component of the intervention. The “healthy conversation” concept was covered in detail, with an emphasis on the importance of supporting parents while also encouraging them to set goals relating to the application of autonomy promoting parenting practices. The facilitators were given the same facilitator manual used in Trial 1 and received ongoing support from the PhD candidate via regular phone and email contact. They were encouraged to contact the PhD candidate at any time over the course of the program to discuss any aspect of the program content, scheduling, or group facilitation issues.

6.1.3 Participants and setting

Community playgroups were recruited from the greater Brisbane metro area, within the same urban location as the playgroups identified for the first trial (section 5.1.3). A list of eligible playgroups was compiled by PGQ. Playgroups who had taken part in the focus groups or Trial 1 were ineligible to take part, but those who had

declined to take part in Trial 1 were included. Initial contact with the primary contact person (CP1) of each playgroup was made via email by either PGQ or the PhD candidate. A flyer that briefly explained the program was attached to the email. A copy of the flyer is in Appendix L. The purpose of this initial contact was to schedule a time for a member of the research team to visit the playgroup and explain the program and the study in further detail. Parents who were interested in participating in the evaluation provided their name, email address and (optionally) their mobile phone number. In some cases, the CP1 provided contact details of interested parents who were not in attendance on the day of the visit.

Parents who had expressed an interest in taking part in the study were sent an email with a link to the participant information sheet and an informed consent form. Parents who selected “yes” on the consent form were progressed to the baseline survey. If parents selected “no” to consent, they were not sent any surveys and did not participate in the program evaluation. After randomisation of the playgroups, and prior to the commencement of the first intervention session, additional parent participants were recruited. The control group playgroups were also visited by the PhD candidate to further recruit parents to take part in the study. These additional intervention and control group participants provided written consent and contact details, and completed a paper-based baseline survey.

6.1.4 Data collection

Baseline and post intervention surveys, and process evaluation surveys were administered according to the timeline shown in *Figure 6.1*. Demographic information was collected on the baseline survey, and included participant’s age, education level, work status, and relationship to the child/ren at playgroup and the child/ren age and gender.

The majority of surveys were administered on-line using the Research Electronic Data Capture (REDCap) platform (version 8.10.20), and a small proportion of parents completed paper-based assessments. Parents were sent an email via REDCap that contained a link to the survey. Reminder emails, phone calls and text messages were sent to participants who had not completed the baseline or post-intervention survey in the specified time frame. After each intervention session, parents participating in the evaluation were sent an email with a link to the session feedback survey. One reminder email was sent to participants who had not completed the feedback survey in the

specified time frame. After each session at each playgroup, facilitators completed a paper-based questionnaire for the purposes of process evaluation.

6.1.5 Process evaluation measures

6.1.5.1 Feasibility and acceptability – facilitators

At each session, facilitators recorded the number of parents participating in each of the two conversations, and the total number of adults attending playgroup that week, on the facilitator post-session questionnaire. The questionnaires were tailored to the topics for each session, and included time spent on each conversation and whether the session key messages were delivered. The questionnaire also included an open-ended question for facilitators to record comments or suggestions about delivery of the program. An example of the questionnaire for one of the sessions is in Appendix I.

6.1.5.2 Feasibility and acceptability – participants

Parent feedback surveys developed specifically for the study, were unchanged from Trial 1. They were emailed to participants immediately after each session and were used to obtain feedback on the individual sessions, including whether the parents were satisfied with the conversations, whether they enjoyed the session, and whether they found the suggestions made by the facilitator or the group discussions useful. There was an open-ended question for participants to provide any additional feedback or comments about any aspect of the session, or the program in general. The wording on each survey included the session and conversation topics. An example of the survey for one of the sessions is in Appendix J. The survey after the Session 5 (the final session) included two additional questions: “How useful was the program overall?” and “How useful was it have additional online resources provided throughout the program?”.

6.1.6 Impact evaluation

To explore the impact of the intervention on parental self-efficacy and engagement with the online resources recommended after each session, participants completed a 19-item questionnaire at baseline and immediately post-intervention. The measures are described in the following sub-sections, and the full questionnaire can be found in Appendix M. It was estimated that it would take participants 5-7 minutes to complete the questionnaire at baseline (including the demographics questions) and 5 minutes at post-intervention.

6.1.6.1 Parental Self-Efficacy

At baseline, and immediately post intervention, participants completed a questionnaire measuring: 1) parental self-efficacy for promoting physical activity; 2) parental self-efficacy for limiting intake of unhealthy foods, drinks and screen time; and 3) parental self-efficacy for promoting intake of fruits and vegetables (Norman et al., 2018). The items were identical to those used in Trial 1 and are described in section 5.1.6.4.

6.1.6.2 Accessing of online resources

Four items were used to evaluate whether parents searched online for resources related to the session topics. Parents were asked how often they searched online for information on-line around fussy eating, ideas for child physical activity, limiting screen time and sleep topics over the last month.

6.1.7 Data Analysis

6.1.7.1 Process evaluation

Descriptive statistics, including frequencies, were calculated for the acceptability and feasibility measures. Counts were used to summarise the number of times the key messages were delivered, and for playgroup attendance.

6.1.7.2 Impact evaluation

Medians and interquartile ranges were calculated for the parental self-efficacy scores. Because scores exhibited strong negative skewness, between-group differences in change scores were evaluated using the Wilcoxon Rank Sum Test. All analyses were implemented in SAS (Version 9.4) using the NPAR1WAY procedures. Counts were used to summarise the number of times the participants in each study arm searched for online resources in respect to each of the four child healthy behaviour topics at baseline and post-intervention. The percentage of participants in each study arm reporting searching for online resources was calculated. Group differences were tested for significance using weighted least squares regression implemented via PROC CATMOD in SAS (Version 9.4). All analyses were conducted on an intention-to-treat basis, with missing post-test values conservatively imputed using the last observation carried forward method. For comparison purposes, the analyses were also conducted on a complete data basis. Cohen's *d* was used to describe resultant effect sizes (Thalheimer & Cook, 2002). An effect size of greater than or equal to 0.20 was

considered small, 0.50 or greater considered medium and 0.80 or greater considered large (Cohen, 1992).

6.2 RESULTS

6.2.1 Playgroups recruited

The recruitment of playgroups and the flow of participants through each phase of the trial is depicted in *Figure 6.2*. Fifty-seven community playgroups were identified as eligible to be invited to take part in the trial. Of the 57 playgroups contacted, 24 agreed to participate and were randomised to the intervention (n=12) or wait-list control (n=12) after completing baseline assessments. From the 12 intervention playgroups, 90 parents consented to participate in the study evaluation and completed the baseline survey. Of this number, 70 parents completed the post-intervention survey. From the 12 control playgroups, 94 parents consented to participate in the evaluation and completed the baseline survey. Of this number, 67 completed the post-intervention survey.

6.2.2 Parent participant characteristics

The characteristics of the 184 participants who completed the baseline survey are summarised in Table 6.1. The majority of participants were mothers (92%), aged between 30 and 39 years (70%), and university educated (68%). Sixty-three percent of parents had one child at playgroup and 35% had two children in attendance. Forty-one percent of children were under the age of 2 years. Seventeen percent were aged 2-3 years, 24% aged 3-4 years, with 15% over 4 years of age.

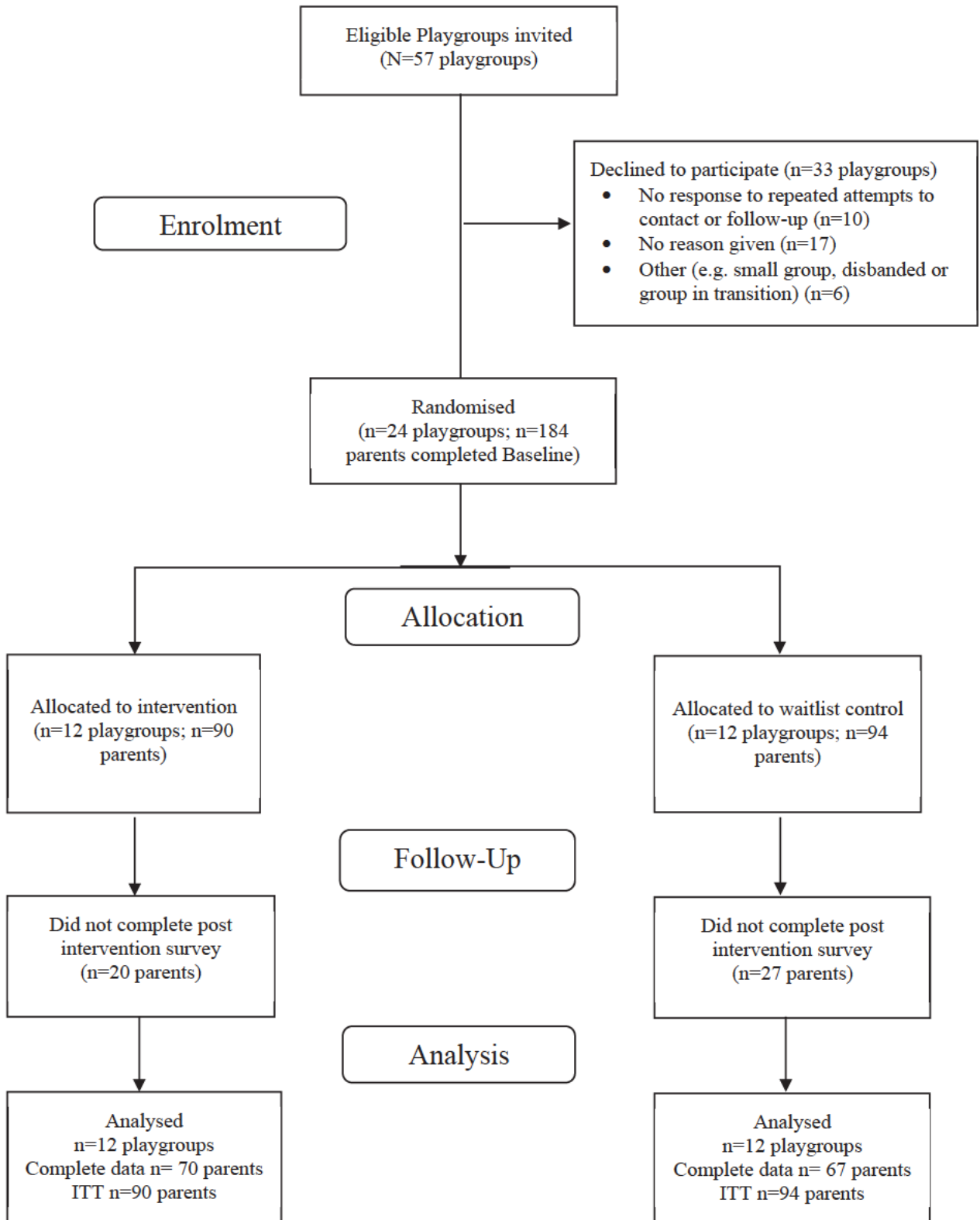


Figure 6.2. Trial 2 CONSORT Diagram

Table 6.1

Demographic Characteristics of the Participants who Consented to Take Part in the Evaluation

Variable	Intervention group (N=90)		Control group (N=94)	
	n	%	n	%
Relationship to child/ren				
Mother	81	90.0	88	93.6
Father	3	3.3	4	4.3
Grandparent	5	5.6	0	0.0
Carer	1	1.1	2	2.1
Age of parent/carers				
Under 30 years	6	6.7	10	10.6
30 – 34 years	27	30.0	29	30.9
35 – 39 years	40	44.4	33	35.1
40 years or older	17	18.9	22	23.4
Education				
University education	65	72.2	60	63.8
TAFE or trade	18	20.0	22	23.4
Secondary school	5	5.6	9	9.6
Diploma/Certificate or not stated	2	2.2	3	3.2
Employment status ¹				
Not in paid employment	45	50.0	47	50.0
Part-time employment	34	37.8	36	38.3
Full-time employment	4	4.4	6	6.4
Maternity leave ²	7	7.8	4	4.2
Student	2	2.2	3	3.2
Volunteer	5	5.6	3	3.2
Number of children per parent/carers at playgroup				
One	55	61.1	61	64.9
Two	32	35.6	32	34.0
Three	2	2.2	0	0.0
Four	1	1.1	1	1.1
Children at playgroup	n=129		n=129	
Male	64	49.6	60	46.5
Female	62	48.1	66	51.2
Not stated (missing data)	3	2.3	3	2.3
Under 2 years old	49	38.0	57	44.2
2 – 3 years	17	13.2	27	20.9
3 – 4 years	34	26.4	28	21.7
Over 4 years old	25	19.4	13	10.1
Not stated (missing data)	4	3.0	4	3.1

¹ Multiple options may be selected so totals do not add to 100%² Maternity leave entered as free text with “other” option so may not capture all the parents on leave

6.2.3 Process evaluation

6.2.3.1 Feasibility and acceptability – facilitators

Both facilitators reported delivering the key messages at all sessions and emailing the links after each session to all playgroup parents who had provided their email address. A total of 118 out of the expected 120 conversations were delivered. All conversations were completed in the expected time frame, with most delivered in 10-15 minutes. Details are reported in Table 6.2.

Table 6.2

Time Spent Facilitating the Conversations at Intervention Playgroups (N=59 Sessions)

	Time spent	n (%)
Conversation 1	Less than 10 minutes	15 (25.4)
	10-15 minutes	37 (62.7)
	Over 15 minutes	7 (11.9)
Conversation 2	Less than 10 minutes	23 (39.0)
	10-15 minutes	33 (55.9)
	Over 15 minutes	3 (5.1)

The two facilitators were allocated specific playgroups for delivery of the program. Most playgroups received all sessions from the one facilitator. However, due to some re-scheduling associated with other activities occurring at some playgroups, the facilitators delivered some sessions to playgroups other than those they were allocated.

6.2.3.2 Feasibility and acceptability – participants

Table 6.3 reports the number of parents at playgroup on the day of the session, and the number of parents participating in the group conversations. The proportion of parents taking part in the conversations in individual playgroups ranged from around 50% to 100%, with a slightly higher proportion of parents across all playgroups taking part in the first conversation (65.4%) compared to Conversation 2 (61.1%). Responses to feedback surveys were generally consistent across all playgroups, and there did not appear to be any differences in respect to playgroups who received the program from both facilitators compared to those who had the same facilitator for all sessions.

Table 6.3

Total Number and Proportion of Parents Participating in Each Conversation at Intervention Playgroups

	Parents attending playgroup	Participating in Conversation 1	Participating in Conversation 2
	N	n (%)	n (%)
Session 1 (Eating)	122	82 (67.2)	72 (59.0)
Session 2 (Screens)	108	71 (65.7)	70 (64.8)
Session 3 (Active play)	123	82 (66.7)	77 (62.6)
Session 4 (Sleep)	117	79 (67.5)	76 (65.0)
Session 5 (Wrap up)	108	64 (59.3)	58 (53.7)
Total	578	378 (65.4)	353 (61.1)

The results of the post-session feedback surveys are summarised in Table 6.4 and Table 6.5. The number of respondents who rated the group discussions and the suggestions made by the facilitator as useful or very useful ranged from 62.5% to 89.3%. Parents rated Conversation 1 slightly higher on average (70-89%) compared to the second conversation (62-77%). As shown in Table 6.5, for each intervention topic, at least 70% of respondents were satisfied or very satisfied with the program. At least 72% rated the conversations as enjoyable or very enjoyable, with the session on movement and active play providing the highest ratings.

Of the 31 parents who provided feedback about the program overall, 22 (71%) felt that the program was useful or very useful. The same proportion (71%) felt that the links to online information were useful or very useful. A small number of participants (n=22) provided additional written feedback about the sessions, the peer facilitators, and the delivery of the program. All of the written feedback is reported in Table 6.6.

Table 6.4

Number and Percentage of Participants Rating the Conversations as Useful or Very Useful

	Session 1: Eating n (%)	Session 2: Screens n (%)	Session 3: PA n (%)	Session 4: Sleep n (%)	Session 5: Wrap-up n (%)
Conversation 1	N=39	N=35	N=28	N=27	N=26
Group Discussion	29 (74.4)	27 (77.1)	22 (78.6)	19 (70.4)	22 (84.6)
Facilitator Suggestions	30 (76.9)	29 (82.9)	25 (89.3)	22 (81.5)	20 (76.9)
Conversation 2	N=37	N=36	N=27	N=24	N=26
Group Discussion	28 (75.7)	26 (72.2)	18 (66.7)	15 (62.5)	20 (76.9)
Facilitator Suggestions	27 (73.0)	27 (75.0)	20 (74.1)	16 (66.7)	17 (65.4)

Table 6.5

Number and Percentage of Participants Satisfied with, or Enjoyed, Each Session

Session	Satisfied n (%)	Enjoyed n (%)
1 – Eating (N = 39)	29 (74.4)	30 (76.9)
2 – Screens (N = 36)	26 (72.2)	26 (72.2)
3 – Active play (N = 28)	25 (89.3)	25 (89.3)
4 – Sleep (N = 27)	19 (70.4)	21 (77.8)
5 – Wrap-up (N = 26)	20 (76.9)	20 (76.9)

Table 6.6

All Additional Written Feedback Provided by Parent Participants (n = 22)

Session	Written feedback
General - Facilitators	<p>“The facilitator was very good at generating discussion and recommendations.”</p> <p>“[Facilitator] gave some really good recommendations, as did some of the mums.”</p> <p>“The facilitator was very engaging; everyone was comfortable with sharing their experiences.”</p> <p>“We love [Facilitator] and our sessions with her. Many of us have gotten a lot of help from them!”</p> <p>“[Facilitator] was wonderful. Very friendly, easy to talk to and an excellent facilitator.”</p> <p>“[Facilitator] did a great job facilitating the sessions each fortnight.”</p> <p>“[Facilitator] was great at controlling the crowd and keeping the information delivered in an engaging way.”</p>
1: Reducing stress at mealtimes	<p>“The helpful thing was hearing from parents with older children to learn more about what to anticipate and things they'd tried successfully and unsuccessfully.”</p> <p>“I enjoyed the conversation and love this idea of sharing information about these topics!”</p> <p>“Not quite there yet so might be hard to appreciate the suggestions but good to know for near future reference when bub grows up soon.”</p>
2: Limiting screens	<p>“I joined the session late and initially thought it was a discussion about dealing with tantrums and meltdowns. This might also be a good topic to cover in future. In addition, I noted that 'screens' can be used in positive ways, not merely restricted, by utilizing learning and development shows or applications and parents actively guiding their children in these rather than leaving them alone with the screen.”</p> <p>“I'm not sure if I missed one of the conversations. I was only in on one of them regarding screen time but didn't hear any suggestions about reducing screen time.”</p>
3: Supporting movement skills	<p>“I like how it was flexible for parents to come and go while chasing after their kids. The follow up links are fantastic as we can look at them in our own time.”</p> <p>“Excellent home ideas.”</p> <p>“Good session got me thinking thanks.”</p> <p>“Today was a really productive conversation and the suggestions were great. We will definitely be introducing some of them at home.”</p>

Session	Written feedback
4: Bedtime activities and routines	<p>“It was a bit tricky today. I felt I might offend some people re sleep suggestions it’s an area people get a bit touchy about... I also feel it’s hard as all the children are so different and at the moment her sleeps are going well; we didn’t really need any suggestions.”</p>
5: Celebrating achievements (including positive feedback on program overall)	<p>“I found these sessions very helpful. They made me more aware of the challenges that I will face as my toddler develops and provided me with practical solutions and ideas from other parents who have been through challenging times with their children.”</p> <p>“I would love some sessions around behaviour and emotional regulation.”</p> <p>“No online links provided.”</p> <p>“Would be interested in knowing the overall results.”</p> <p>“I loved being part of this program. It was great to get other people’s ideas and approaches on parenting. It also really got conversation started among our group and I feel like it helped us all get to know each other better and have better conversations.”</p> <p>“Final session seemed pointless. No recap occurred if it was meant to be a recap session. I felt the sleep topic was best structured and informative overall. Suggestion: Health of parents during early years, support articles for that topic.”</p> <p>“I’m so busy I didn’t have time to look at links so that’s why they weren’t useful for me. I still loved the program though. It was nice to chat about stuff with someone who knows about the subject.”</p> <p>“Didn’t receive any links. Not facilitators fault, but parents were nasty.”</p> <p>“I still think it’s hard to run sessions at playgroup. The demands of supervising kids and attending to their random needs makes participating meaningfully in a conversation quite difficult. I love the idea of a peer support group, but wonder if a better approach would be to set a topic and have it displayed prominently somewhere to encourage carers to engage in discussions themselves rather than a structured session? Follow up with resources or idea sharing could be via FB pages (we have one dedicated for our playgroup). I’ve loved participating and hope the program is a success!!!”</p>
Issues around program delivery and playgroup barriers	<p>“I think playgroup is a difficult forum to hold group discussions with the need to entertain and supervise kids who are running or crawling everywhere. The conversations were quite fragmented as people dashed off to tend to the kiddies.”</p> <p>“It was hard in this session [1] to give full attention; lots of distractions with the children wanting a story, etc.”</p> <p>“Due to the amount of people there and the level of noise I felt it was hard to hear and hold discussions though the information was useful.”</p> <p>“It was hard to hear other people’s comments over the noise of the children.”</p> <p>“Missed part of this session [3] due to attending to kids.”</p>

Session**Written feedback**

“Feel like I am very distracted with little kids around. Think we as a playgroup need to come up with activities that require less adult help so we can all be involved in the discussion with less distractions.”

“I find it hard because I can never sit still for long when looking after the kids to be able to engage in a 10min conversation. I feel that I miss most of the conversations. But not sure what a solution would be??? I think that's where it being extremely informal helps. And more of an ongoing conversation not necessarily a set start/end time.”

“Again I missed part of the session. Went to the kids to try and get other mums involved who are not normally involved.”

“It was difficult to hear/discuss with everything going on. Perhaps splitting up into smaller groups & whipping through the questions would help. People literally had to call out across the room or use hand gestures. Others lost interest & snuck outside.”

“It was very loud; hard to participate. Perhaps if it was outside it may not be so loud?”

“I think it can be a tricky time to have a group discussion in a playgroup setting with interruptions and distractions.”

“I think it's hard to run sessions at playgroup. The demands of supervising kids and attending to their random needs makes participating meaningfully in a conversation quite difficult.”

6.2.4 Impact evaluation

6.2.4.1 Parental self-efficacy

The Cronbach's alpha coefficients for parental self-efficacy scales were calculated at baseline for this study. Internal consistency was acceptable for all scales: PSE for promoting fruit and vegetables ($\alpha=0.72$); PSE for limiting unhealthy food, drink, and screen time ($\alpha=0.70$); PSE for promoting PA ($\alpha=0.71$). Internal consistency for overall PSE was good ($\alpha=0.82$).

Results of the ITT analyses for the parental self-efficacy are reported in Table 6.7. Twenty (22%) of the 90 intervention group participants had missing post-intervention data. Twenty-six (28%) of the 92 control group participants had missing data. For those participants, their responses at baseline were carried forward for the Last Observation Carried Forward analysis. A statistically significant ($p<0.05$) small effect size was observed for parental self-efficacy for promoting intake of fruit and vegetables ($d=0.32$). No changes were found for self-efficacy for limiting intake of unhealthy foods/drinks and screen time, or for promoting physical activity.

The results of the complete case analyses are reported in Table 6.8 and are consistent with the ITT analysis. A statistically significant ($p<0.05$) small effect size was observed for parental self-efficacy for promoting intake of fruit and vegetables ($d=0.39$). There were positive trends for limiting intake of unhealthy foods/drinks and screen time, and for promoting physical activity.

6.2.4.2 Participant searching online for information on healthy child behaviour topics

Results of the ITT analyses of participants searching online for information relating to the four child healthy behaviour topics are reported in Table 6.9. A small effect size was observed for searching for information around child physical activity ($d=0.27$) and for information in respect to any of the four topics ($d=0.23$), although neither were statistically significant. No changes were found for the online searching for fussy eating, limiting screen time or sleep resources.

The results of the complete case analyses are reported in Table 6.10 and are consistent with the ITT analysis in respect to the small effect size observed for physical activity information ($d=0.32$). There were positive trends observed for searching online for information around child eating and sleep.

Table 6.7

Parental Self-Efficacy Median Scores of intervention and control groups at baseline and post-intervention (Intention-to-Treat): n=90 (intervention) n=92 (control)

Parental Self-Efficacy	Group	Baseline Median score* (IQR)	Post intervention Median score* (IQR)	Sum of Ranks**	Z-statistic	P-value	Effect size (Cohen's d)
Promoting intake of fruit & vegetables	Intervention	9.4 (8.5-10.0)	9.5 (9.0-10.0)	8841.00	2.15	0.03	0.32
	Control	9.3 (7.5-10.0)	9.3 (7.5-10.0)	7449.00			
Limiting intake of unhealthy foods, drinks & screen time	Intervention	7.8 (6.6-9.0)	7.8 (6.2-8.8)	7943.50	-0.83	0.41	0.12
	Control	7.6 (5.8-8.6)	7.4 (5.8-8.6)	8709.50			
Promoting physical activity	Intervention	8.6 (7.8-9.2)	8.6 (7.4-9.4)	8168.00	-0.19	0.85	0.03
	Control	8.4 (7.0-9.4)	8.4 (6.6-9.6)	8485.00			
Overall	Intervention	8.4 (7.6-9.0)	8.3 (7.4-9.1)	8255.50	0.06	0.95	0.01
	Control	8.0 (6.9-9.1)	8.0 (6.9-8.9)	8397.50			

*Items were scored on a 10-point Likert scale

**Sum of Ranks was based on pre to post change scores

Table 6.8

Parental Self-Efficacy Median Scores of intervention and control groups at baseline and post-intervention (Complete Case): n=70 (intervention) n=66 (control)

Description	Group	Baseline Median score* (IQR)	Post intervention Median score* (IQR)	Sum of Ranks**	Z-statistic	P-value	Effect size (Cohen's d)
Promoting intake of fruit & vegetables	Intervention	9.3 (8.5-10.0)	9.5 (9.0-10.0)	5165.00	-2.19	0.03	0.39
	Control	9.3 (7.8-10.0)	9.0 (7.8-10.0)	3746.00			
Limiting intake of unhealthy foods, drinks & screen time	Intervention	7.8 (6.4-9.0)	7.5 (6.0-8.6)	4760.00	0.28	0.78	0.05
	Control	7.2 (5.8-9.0)	7.1 (5.6-8.8)	4420.00			
Promoting physical activity	Intervention	8.6 (7.6-9.2)	8.5 (7.2-9.4)	4717.00	0.19	0.85	0.03
	Control	8.4 (7.0-9.4)	8.4 (6.6-9.6)	4463.00			
Overall	Intervention	8.4 (7.5-9.0)	8.3 (7.1-9.1)	4876.00	-0.51	0.61	0.09
	Control	8.1 (7.1-9.1)	7.9 (7.1-8.9)	4304.00			

*Items were scored on a 10-point Likert scale

**Sum of Ranks was based on pre to post change scores

Table 6.9

Number of Participants Searching Online for Information During the Last Month on Child Healthy Behaviours Topics (ITT)
 n=90 (intervention) n=91 (control)

Topic	Group	Baseline n (%)	Post intervention n (%)	Group x Time Interaction Chi-square	P-value	Effect size (Cohen's <i>d</i>)																																				
Eating	Intervention	33 (36.7)	33 (36.7)	0.58	0.45	0.11																																				
	Control	43 (47.3)	38 (41.8)				Physical activity	Intervention	10 (11.1)	15 (16.7)	3.31	0.07	0.27	Control	25 (27.5)	21 (23.1)	Screen time	Intervention	16 (17.8)	16 (17.8)	0.72	0.39	0.13	Control	19 (20.9)	15 (16.5)	Sleep	Intervention	38 (42.2)	29 (32.2)	0.00	0.99	0.00	Control	42 (46.2)	33 (36.3)	Any topic	Intervention	46 (51.1)	52 (57.8)	2.42	0.12
Physical activity	Intervention	10 (11.1)	15 (16.7)	3.31	0.07	0.27																																				
	Control	25 (27.5)	21 (23.1)				Screen time	Intervention	16 (17.8)	16 (17.8)	0.72	0.39	0.13	Control	19 (20.9)	15 (16.5)	Sleep	Intervention	38 (42.2)	29 (32.2)	0.00	0.99	0.00	Control	42 (46.2)	33 (36.3)	Any topic	Intervention	46 (51.1)	52 (57.8)	2.42	0.12	0.23	Control	63 (69.2)	59 (64.8)						
Screen time	Intervention	16 (17.8)	16 (17.8)	0.72	0.39	0.13																																				
	Control	19 (20.9)	15 (16.5)				Sleep	Intervention	38 (42.2)	29 (32.2)	0.00	0.99	0.00	Control	42 (46.2)	33 (36.3)	Any topic	Intervention	46 (51.1)	52 (57.8)	2.42	0.12	0.23	Control	63 (69.2)	59 (64.8)																
Sleep	Intervention	38 (42.2)	29 (32.2)	0.00	0.99	0.00																																				
	Control	42 (46.2)	33 (36.3)				Any topic	Intervention	46 (51.1)	52 (57.8)	2.42	0.12	0.23	Control	63 (69.2)	59 (64.8)																										
Any topic	Intervention	46 (51.1)	52 (57.8)	2.42	0.12	0.23																																				
	Control	63 (69.2)	59 (64.8)																																							

Table 6.10

Number of Participants Searching Online for Information During the Last Month on Child Healthy Behaviour Topics (Complete Case)
n=69 (intervention) *n*=64 (control)

Topic	Group	Baseline n (%)	Post intervention n (%)	Group x Time Interaction Chi-square	P-value	Effect size (Cohen's <i>d</i>)																																				
Eating	Intervention	26 (37.7)	26 (37.7)	0.62	0.43	0.14																																				
	Control	30 (46.9)	25 (39.1)				Physical Activity	Intervention	9 (13.0)	14 (20.3)	3.26	0.07	0.32	Control	15 (23.4)	11 (17.2)	Screen time	Intervention	13 (18.8)	13 (18.8)	0.80	0.37	0.16	Control	12 (18.8)	8 (12.5)	Sleep	Intervention	32 (46.4)	23 (33.3)	0.02	0.90	0.03	Control	30 (46.9)	21 (32.8)	Any topic	Intervention	43 (62.3)	37 (53.6)	0.06	0.80
Physical Activity	Intervention	9 (13.0)	14 (20.3)	3.26	0.07	0.32																																				
	Control	15 (23.4)	11 (17.2)				Screen time	Intervention	13 (18.8)	13 (18.8)	0.80	0.37	0.16	Control	12 (18.8)	8 (12.5)	Sleep	Intervention	32 (46.4)	23 (33.3)	0.02	0.90	0.03	Control	30 (46.9)	21 (32.8)	Any topic	Intervention	43 (62.3)	37 (53.6)	0.06	0.80	0.04	Control	41 (64.1)	37 (57.8)						
Screen time	Intervention	13 (18.8)	13 (18.8)	0.80	0.37	0.16																																				
	Control	12 (18.8)	8 (12.5)				Sleep	Intervention	32 (46.4)	23 (33.3)	0.02	0.90	0.03	Control	30 (46.9)	21 (32.8)	Any topic	Intervention	43 (62.3)	37 (53.6)	0.06	0.80	0.04	Control	41 (64.1)	37 (57.8)																
Sleep	Intervention	32 (46.4)	23 (33.3)	0.02	0.90	0.03																																				
	Control	30 (46.9)	21 (32.8)				Any topic	Intervention	43 (62.3)	37 (53.6)	0.06	0.80	0.04	Control	41 (64.1)	37 (57.8)																										
Any topic	Intervention	43 (62.3)	37 (53.6)	0.06	0.80	0.04																																				
	Control	41 (64.1)	37 (57.8)																																							

6.3 DISCUSSION

The aims of this second pilot intervention trial were to evaluate the feasibility and acceptability of the intervention delivered by external peer facilitators at community playgroups; and examine the impact of the program on parental self-efficacy relating to promoting healthful child behaviours, and accessing online resources on the intervention topics. The results indicate that the intervention delivered by external peer facilitators was both feasible and acceptable. The program was feasible as evidenced by the number of playgroups and parent participants recruited, and the high proportion of parents at playgroup participating in the conversations. The facilitators successfully delivered the program content and key messages in the expected time frame and kept the conversations on topic. The program was acceptable, as more than 70% of parents reported that the group discussions were useful and felt that the sessions were enjoyable. The facilitators' suggestions were also highly rated by the participants, and they received positive written feedback from the parents. Facilitators reported emailing the participants the links to further information after every session as planned. The intervention had a significant positive effect on parental self-efficacy for promoting fruit and vegetables but minimal impact on parental self-efficacy for limiting intake of unhealthy foods, drinks, and screen time, and for promoting physical activity.

6.3.1 Feasibility and acceptability

The use of peer facilitators external to the playgroups significantly increased the feasibility of the intervention. Twenty-four playgroups, out of the 57 eligible to take part, were recruited compared to only nine out of 67 in the first pilot trial. Playgroups were more receptive to taking part in the trial once the requirement of providing a volunteer facilitator was removed, as several of the playgroups who took part in this second trial had declined participation in the first trial.

The facilitators were successful in bringing the parents together for the conversations, and participation was consistently high across all sessions and all playgroups. Nearly all planned sessions were successfully implemented, with both conversations and all key messages delivered in the expected time frame. On average, between 60 and 70% of parents attending playgroup participated in the conversations; the vast majority of them participating in both conversations. This was despite the

expected challenges associated with a busy playgroup that had been identified in our focus group research (Fuller et al., 2019). While a small number of parents commented on the challenges associated with the noise at playgroup and distractions from children, the level of engagement with the intervention was consistently high throughout the program.

The high level of acceptability of the program was evident from the positive written feedback provided by some of the parents and high satisfaction (71%) with the program overall. The sessions were highly rated by the participants both in terms of usefulness of the group discussion and suggestions made by the facilitator. Most (over 70%) of parents found the sessions enjoyable, with 89% rating the session on movement and active play as enjoyable or very enjoyable. This was a surprising result as parents participating in the focus groups had indicated that physical activity was not a priority compared to other child health behaviours, as parents generally felt that their child was “active enough” (Fuller et al., 2019). One of the themes of the focus groups was that parents felt that they had enough information about healthy behaviours, including physical activity. Given that the parents “knew” that physical activity was important, and that they believed that their child did not need to increase the amount of physical activity, it is not surprising they did not want more “information”. However, the focus of the conversations at Session 3 (Supporting Movement Skills) was brainstorming active play ideas that required minimal, if any, equipment or parent involvement. As such, encouraging parents to think of physical activity in terms of movement and active play rather than structured exercise or sport was a key aspect of the facilitator’s role. In addition, the active play ideas generated by the group were intended to provide alternatives to screens to complement Session 2 (Limiting Screens) and thus help parents address barriers to implementing screen time rules.

6.3.2 Intervention impact on parental self-efficacy

The study examined the impact of the intervention program on parental self-efficacy with respect to healthful child eating, screen time and physical activity behaviours. The intervention had a significant positive effect on parental confidence to promote fruit and vegetables. This is an important finding because, although child behaviours were not directly measured, there is consistent evidence that parental self-efficacy for supporting healthy eating behaviours, including consuming fruit and

vegetables, is positively associated with healthy eating outcomes in children (Campbell, Hesketh, et al., 2010; Hammersley et al., 2019; Koh et al., 2014).

To date, relatively few parenting group interventions have targeted and measured parental self-efficacy to support healthy behaviours. The Parents and Tots Together multi-site group intervention evaluated parental self-efficacy related to general parenting, but there was no change in parental self-efficacy in either the US (Haines et al., 2016) or Canadian (Walton et al., 2015) trials. Another parent group intervention that had a focus on increasing parental self-efficacy was the HENRY study, which evaluated the effects of an 8-week parent program on family eating behaviours, dietary intake and parental self-efficacy (Willis et al., 2014). Post-intervention outcomes from the trial at nine locations across England with 71 parents included significant increases in parental self-efficacy around feeding practices as well as increased child fruit and vegetable intake, frequency of family meals, and reduction in eating while watching television (Willis et al., 2014). Another HENRY study, that analysed routine data collected from 1100 parents attending 144 programs across England over two years, reported similar results (Willis et al., 2016).

6.3.3 Signposting to further information

An essential element of the intervention design was the use of “signposting” to direct participants to further information on the session’s topic. Although 71% parents reported that the links to online resources were useful, the impact evaluation results showed minimal intervention effect for parents searching for information online. These contradictory outcomes may be related to the wording of the survey items; they did not distinguish between general internet searches for information and the links provided as part of the program. Parents were asked how often they “searched” for online information, so they may not have equated clicking on the links provided in the emails after each session as “searching”. Another possible explanation is that parents may not have felt the need to access additional information if they were satisfied with the strategies discussed at the session, and so did not feel the need for further information. The results of our focus group study indicated that parents felt that they had enough information and just wanted strategies (Fuller et al., 2019). It is possible that the parents perceived the “links to resources” as “educational information”, so the low level of engagement with internet resources supports the focus group outcomes.

However, despite the low level of internet searching on any topic, the small intervention effect observed for “ideas on how to encourage your child to be physically active” was an interesting finding, and is consistent with the session on movement and active play receiving the highest satisfaction level out of all of the sessions. At the focus groups, many parents indicated that they felt that their child was sufficiently physical active, and showed the least interest in “active play” as a potential program topic. This is also consistent with other studies (Hennink-Kaminski et al., 2018; Hesketh et al., 2012). The total number of parents searching online for each of the session topics was also lowest for physical activity topics compared to eating, screen time and sleep. Regardless of the reasons for the lack of engagement in internet resources, the strategy of emailing links to participants after each session was not effective. Strategies for applying the concept of “signposting” in this intervention, and motivating parents to access additional information and services related to the intervention topics, requires further investigation. A study that successfully used video clips (3-5 minutes each) on infant feeding topics was the “Early Food for Future Health” eHealth intervention (Helle et al., 2019). Eighty-five percent of participants viewed all or most of the seven monthly videos, and there was a positive statistically significant intervention effect on family mealtimes (Helle et al., 2019). Thus, the use of videos designed specifically for the intervention is worthy of future consideration. Other potential strategies for increasing engagement with the signposting resources are discussed in Section 7.4.1.3.

6.3.4 Strengths and limitations

A strength of this study was the rigorous study design. Previous obesity prevention community-based intervention studies have adopted single group pre-post designs or relied on qualitative findings which cannot establish causal relationships between the intervention and parent/child outcomes. The current study is one of the first in a playgroup setting to evaluate a healthy lifestyles behavioural intervention using a rigorous RCT study design. Although the REFRESH program for mothers at community playgroup was evaluated using a cluster RCT design, this intervention aimed to improve the diet and level of physical activity of mothers, and did not target parenting practices or any child behaviours (Jancey et al., 2014). The *smalltalk* parenting intervention, implemented in supported playgroups in Victoria, used a cluster RCT design, but its focus was on the child learning environment, not healthy

lifestyle behaviours (Hackworth et al., 2017). The “Have Fun – Be Healthy” intervention program, delivered in supported playgroups in Queensland, targeted parenting practices and parental self-efficacy in respect to child eating and physical activity (Pathirana et al., 2018). However, the evaluation was based on a single group pre-post study design (Pathirana et al., 2018).

Opposing these strengths were several limitations. A limitation was that the items on the parental self-efficacy instrument focussed on parent confidence in getting their child to engage in specific healthy behaviours, but not confidence to implement autonomy promoting parenting practices related to those behaviours. For example, the question “How certain are you that you can get your child to eat at least one serving of vegetables every day?” measured a different construct from certainty in being able to use autonomy promoting practices to get their child to eat vegetables (without resorting to the use of bribes, for example). In addition, parents in the intervention and control arms reported uniformly high self-efficacy perceptions in relation to each behaviour. Thus, ceiling effects made it difficult to promote and measure change over time. Further, the self-efficacy instrument did not measure parental self-efficacy in respect to child sleep, despite this aspect of parent confidence being targeted in Session 4 of the intervention.

Another study limitation was the low completion rates for the post-session feedback surveys. Inviting parents to complete a feedback survey immediately after every session may have been too burdensome and contributed to the low response rate (around 35%). Sending the links to the surveys via email may also have limited the number of responses. It is likely that many parents did not read the emails at a time convenient to complete the survey, or did not read them at all. Finally, the decision to reduce the burden on participants by removing the parenting practices measures from the baseline and post-intervention survey meant that the impact of the intervention on parenting practices could not be evaluated. However, reducing the length of the surveys appears to have greatly improved the response rates and reduced the amount of missing data. It is also very likely that following up participants who had not completed surveys via phone and text messages contributed to the improved response rate, so it may be that reducing the length of the survey to such an extent was not necessary.

6.3.5 Conclusion

The “Supporting Parents at Playgroup Program” intervention delivered by external peer facilitators was feasible and acceptable to parents attending community playgroups. Removing the requirement of a volunteer facilitator from each playgroup significantly increased the feasibility of the program, while keeping with the preferences for a program to be delivered by a fellow parent. The intervention had a significant positive impact on parents’ confidence for promoting fruit and vegetables, with positive effects on confidence for promoting physical activity and limiting unhealthy food and screen time. Thus, further investigation of the intervention program in a larger, fully powered trial is warranted. Future studies should measure parental self-efficacy using scales that specifically measure confidence in using autonomy promoting parenting practices across all four health behaviour domains. Future studies should also measure the actual use of these autonomy promoting parenting practices, and associated child health behaviours. Additionally, future trials should explore different signposting strategies to link parents to additional information and services related to the topics discussed during each conversation.

Chapter 7: Discussion and Conclusion

7.1 OVERVIEW OF STUDY SIGNIFICANCE AND OUTCOMES

This study was the first obesity-prevention intervention targeting parenting practices in relation to child feeding, screen time, physical activity, and sleep, delivered in community playgroups. The results of the process evaluation demonstrated that the intervention was both feasible and acceptable, and that the parents enjoyed the program. Outcomes, in terms of intervention impact on parental self-efficacy and use of autonomy promoting parenting practices around the four obesity-related behaviours, showed promise. The intervention had several novel aspects in terms of delivery mode, and the way social support was integrated into the program. It leveraged existing support networks at community playgroups and had an underlying premise of supporting rather than educating parents about autonomy promoting parenting practices. The concept of a brief intervention delivered via peer facilitated group conversations, with signposting to further information, meant that the intervention was able to integrate seamlessly into the busy playgroup environment. In addition, the program content and delivery methods were informed by focus groups conducted with parents attending community playgroups. The intervention stayed true to what parents wanted and addressed the concerns they raised in respect to barriers associated with the playgroup environment. The peer facilitated healthy conversation concept was novel in terms of obesity prevention intervention research and was well-suited to the community playgroup setting. With over 7,500 families currently attend community playgroups across Australia (Playgroup Australia, 2018), the positive process evaluation results and promising impact evaluation outcomes are a significant first step to further research in this setting across a range of geographically diverse locations.

7.2 SUMMARY OF KEY FINDINGS

This research investigated the barriers and facilitators to parents promoting healthy lifestyle behaviours in their children. The research also developed and evaluated the acceptability, feasibility, and potential efficacy of a multi-behaviour obesity prevention intervention for parents of young children attending community

playgroups. Key findings in relation to each research question (section 1.2.2) are listed below.

7.2.1 Focus group outcomes and intervention design

The outcomes from focus groups conducted at community playgroups are discussed in detail in Chapter 3:. This section provides the answers to research questions one and two that came from the focus group findings.

Research question 1: What are the barriers and facilitators for parents in respect to using parenting practices that encourage the development of healthy obesity-related behaviours in their child?

Barriers to parents using autonomy promoting parenting practices primarily relate to feeling stressed, tired, or frustrated. In moments of stress, parents use parenting practices that are counter-productive to what they felt they “should” do. This includes practices such as using bribes to get children to eat vegetables and using iPads® as “babysitters”. Feelings of stress are exacerbated by the belief that child behavioural traits or temperament are fixed, so parents feel disempowered to influence their child’s behaviour.

A facilitator to using autonomy promoting parenting practices was, paradoxically, parents’ confidence that they had adequate knowledge around healthy child behaviours in respect to eating, screen time, physical activity, and sleep. Parents just wanted strategies to use that knowledge. They also felt confident that many of their parenting frustrations were temporary, and a “phase” of their child’s development. An important facilitator was the support and guidance from playgroup peers, and this was a major reason why parents attended playgroup. The experiences and advice from parents at playgroup were highly valued and trusted, and this was consistent with previous research (Strange et al., 2014). In addition, being able to observe other parents’ interactions with older children provided insight and guidance for the future developmental stages of their own child.

Peer support became the central premise for intervention content and delivery. The intervention was not promoted as “obesity prevention” or “parenting education”. Instead, it was promoted as a program that supported parents to develop healthy behaviours in their children, and that would provide strategies for their everyday parenting challenges around child eating, screen time, active play, and sleep.

Leveraging playgroup support networks by facilitating conversations around child health behaviour challenges, meant that the group discussed strategies that were both practical, and that did not add to parental stress. As such, the barriers around stress and tiredness were addressed in the intervention via the underlying theme of “making parent’s life easier”. The delivery mode of group conversations in respect to the parenting challenges that caused parents’ stress (for example, fussy eating) enabled them to vocalise their frustrations, and gain validation as a parent. The facilitators in both trials guided the group to come up with solutions to the challenges raised, so that parents had specific autonomy promoting parenting strategies to try at home.

Research question 2: What do parents want in a parenting support and early childhood lifestyle program at playgroup?

Parents at the focus groups were generally open to the idea of a healthy lifestyle program, and they expressed a desire for strategies around fussy eating, limiting screen time and child sleep. They wanted a program to be delivered by a peer; a parent of young children who they could relate to, and who would understand their challenges as a parent. However, parents were concerned that such a program would impact on their playgroup time, undermine the reasons they came to playgroup, and disrupt the relaxed, unstructured environment. It was also apparent that there were a number of barriers to delivering an intervention in the playgroup setting, particularly in respect to noise, and the distractions associated with the children. As such, the intervention was designed to deliver what parents wanted, while addressing and minimising the barriers and parent concerns.

The intervention needed to be brief and flexible enough to fit the playgroup setting, and the busy, unstructured environment. This led to the decision to use the “healthy conversation” concept, in conjunction with signposting to further information and resources on each program topic. In order to leverage the support at playgroup and meet the request that the program be delivered by a peer, the conversations were facilitated by a parent of young children. A volunteer parent model was trialled but was found to be not feasible (discussed further in sub-section 7.2.2). However, the decision to use an external peer facilitator model in the second trial stayed true to the focus group parents’ preference for an intervention to be delivered by a parent peer. During the training of facilitators in both trials, the potential barriers at playgroup in respect to noise and competing activities was discussed. The external facilitators in the

second trial, in particular, were encouraged to assess each playgroup's environment upon arriving at the venue, and to discuss the best time and location with the lead parent at the playgroup. The need to be flexible and adaptable was one of the attributes required of applicants to the external facilitator position.

7.2.2 Evaluation of a healthy lifestyle intervention delivered to parents at playgroup

The intervention, developed as a result of addressing research questions 1 and 2, was evaluated in two trials. This section provides a summary of the outcomes from both trials. Process evaluation outcomes provided the answer to research question three, and the impact evaluation outcomes are discussed in respect to research questions four and five.

Research question 3: Is a child obesity prevention intervention for parents attending playgroup feasible and acceptable when delivered in the community playgroup environment?

The results of both trials indicated that the intervention was both feasible and acceptable when delivered by an external peer facilitator. Although a delivery model using a volunteer parent from each playgroup as facilitator was trialled, this option was not feasible, mainly due to the limited number of parents willing to volunteer to be facilitator. The results of the focus groups suggested that parents are time poor and under pressure from the many challenges associated with being a parent of a young child. It is, therefore, not surprising that parents were reluctant to take on the commitment of peer facilitator for their playgroup.

Based on the process evaluation results in both trials, it is evident that the intervention, which was based on the strong theoretical framework, based on Self-Determination Theory and Social Cognitive Theory, was acceptable and enjoyable for parents at playgroup. The program was successful in terms of participation rates, which were high at all sessions across all playgroups in Trial 2. Participation in the conversations was also high in one of the Trial 1 playgroups (100% at most sessions). Post-session feedback from parents during both trials was also mostly positive, although a few parents stated that noise was an issue at their playgroup. Parents at both trials enjoyed the group conversations and found both the discussions and facilitator's suggestions helpful. Therefore, it can be concluded that the delivery mode of a brief intervention using the healthy conversation concept (Barker et al., 2011) was

successful (both feasible and acceptable). The signposting concept, where referrals to further information and resources were provided to participants via email, was less successful. However, the way this information was disseminated may be the issue, rather than the concept itself. Although 71% of the 31 parents who responded to the final feedback survey enjoyed receiving the links, it is unclear how many received the emails or accessed the recommended resources on the internet. It appears that email may not be the ideal method of providing this information.

As with previous studies (Duncanson et al., 2014; Kuliukas et al., 2019), a key factor to the program's success in terms of feasibility and acceptability in the second trial was the recruiting of external facilitators, who were active listeners, and possessed the skills to quickly build rapport with the parents. The focus groups identified a number of barriers and challenges in respect to the playgroup setting, so it was not unexpected that both the internal (Trial 1) and external (Trial 2) facilitators encountered some issues in getting the group together and coping with noise and child distractions.

Research question 4: Can a healthy lifestyle intervention targeting parents attending community playgroup be effective in increasing parental self-efficacy in respect to autonomy promoting parenting practices?

The intervention had a significant positive impact on parental self-efficacy, particularly in respect to promoting fruit and vegetables (Trial 2). Although there were ceiling effects associated with the measurement tool for this outcome in both trials, there was indication that the program increased parenting confidence. There was some inconsistency in the results between the first and second trials in terms of which aspects of parental self-efficacy were increased, but considering the small numbers of participants and missing data in Trial 1, the results should be interpreted with caution. As such, a detailed comparison of results between the two trials would not be appropriate.

Interventions that involve small group discussions can enhance self-efficacy around healthy behaviours (Bridge et al., 2019). Allowing participants to determine their own priorities, and acknowledge that they are "experts" of their own situation, is also a key factor in building self-efficacy (Barker et al., 2011). As such, a number of aspects of the intervention in this current research were associated with increasing self-efficacy. Through peer-facilitated healthy conversations, parents were encouraged to

identify their personal priorities and goals for trying new parenting strategies (Jarman et al., 2019). Support from peers, the listening skills of the facilitators, and the approach of coming up with practical strategies that parents could try, are key to increasing parent confidence (Bridge et al., 2019).

Research question 5: Can a healthy lifestyle intervention targeting parents attending community playgroup be effective in improving parenting practices that support healthy development of obesity-related behaviours in young children?

There were positive indications of intervention effect in respect to parenting practices in the first trial. Previous studies evaluating interventions using healthy conversation skills to support healthy lifestyle behaviour change have resulted in favourable outcomes for mothers of young children (Barker et al., 2011), and during pregnancy (Jarman et al., 2019). Other interventions using similar group support strategies have reported limited success in changing parenting practices (Haines et al., 2016; Skouteris et al., 2016). However, these interventions were not delivered in existing community-based parent groups, and generally take more of an education approach in respect to encouraging responsive parenting practices (Hughes et al., 2020). The current intervention is unique in respect to the extent that existing support networks were utilised, along with an emphasis on participants developing solutions together, and then individual parents determining their own priorities and goals. Playgroup interventions leveraging the supportive environment of the existing parent group have shown positive results in terms of dietary outcomes of mothers (Jancey et al., 2014), and parenting responsivity (Hackworth et al., 2017).

7.3 STRENGTHS AND LIMITATIONS

7.3.1 Overall thesis strengths

This research has a number of strengths, both in terms of the way the intervention was developed and evaluated, and the underlying theoretical framework. Firstly, a major strength was the use of both SDT and SCT to inform the focus group conceptual framework and the intervention content and delivery. While there is evidence that the use of responsive parenting practices can reduce the risk of obesity in young children (Gerards & Kremers, 2015), this research integrated the SDT construct of autonomy promoting parenting (Ryan & Deci, 2017a), and applied it across *all four* child behavioural domains. In addition, the concerns discussed at the focus groups around

specific parenting practices in respect to each behavioural domain were directly targeted. This meant that the intervention topics resonated with the participants and they remained engaged throughout the program.

Secondly, the intervention was developed using the Intervention Mapping protocol (Bartholomew et al., 2016). This meant that the intervention design, implementation plan, and evaluation plan, all went through a rigorous process. This process incorporated evidence from the literature, applied a robust theoretical framework, and considered the needs of the end users. The intervention was conceived with the playgroup setting in mind, and co-designed with the peak body for playgroups in Queensland, and every barrier and concern raised by the playgroup parents at the focus groups was addressed. The program delivery mode mitigated many of the limitations around the playgroup setting, while leveraging the advantages associated with parent groups with existing social networks. Importantly, the key messages of the intervention aligned with playgroup values in respect to supporting children and families, nurturing child development, sharing experiences and ideas, and the concept of parents as first teachers (Playgroup Queensland, 2019a, 2019b).

Another strength of this study was the use of the peer facilitated healthy conversations model for the intervention delivery (Barker et al., 2011; Duncanson et al., 2014). This delivery mode was developed as a direct result of listening to the parents at the focus groups, who wanted a brief, informal, flexible program delivered by a peer. Not only was this format acceptable and feasible for the participants, this study adds to the current limited evidence around peer-led interventions, and builds on existing research around healthy conversation skills. Additionally, the peer facilitator model is sustainable. Future programs could source and train suitably experienced local playgroup facilitators from the same geographical location as the playgroups taking part in the program. As such, there would not be a reliance on researchers or health professionals to deliver the intervention and ensure fidelity.

The rigorous study design and the reporting of results according to CONSORT protocols was also a strength (Eldridge et al., 2016). The evaluation plan, in particular the process evaluation, was comprehensive, and mapped to the essential elements of the intervention (Moore et al., 2015). The second trial implemented the lessons learned from the first trial, while staying true to the focus group results.

7.3.2 Overall thesis limitations

There were some limitations to the research. The community playgroups that took part in the research were located in the greater Brisbane metropolitan area in south-east Queensland, Australia. Although there was no attempt to limit diversity in any way, the community playgroups from this urban environment were not particularly culturally or socio-economically diverse. As such, the generalisability of the program to rural, culturally, and linguistically diverse populations, playgroups for Indigenous families, and/or disadvantaged families, is unknown. However, PGQ, and similar lead organisations in other states, currently run programs that offer tailored support to these groups, in particular supported playgroups for disadvantaged populations.

There were a number of limitations associated with the evaluation instruments and data collection methods that impacted the amount and type of data collected. This limited the extent to which conclusions could be drawn, particularly around intervention impact. In terms of the process evaluation, distributing the feedback surveys via email immediately after each of the five sessions may have limited the number of responses received. There was a modest response rate (around 35%) to these surveys, but it is possible that five fortnightly surveys resulted in a heavy participant burden. In addition, the post intervention survey was sent to participants at the same time as the post-Session 5 feedback survey. This not only added to the burden, the two surveys possibly confused participants in respect to whether the multiple emails related to the same survey. Sending the survey links via email was also a limitation of this process, as it seemed that many participants did not check email regularly. In regard to participants who did not respond to any emails, it is unknown if they received them. However, this was mitigated to a large extent in the second trial in respect to the post-intervention surveys, as non-responders were able to be contacted by phone and text message. This greatly increased the amount of complete data available for analysis in Trial 2 (75% compared to 33% in Trial 1).

There were also limitations in respect to the choice of impact evaluation instruments. The development of healthy obesity-related child behaviours is the ultimate goal of an intervention targeting parenting practices. However, due to its pilot design, child behavioural outcomes were not measured in this study. In respect to parenting practices measured in the first trial, these items were self-reported, and responses may have been influenced by social desirability bias (Mâsse & Watts, 2013).

To minimise this potential bias, it was emphasised to the participants that the surveys were anonymous. In the second study, the decision to reduce the burden on participants by removing the parenting practice items meant that parenting practices outcomes were not evaluated. In addition, the parental self-efficacy measure was subject to ceiling effects. It also only measured confidence to achieve child behaviour outcomes, rather than confidence in implementing autonomy promoting parenting practices (Norman et al., 2018). For example, a parent may be confident that they can get their child to eat vegetables, but the item does not measure *how* the parent got the child to eat (i.e. whether the practice used was autonomy promoting). The instrument also did not include items measuring parental self-efficacy for supporting adequate, and/or regular, sleep.

Finally, the evaluation of the participant's engagement with the online resources provided via emailed links after each program session was limited. Participants were surveyed pre- and post-intervention on how often they searched online for information about the four healthy behaviour topics. The survey items did not specifically measure the accessing of, or engaging with, the online resources. The signposting to further intervention resources has been used in a variety of interventions (Griffin et al., 2017; McLeish & Redshaw, 2015; West Sussex County Council, 2018), but the concept was under-explored in this PhD research project.

7.4 FUTURE DIRECTIONS AND IMPLICATIONS FOR PRACTICE

7.4.1 Future directions

This PhD research project evaluated the feasibility and acceptability of a peer-led intervention, delivered in community playgroups, targeting obesity-related parenting practices. Based on the positive feasibility and acceptability results, and the promising impact evaluation results, further testing in a fully powered trial is warranted. Although the intervention was designed so it could be implemented in all community playgroups, its generalisability to playgroups servicing disadvantaged populations, and/or playgroups operating in rural and remote areas, is unknown. Therefore, future evaluation trials should include playgroups that service demographically and geographically diverse families.

7.4.1.1 Demographic, cultural, and geographic diversity

The community playgroup model has been adapted to include distinct groups for grandparents, fathers, educational philosophy, LGBTI families, and special needs or interests (McShane et al., 2016; Playgroup NSW, 2015; Playgroup Queensland, 2019b). Multi-lingual groups have also been established to promote languages other than English, and the values associated with that cultural heritage (Playgroup Australia, 2013). These playgroups offer unique support for families of similar traditions, so it is conceivable that, with appropriate adaptations, the intervention could be delivered in these playgroups. The peer facilitator model may even be more appropriate for these groups, given the obvious benefits associated with a facilitator that is familiar with the parenting culture of the parents.

Future trials should be conducted outside of the metropolitan area in regional, rural, and even remote areas. Playgroup attendance is higher in non-urban locations (34% in major cities, 38% in regional areas, and 43% in remote towns) (Gregory et al., 2017), so including playgroups in locations outside of capital cities is important. However, it is unknown whether the needs of parents or the dynamics of playgroups in these areas differ to the playgroups who took part in the current study. As part of future trials, further input from consumers, including focus groups with parents in areas targeted for future trials would be prudent. Finally, continued input from the peak bodies of playgroups in Australia, in terms of further program co-design, resource development, and program promotion, is essential.

7.4.1.2 Facilitator training

Further development of training content, resources, delivery mode, and ongoing support to facilitators is warranted. The consideration of flexible modes of training delivery is particularly important, as it is likely that program facilitators will have young children and associated challenges in respect to training attendance. Options for training could include providing pre-training materials, including the Facilitator Handbook, and a video giving an overview of the program. Training participants could therefore attend the training, already having a general understanding of the program content and the expectations of the facilitators. The face-to-face training could then focus more on scenario-based activities that allow facilitators to consider, and troubleshoot, potential barriers and challenges in respect to the environment and parent dynamics at individual playgroups. The current training time frame of four hours could

remain unchanged (or even shortened), but there would be more time for role-playing of facilitating conversations, as well as discussion of the intervention content. The current manuals were designed with space throughout for the facilitators to make their own notes, including how they could pose the starter questions in their own words, and potential strategies around the session topics (for example, their own ideas for active play). With more time for informal discussion during training, there would be more opportunity for facilitators to make personalised notes.

Training could also be provided online (via a platform such as Zoom video conferencing), particularly for playgroups in remote regional locations. Although this would not be ideal in terms providing a realistic role-playing scenario, it is a way to reach facilitators that may not be able to attend training in person, or as an adjunct to a brief face-to-face training session. Finally, short training videos could be made available on each session topic and in respect to group facilitation skills. A video of an actual session delivered at playgroup could also be provided as an exemplar. Some of these options could be trialled and evaluated via facilitator qualitative feedback (interviews and focus groups) as part of a future trial.

During both trials, facilitators were encouraged to contact the PhD candidate at any time if there were any aspects of the program or any challenges they wished to discuss. The PhD candidate also “checked in” with the facilitators regularly. In addition, during the second trial, the two facilitators kept in contact with each other, and were therefore each able to provide support. For a future trial, the support for the facilitators should be formalised. Options for this support could include a “closed” Facebook page for the facilitators, a regular online meeting using a video conferencing platform, a “booster” training session part-way through the program, and a “debrief” at the end of the program (Kuliukas et al., 2019; Thomson et al., 2015). A post-program meeting (in person or online) with facilitators would not only provide feedback that could highlight any need for minor program modifications, or improve the training for future facilitators, it would also directly benefit any facilitators who planned to deliver the program to other playgroups in the future (Morgan et al., 2016).

7.4.1.3 Signposting to additional resources

An important aspect to the brief intervention concept was the use of signposting to further information and services, and this warrants further development for future trials. The design of an evaluation tool specifically to measure its acceptability and

impact is also needed. While most of the post-session links provided strategies to support the use of autonomy promoting parenting practices, it is possible that the parents assumed the information was “education” focussed. To remedy this, the outcomes of the conversations after each session (i.e., the strategies identified by the group) could be posted onto Facebook or other social media channel by the facilitator, and made accessible to all parents, even those who were not in attendance on the day (Downing et al., 2017). The links to online information could also be provided via text message (R. Ball et al., 2017; Downing et al., 2018; Duncanson et al., 2014). In addition, rather than directing parents to information on existing websites, tailored information, including short videos, could be developed specifically for the intervention. This would have the added advantage of potentially using a medium within which views can be tracked.

Smartphone applications (apps) are also a potential medium that could be explored in future trials (Hingle & Patrick, 2016). Thousands of healthy lifestyle apps are available, and many target parents to provide information and support for healthy eating, weight loss, or increasing physical activity (Mateo et al., 2015; Mauch et al., 2018; Schoeppe et al., 2016). An app, developed specifically for the intervention, has potential, as it could be tailored to the program, its key messages, and provide support for playgroup parents (Mauch et al., 2018). An added advantage of a smartphone app over traditional websites, is that they are potentially more accessible for providing “in the moment” tips and strategies (Schoeppe et al., 2016).

7.4.1.4 Evaluation instruments and data collection

Evaluation instruments, particularly in respect to assessing intervention impact, need to be re-visited for future trials. Outcomes that align with the theoretical framework should be measured. This would include autonomy promoting parenting practices and parental self-efficacy in all four obesity-related behaviour domains. Measurement of child behavioural outcomes, including self-regulation, should also be considered in a larger trial.

The measurement of parenting practices presents challenges (Mâsse & Watts, 2013), and these have been highlighted in the limitations in respect to the current research (section 7.3.2). In addition, child behaviour outcomes were not measured for this study, so the effects of the intervention on child eating behaviour, physical activity, screen time, and sleep should be measured in future trials. Given that a barrier to the

use of autonomy promoting parenting practices identified in the focus groups was tiredness, and other “momentary” barriers, such as time, frustration, and stress, there is also a need to measure the use of parenting practices in a more context-specific way (Loth, 2018). Food parenting practices, for example, “fluctuate over time and context” (Berge et al., 2017; Loth et al., 2018). Ecological Momentary Assessment tools that capture the context of the parenting situation may be particularly appropriate for this task (Mâsse & Watts, 2013). A more practical solution, particularly in the shorter term, may be the development of a short-form tool that measures key autonomy promoting parenting practices across multi-behavioural domains. Finally, the instrument measuring parental self-efficacy was subject to ceiling effects so the development of a new measurement scale that captures self-efficacy perceptions in relation to the use of autonomy promoting parenting practices associated with healthy eating, screen time, physical activity, and sleep, is required.

The methods of data collection, and the number of surveys the study participants are asked to complete, should also be re-considered for future trials. The dissemination of surveys via email had its limitations. In addition, the number of surveys parents were asked to complete for the process evaluation may have added to participant burden unnecessarily. Although the post-session surveys were designed to obtain feedback on the specific session topic, a more comprehensive single post-program survey is likely to be more appropriate. Most of the written comments received on the surveys related to the facilitators, delivery mode or environmental challenges, rather than comments on the topic content. As such, the benefits of a single, post-intervention process evaluation survey may outweigh any disadvantages of less timely feedback. In addition, incorporating the feedback surveys into the app described above, or as part of other online media developed for the intervention, may be a further solution to increasing response rates.

A separate issue was the loss to follow-up in respect to impact evaluation. While there was a high response rate for the second trial (75% of participants with complete data), this may have been achieved at the expense of parenting practices data. A short tool, as proposed above, would mitigate this issue, but the method of survey administration would also need to be considered. The use of phone calls and text messages was successful in increasing the response rate of the surveys in the current trial. However, this was time consuming for the PhD candidate and, although text

messaging could be automated, phone calls and/or personalised messages to participants are likely to be impractical for a fully powered trial with a greater number of participants. As such, data collection strategies are needed that encourage participants to complete surveys either without the need for reminders, or with a reminder functionality that is automated as well as effective. Finally, the use of paper-based surveys significantly increased (doubled) the data collected at baseline. So, this method could be also used for the survey administration. Peer facilitators could ask parents in attendance at the final session to complete the paper-based survey.

7.4.2 Implications for practice

7.4.2.1 Interventions at playgroups

Several small qualitative studies and intervention trials have been conducted in Australian playgroups, although most were conducted in supported playgroups (Section 2.4.1). The results from the trials within this thesis adds to the existing evidence that interventions delivered to parents at playgroup are in the unique situation of being able to leverage the social support already existing in the playgroup environment. However, there are some barriers to delivering interventions at playgroup that need to be factored into programs run in this setting. Importantly, each playgroup has its own unique environment and dynamics, so a “one size fits all” approach should be approached with caution.

The common challenges around noise and child distractions must be addressed with any intervention design. An important factor for a program delivered in community playgroups specifically is that parents primarily come to playgroup for the unstructured, relaxed environment. Reasons parents attend playgroup include social interaction with other parents, guidance from other parents, social interaction for their child, and “time out” for themselves. Interventions delivered at community playgroups must work within this paradigm and cannot undermine the reasons parents come to playgroup. In addition, although it is possible that children could be supervised by a parent while other parents participated in a program, this option did not appeal to the focus group parents, so it was not included in our study design (Section 3.2.3.3).

7.4.2.2 Scaling up of the intervention

If further testing supports the efficacy and effectiveness of the intervention, the next step would be a scale up of the program at the population level (Rychetnik et al.,

2012). Strong partnerships with local playgroup providers are essential for program scale-up (Laws et al., 2016). With the continued support of PGQ and the playgroup peak bodies in other Australian states and territories, the program could be made available to all community playgroups across Australia. The intervention was designed to be generic and thus applicable to any community playgroup. However, there are some aspects of the program that may need further consideration, particularly when implementing the program to culturally and linguistically diverse, or remote rural and regional locations (Love et al., 2019). However, any adapting of the program to specific circumstances as part of the translation process will need to be balanced with program fidelity (Laws et al., 2016). As such, additional consultation and formative research with these populations would be prudent. If the external peer facilitator model is shown to be feasible and efficacious in larger trials, consideration will also need to be made to how the employment of these facilitators will be funded. Partnerships with playgroup peak bodies, local councils, and state governments are all possibilities for program funding that could be explored, including “in kind” contributions of human or other program resources, such as facilitators, training platforms, and training venues (Laws et al., 2016).

7.4.2.3 Other delivery models

The intervention evaluated in the current study used a peer facilitated model with brief face-to-face small-group discussions. While the “in person” group conversation is the foundation of the intervention, other delivery modes of the intervention itself could be considered (Morgan et al., 2016). This could include online Zoom discussions, either outside playgroup time, or via Zoom at playgroup, so that those at home could participate. At the focus groups, parents stated they were often not able to attend due to a sick child, so this may be an option for some playgroups. The COVID-19 pandemic in 2020 is another example of when an online meeting could have been used to deliver the program when playgroups were not operating. Further to the use of a smartphone app for providing post-session information and support, an mHealth version of the intervention could be developed (Helle et al., 2019; Laws et al., 2018). Other delivery models could also be considered. At the focus groups, parents offered several options for how often they would like the sessions to occur, ranging from weekly to monthly, and how many sessions were preferred. Future trials could consider

whether the current fortnightly model works or if other options such as weekly or monthly may be more appropriate.

7.5 CONCLUSION

This PhD research provides the evidence for community playgroups as a setting for interventions aimed at promoting autonomy promoting parenting practices in Australia. Community playgroups are culturally, geographically, and demographically diverse, and are accessible to families across all areas of Australia. They are places of social support and peer guidance, and they endorse and cultivate the concept of parent as first teacher. This research demonstrated that the playgroups are well suited for brief interventions using a peer-facilitated healthy conversation model of delivery. Parents want support and suggestions to help with challenging child healthy lifestyle behaviours, but they also want to determine their own family priorities. They don't want to be educated on how to parent. The intervention co-design approach with the key stakeholder was crucial to the success of the intervention, along with focus groups with parents at playgroup. The intervention not only stayed true to what parents wanted, the learnings from the first trial were used to make successful changes in the second trial.

The research primarily tested feasibility and acceptability of the intervention, but there were also indications that the intervention can be beneficial to parenting practices and parental self-efficacy. The community playgroup setting presents several challenges, not least because no playgroup is the same in terms of layout, size, or parent dynamics. But, despite the noisy, unstructured, and often chaotic environment, these barriers were addressed in the intervention developed and evaluated in this thesis. Based on the research in this thesis, a peer led intervention, delivered in community playgroups, targeting parenting practices associated with healthy eating, screen time, physical activity, and sleep is worthy of a further examination in a fully powered, cluster randomised controlled trial. Finally, it provides a robust starting point for further obesity prevention research in the community playgroup setting, as well as other jurisdictions with similar parent group formats to the community playgroup model.

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Appendices

Appendix A - Interventions in preschools and childcare centres – no parent involvement

Intervention (Country) (Reference)	Type of Study ^a	Theoretical Framework ^b	N	Age	Setting and Length of Intervention	Type of intervention	Outcomes targeted * = outcome measured	Data Collection Points	Intervention Effects	
									Diet and/or eating	PA
Jump Start (Australia) (Jones et al., 2016)	RCT	SCT	4 centres	3-5 yrs	Early childhood centres	Physical activity program for developing gross motor skills.	PA at childcare + Gross motor skills*	Pre and post intervention	— PA	↑ gross motor skills
Munch and Move (Australia) (Hardy et al., 2010)	Cluster RCT	N/A	430	Mean 4.4 yrs	Preschools and Childcare 6 mths	Curriculum and policy-based. Upskill of staff. Includes lunch box audit of SSB	Y* Movement Skills*	Pre and post intervention	↓↓ SSB ^c	↑↑
Move and Learn (USA) (Trost et al., 2008)	RCT	N/A	1 centre; 4 classes	3-5 yrs	Preschools 8 weeks	Integration of PA program into curriculum	Classroom MVPA ^{c*}	Pre and post intervention		↑↑
Baby Nutrition & PA Self-Assessment for Childcare (USA) (Benjamin Neelon et al., 2014)	RCT	N/A	32 centres	<2yrs	Childcare 6 mths	Assessments and improvements to childcare centre nutrition and PA policies and practices and education re infant & toddler feeding and physical activities	Y*	Pre and post intervention	↑	↑↑
Food Friends (USA) (Johnson et al., 2007)	NonRT	Social Marketing	46	3-5 yrs	Head Start Preschools 12 weeks	Preschool program to encourage children to try new foods	Y*	Pre and post intervention & 10-day f/up	↑↑ (novel food item)	

Intervention (Country) (Reference)	Type of Study ^a	Theoretical Framework ^b	N	Age	Setting and Length of Intervention	Type of intervention	Outcomes targeted		Intervention Effects			
							* = outcome measured		Data Collection Points	↑ small or non-significant increase; ↓ small or non-significant decrease; ↑↑/↓ significant effect	— no intervention effect	PA
							Diet and/or eating	PA				
Healthy Kansas Kids (USA) (Trost et al., 2011)	Pre-post	N/A	236 FCCH	<5yrs	Family Child Care Homes (FCCH) 1 year	Train-the-trainer program for childcare trainers. Trainers then completed site visits to support nutrition & PA policies and practices in FCCH	Y*	Y*	Pre and post intervention	↑↑	↑↑	↑↑
Healthy Start (USA) (Williams et al., 2002)	RCT	N/A	9 centres	2-5 yrs	Head Start Preschools	Food service intervention with without nutrition education.	Y*	Y*	Baseline, 1 yr and 2 yrs	↓↓ fat & saturated fat		
Tiger Kids (Germany) (Herbert et al., 2013)	Cluster RCT	SLT	215 centres	Not stated	Kindergartens 3 yrs	Physical activity program. Daily fruit and vegetable preparation by children, healthy eating games	Consumption of FV at kindergarten*	Consumption of PA at kindergarten*	Pre and post intervention	↑		↑

^aPre-post = intervention study with no control group; NonRT = non-randomised trial (intervention study with a control group); RCT = Randomised Controlled Trial

^bSCT = Social Cognitive Theory; SLT = Social Learning Theory; N/A = not applicable or none evident

^cMVPA = Moderate to vigorous physical activity; SSB = Sugar-sweetened beverage intake

Appendix B – Interventions in preschools and childcare centres – some parent involvement

Intervention (Country) (Reference)	Type of Study ^a	Theoretical Framework ^b	N	Age	Setting and Length of Intervention	Overview of intervention	Parent Involvement	Child behaviours targeted * = outcome measured			Intervention Effects ^c		
								Diet and/or eating	PA	E M Use	Diet and/or eating	PA	E M Use
								Points	Points	Points	Points	Points	Points
Tooty Fruity Veggie (Australia) (Zask et al., 2012)	Cluster RCT	Health Belief Model + Competence Motivational Therapy	560	3-6 yrs	Preschools 10 mths	Policies re lunchboxes. "Fun Moves" PA program twice a week.	Parent workshops and newsletters	Y*	Movement skills*	Y*	PA	E M Use	↑ small or non-significant increase; ↓ small or non-significant decrease; ↑/↓/↔ significant effect — no intervention effect
Balabeina Study (Switzerland) (Puder et al., 2011)	Cluster RCT	Socio-ecological model	652	Mean 5 yrs	Preschool 1 school year	PA program to increase child fitness and motor skills + child education on nutrition, media use and sleep	3 information sessions re promotion of PA, healthy food, limit TV, & importance of sleep	Y*	Fitness & motor skills*	Y*	PA	E M Use	↑
Education intervention (Columbia) (Céspedes et al., 2013)	Cluster RCT	SCT & Trans theoretical model	1216	3-5 yrs	Preschool 5 mths	Education program for children on importance of healthy eating and PA	Healthy Family Day workshop and weekly health information and activities	Y*	Knowledge, attitudes and habits*	Y*	PA	E M Use	↑
Hip-Hop to Health Jnr (USA) (Fitzgibbon et al., 2011; Kong et al., 2016)	Cluster RCT	SCT, SDT & Stages of Change	618	3-5 yrs	Head Start Preschools 14 weeks	Healthy eating and PA curriculum. Classroom cooking and food tasting	Newsletter and "homework" for parents and twice weekly aerobics class	Y*	Y*	Y*	PA	E M Use	↑↑ (post intervention only – not measured at follow up)
Movement & Activity Glasgow Intervention in Children (MAGIC) (Scotland) (Reilly et al., 2006)	Cluster RCT	N/A	545	Mean 4.2 yrs	Preschool 24 weeks	PA program = 3 X 30 minute sessions per week for 24 weeks Posters displayed	Resource pack of materials re info on PA at home	Y*	Y*	Y*	PA	E M Use	—

Intervention (Country) (Reference)	Type of Study ^a	Theoretical Framework ^b	N	Age	Setting and Length of Intervention	Overview of intervention	Parent Involvement	Child behaviours targeted * = outcome measured			Intervention Effects ^c			
								Diet and/or eating	PA	E M Use	Data Collection Points	Diet and/or eating	PA	E M Use
Preschoolers in the Playground (PIP) (UK)	Cluster RCT	SCT	164	18 mths to 4 yrs	Preschool 52 weeks	Outdoor PA program: 6 x 30min sessions pw	parents encouraged to attend 3 sessions pw for 30 weeks	Y*	Y*	Y*	Y*	—	—	—
(Barber et al., 2016)														
Study of Kids in Preschool (SKIP) (UK)	Cluster RCT	SCT	36	3-5 yrs	Preschools 5 mths	5 monthly sessions aimed at increasing PA and healthy eating	Introductory session & monthly meeting (individual or group according to preschool preference)	Y	Y	Y	Y	Pre and post intervention	Pre and post intervention	—
(McSweeney et al., 2017)						Activities such as fruit tasting, healthy eating games, physical activities.	Newsletters with diet & PA tips + strategies for goal setting, monitoring & planning							
Educational intervention to promote healthy lifestyles in preschool children (Italy)	Cluster RCT		425	3yrs	Childcare centres 6 mths	Educational intervention ("learning experiences" 1 hr/day) to promote FV, active play, limit screens, nil SSB	Parents received 2 motivational interviews from a nurse and a paediatrician to encourage child healthy behaviours at home.	Y*	Y	Y	Y	Baseline, 1-year & 2-year follow up	↑↑FV ↓↓SSB	↑ ↓
(Iaia et al., 2017)						Leaflet and manual. Book lending (to decrease TV viewing at home)								
Healthy Caregivers Healthy Children (USA)	RCT	Role modelling	1211	Mean 11 mths	Childcare Centres 1 year	Changes to childcare drinks, snack, PA & screen time policy & curriculum.	Group nutrition program (where importance of role modelling was promoted)	Y*	Y	Y*	Y*	Pre and post intervention	— FV (but controls ↓ FV) ↓ ED (controls ↑)	↓
(Natale, Messiah, et al., 2014)						Group nutrition program for teachers								

Intervention (Country) (Reference)	Type of Study ^a	Theoretical Framework ^b	N	Age	Setting and Length of Intervention	Overview of intervention	Parent Involvement	Child behaviours targeted			Intervention Effects ^c			
								* = outcome measured			Data Collection Points	↑ small or non-significant increase; ↓ small or non-significant decrease; ↑↑/↓↓ significant effect — no intervention effect		
								Diet and/or eating	PA	E M Use		Diet and/or eating	PA	E M Use
EPIPOI (France) (Jourret et al., 2009)	RCT	None stated	1253	3-4 yrs	Preschool 10 sessions over 1 year	Classroom sessions on healthy eating and the importance of PA	Nutrition and PA information packs provided to parents	Y	Y	Y	Baseline and after 2 years	—	—	—
Healthy Inside-Healthy Outside (HIHO) (USA) (Natale, Lopez-Mitnik, et al., 2014)	RCT	Socio-ecological model	307	2-5 yrs	Childcare 6 mths	Based on Hop to Health preschool curriculum, including teacher training (Fitzgibbon et al., 2002) Policy level change (e.g. healthy meals at childcare)	Parent encourages to introduce new foods, model healthy eating, increase PA and decrease TV via monthly education dinner, newsletters & home activities	Y	Y*	Y*	Pre and post intervention	— (home)	—	↑ (childcare)
Nutrition & PA Self-Assessment for Childcare (NAPP SACC) (USA) (Bonis et al., 2014)	RCT	N/A	209	3-5 yrs	Childcare 7 mths	Educational workshops for childcare providers on nutrition & PA	Information re nutrition and PA recommendations at home	Y	Y*	Y*	Pre and post intervention	↑↑	—	—
Nutrition & PA Self-Assessment for Childcare (NAPP SACC) (USA) (Alkon et al., 2014)	RCT	N/A	552	3-5 yrs	Childcare 6 months	Educational workshops for providers on nutrition & PA Visits by healthcare consultant. Changes to nutrition & PA policies	“Raising Healthy Kids” workshop at 7 of the 9 intervention childcare centres. Posters and information sheets.	Y	Y	Y	Pre and post intervention	—	—	↓

Intervention (Country) (Reference)	Type of Study ^a	Theoretical Framework ^b	N	Age	Setting and Length of Intervention	Overview of intervention	Parent Involvement	Child behaviours targeted * = outcome measured			Intervention Effects ^c		
								Diet and/or eating	PA	E M Use	Diet and/or eating	PA	E M Use
Nutrition education program (Germany) (De Bock et al., 2011)	RCT	SLT & Zajonc's exposure effect	348	3-6 years	Preschool 15 sessions over 6 mths	Aimed to increase fruit and vegetable consumption via 10 preschool sessions & repeatedly offering new foods during preschool	3 nutrition education sessions 2 parent & child sessions preparing FV snacks & baking	Y*			Baseline, 6 mths and 12 months	↑↑ FV — SSB	—
Family Fun with New Foods (USA) (Bellows & Anderson, 2006)	Pre-post	SLT & Social Marketing	26	3-5 yrs	Preschool 12 weeks	Preschool program to encourage children to try new foods (as per Food Friends (Johnson et al., 2007))	Parents encouraged to offer new foods to child via educational handouts containing tips, recipes & food activities	Y			Post intervention		

^aPre-post = intervention study with no control group; RCT = Randomised Controlled Trial

^bSCT = Social Cognitive Theory; SLT = Social Learning Theory; SDT = Self-Determination Theory; N/A = not applicable

^cFV = Fruit and Vegetable intake; SSB = Sugar-sweetened beverage intake; ED = Energy Dense foods intake

Appendix C – Ethics approval for focus group study



University Human Research Ethics Committee (UHREC)
HUMAN RESEARCH ETHICS APPROVAL CERTIFICATE
NHMRC Registered Committee Number EC00171

Date of Issue: 27/3/20 (supersedes all previously issued certificates)

Dear Prof Stewart Trost

This approval certificate serves as your written notice that the proposal has met the requirements of the *National Statement on Ethical Conduct in Human Research* and has been approved on that basis. You are therefore authorised to commence activities as outlined in your application, subject to any specific and standard conditions detailed in this document.

Project Details

Category of Approval: Negligible-Low Risk
Approved From: 15/11/2017 **Approved Until:** 15/11/2020 (subject to annual reports)
Approval Number: 1700001031
Project Title: Development of an intervention pilot group program targeting parenting practices associated with obesity-related behaviours in young children attending playgroup

Investigator Details

Chief Investigator: Prof Stewart Trost

Other Staff/Students:

Investigator Name	Type	Role
Mrs Andrea Fuller	Student	Doctoral (Research)
Dr Rebecca Byrne	Internal	QUT Associate Supervisor
Dr Rebecca Golley	External	External Associate Supervisor

Conditions of Approval

Specific Conditions of Approval:

No special conditions placed on approval by the UHREC. Standard conditions apply.

Conditions of Approval:

1. Conduct the project in accordance with the principles of the NHMRC National Statement on Ethical Conduct in Human Research 2007, the Australian Code for the Responsible Conduct of Research, any additional specific conditions defined by the UHREC, any associated NHMRC guidelines and regulations, and the provisions of any legislation which is relevant to the project;
2. Conduct the project in accordance with the standard and any additional specific conditions defined by the HREC, the principles of the NHMRC National Statement
3. Obtain any additional approvals or authorisations as required (e.g. from other ethics committees, collaborating institutions, supporting organisations);
4. Maintain research records and data in accordance with MoPP D/2.8 Management of research data.
5. Respond promptly to the requests and instructions of UHREC;
6. Declare all actual, perceived or potential conflicts of interest (NS 5.4);
7. Immediately advise the Office of Research Ethics and Integrity (OREI) of any concerns, complaints or adverse events including (NS 5.5.3):
 - o if any unforeseen development or events occur that might affect the continued ethical acceptability of the project;
 - o if any complaints are made, or expressions of concern are raised, in relation to the project;
 - o if the project needs to be suspended or modified because the risks to participants now outweigh the benefits;
 - o if a participant can no longer be involved because the research may harm them.
8. Report on the progress of the project at least annually, or at intervals determined by UHREC (NS 5.5.5);

If any details within this Approval Certificate are incorrect please advise the Research Ethics Advisory Team immediately.

End of Document


Appendix D – Focus Groups Topic Guide

Thanks for coming along today. We're here to talk about what kind of information and support parents want about their child's health. I'm going to ask questions about food, active play, screen time and sleep. You don't have to answer a question if you don't want to, but I am hoping we can bounce some ideas around as a group and you can tell me what you think.

Focus group question	Prompts
Can you tell me what you enjoy about coming to playgroup?	<p>How is the playgroup run?</p> <p>What do you like about playgroup?</p> <p>What do you get out of playgroup?</p>
Where do you get information about healthy child behaviours?	<p>Food, eating</p> <p>Active play / energetic play</p> <p>Screen time (TV, iPads, computers, hand-held games)</p> <p>Child development / parenting</p> <p>How do you know if the information is reliable?</p> <p>Have you been to any programs run by playgroups?</p> <p>Have you been to any programs for parents outside playgroup?</p>
What barriers do you face when it comes to encouraging healthy behaviours in your child?	<p>What food to provide / How much to provide?</p> <p>Are there any foods or drinks that concern you or that you try to limit? Do you find it hard to limit these foods?</p> <p>What influences the type of food and drink?</p> <p>What is it about your child that influences what you feed them?</p> <p>Being active enough</p> <p>Limiting screen time</p> <p>Getting sufficient sleep and a regular bedtime</p> <p>Barriers that impact across all 4 behaviours</p>

Focus group question	Prompts
<p>What things are helpful when it comes to encouraging healthy behaviours in your child?</p>	<p>What tips and strategies work when it comes to influencing:</p> <p>What and how much your child eats?</p> <p>What they play?</p> <p>How much they watch TV or use electronic devices?</p> <p>When they go to bed?</p> <p>Things that influence all 4 behaviours?</p> <p>What information do you want or need about your child's: food and eating behaviours? PA? Screen time? Sleep?</p> <p>Do you find discussing concerns around your child's health or behaviours with other parents helpful?</p> <p>What type of parenting information or strategies would be helpful to you?</p>
<p>How do you think a healthy lifestyle program at playgroup could work?</p>	<p>How could it be run in playgroup time?</p> <p>What issues might there be in running a program for parents at playgroup?</p> <p>What would work well?</p> <p>How could it be incorporated into the playgroup schedule?</p> <p>Would it be better to run it separately from your usual playgroup time slot?</p> <p>Who should deliver the program? A parent? Health professional?</p> <p>Would you prefer weekly or fortnightly or some other timeframe?</p> <p>What format would be ideal for supporting information (hard copy, website or app)?</p>

Appendix E – Ethics approval for randomised controlled trial

	<p>University Human Research Ethics Committee (UHREC) HUMAN RESEARCH ETHICS APPROVAL CERTIFICATE NHMRC Registered Committee Number EC00171</p>
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Date of Issue: 21/2/19 (supersedes all previously issued certificates)

Dear Prof Stewart Trost

This approval certificate serves as your written notice that the proposal has met the requirements of the *National Statement on Ethical Conduct in Human Research* and has been approved on that basis. You are therefore authorised to commence activities as outlined in your application, subject to any specific and standard conditions detailed in this document.

Project Details

Category of Approval:	Negligible-Low Risk		
Approved From:	20/02/2019	Approved Until:	1/03/2021 (subject to annual reports)
Approval Number:	1900000011		
Project Title:	Evaluation of an intervention targeting parenting practices associated with obesity-related behaviours in young children attending playgroup		

Investigator Details

Chief Investigator:	Prof Stewart Trost		
Other Staff/Students:			
Investigator Name	Type	Role	
Mrs Andrea Fuller	Student	Doctoral (Research)	
Dr Rebecca Byrne	Internal	QUT Associate Supervisor	
Dr Rebecca Golley	External	External Associate Supervisor	

Conditions of Approval

Specific Conditions of Approval:
 No special conditions placed on approval by the UHREC. Standard conditions apply.

- Standard Conditions of Approval:**
1. Conduct the project in accordance with the principles of the NHMRC National Statement on Ethical Conduct in Human Research 2007, the Australian Code for the Responsible Conduct of Research, any additional specific conditions defined by the UHREC, any associated NHMRC guidelines and regulations, and the provisions of any legislation which is relevant to the project;
 2. Obtain UHREC approval for any proposed variation to the project prior to implementation (note that major changes may require a different level of review and/or submission of a new application);
 3. Obtain any additional approvals or authorisations as required (e.g. from other ethics committees, collaborating institutions, supporting organisations);
 4. Maintain research records and data in accordance with MoPP D/2.8 Management of research data.
 5. Respond promptly to the requests and instructions of UHREC;
 6. Declare all actual, perceived or potential conflicts of interest (NS 5.4);
 7. Immediately advise the Office of Research Ethics and Integrity (OREI) of any concerns, complaints or adverse events including (NS 5.5.3):
 - o If any unforeseen development or events occur that might affect the continued ethical acceptability of the project;
 - o If any complaints are made, or expressions of concern are raised, in relation to the project;
 - o If the project needs to be suspended or modified because the risks to participants now outweigh the benefits;
 - o If a participant can no longer be involved because the research may harm them.
 8. Report on the progress of the project at least annually, or at intervals determined by UHREC (NS 5.5.5);
 9. Participate in project monitoring activities in accordance with MoPP D/2.4 Monitoring of research approved by a University

If any details within this Approval Certificate are incorrect please advise the Research Ethics Advisory Team immediately.

End of Document

Appendix F – Facilitator training agenda

Supporting Parenting at Playgroup – Training

9.30am to 2pm (4 hours + 30 minute break)

9:30	Welcome Attendees introduce themselves (name, playgroup) Overview of today's training session: how it will work, including practicing with PGQ staff The handbook (layout and space for your notes) Overview of the intervention 5 sessions x 2 conversations Role of the facilitator (before, during and after the session) Outline of the topics	20 mins
9:50	Explain concept of open questions and listening Demonstration using open questions (Andrea to ask Maree about a challenging situation - open and closed questions) Attendees to notice open and closed questions Group discussion – what they noticed. What happened when asked a closed question?	20 mins
10:10	Activity 1 Each attendee practices using an open question with Andrea (other attendee observes) for 3-5 minutes Swap and repeat Attendee 1 asks Attendee 2 a question Attendee 2 asks Attendee 1 a question	30 mins
10:40	General principles of facilitating a group conversation How to guide the conversation to solutions How to encourage attendees to pick a strategy and turn it into a goal	20 mins
11:00	<i>Session 1 – Reducing stress at mealtimes*</i>	10 mins
11:10	Demonstration of a group conversation (whole group takes part, facilitated by Andrea) Conversation starter question: <i>Session 1 – conversation 1</i>	15 mins
11:25	Activity 2 Practice facilitating group conversations (5 minutes each)	20 mins
11:45	Activity 3 Volunteer 1 to facilitate group conversation with extra participants from PGQ Conversation starter question: <i>Session 1 – conversation 2</i> Feedback to volunteer	15 mins
12:00	Lunch break	30 mins
12:30	<i>Session 2 – Limiting Screens*</i>	10 mins
12:40	Activity 4 Volunteer 2 to facilitate group conversation Conversation starter question: <i>Session 2 – conversation 1</i> Feedback to volunteer	15 mins
12:55	<i>Session 3 – Supporting movement skills*</i>	10 mins
1:05	Activity 5 Volunteer 3 to facilitate group conversation Conversation starter question: <i>Session 3 – conversation 1</i> Feedback to volunteer	15 mins
1:20	<i>Bedtime routines & activities*</i>	10 mins
1:30	Activity 6 Volunteer 4 to facilitate group conversation Conversation starter question: <i>Session 4 – conversation 1</i>	15 mins

	Feedback to volunteer	
1:45	<i>Session 5 – Final session (Celebrating Achievements) and wrapping up the program*</i>	10 mins
1:55	Facilitating group conversations – some final tips Further help – study contacts, attendee issues out of scope Any final questions?	5 mins
2:00pm	End of Session	

* For each Session – run through the handbook for that section and encourage attendees to state how they would word this, and to take notes on what they would say.

Activity 1 – Conversation questions

What do you do to keep your children occupied in the school holidays?

Why did you decide to volunteer as a facilitator for your playgroup?

What do you like about going to playgroup?

Activity 2 – Conversation questions

What types of foods do you enjoy cooking?

How do you encourage your child to try new foods?

What are your go-to meals when you are pushed for time or haven't had time to go shopping?

For these activities, facilitators can use their own words as noted in their workbooks

Activity 3 – Conversation question

One of the biggest frustrations as a parent is that children turn their nose up at a new or disliked food.

You put all that effort into preparing and cooking the meal, and then they say “yuck” without even trying it. What is everyone else's experience?

Activity 4 – Conversation question

When we talk about screen use in young children, this usually means TV, iPads and games on phones and computers. We know children shouldn't be spending hours on these devices, but technology is everywhere, including schools. These devices are so handy, but parents in the focus groups said there are times when we give them to our children when we don't really want to. What are some of the times you allow screens, *but wish you didn't?*

Activity 5 – Conversation question

When people think about physical activity, they often think of things like organised sports, going to the gym, walking, or an organised game. When you think about physical activity and your child – what does it mean to you?

Activity 6 – Conversation question

One thing that almost all parents have in common is challenges in respect to child sleep. At the focus groups lots of mum's commented that they had tried everything, but nothing worked. Some parents had even sought help from professionals, but still didn't find that a great help. What are the challenges you face in respect to your child's sleep?

Appendix G – Facilitator training feedback survey – Trial 1

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Page 1 of 1

Facilitator Post Training

Please complete the survey below.

Thank you!

1) Name _____

2) Date of training _____

	1 = Strongly disagree	2 = Disagree	3 = Neither agree nor disagree	4 = Agree	5 = Strongly agree
3) I feel equipped to deliver the program at my playgroup as a result of the training	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4) The duration of the training course was appropriate (4 hours)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5) The location of the training was convenient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6) The mode of delivery of the training was appropriate (face to face, in person)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7) The practical role play activities were enjoyable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8) The practical role play activities aided my learning	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9) We are considering incorporating online training in future trials. What would your suggestion/preference be? Please choose all that apply

Online training (self guided)

Face to face training in person

Face to face training via video link (e.g. Zoom meeting)

Pre-reading of handbook before attending face to face training


10) Do you have any other suggestions to improve future training sessions?

19/02/2020 17:24

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Appendix H – Participant information sheet and consent form

	PARTICIPANT INFORMATION FOR QUT RESEARCH PROJECT – Program participant –
Evaluation of an intervention targeting parenting practices associated with obesity-related behaviours in young children attending community playgroups	
QUT Ethics Approval Number 190000011	

RESEARCH TEAM

Principal Researcher:	Mrs Andrea Fuller	PhD student
Associate Researchers:	Professor Stewart Trost	Principal Supervisor
	Dr Rebecca Byrne	Associate Supervisor
School of Exercise and Nutrition, Faculty of Health		
Queensland University of Technology (QUT)		
	Associate Professor Rebecca Golley	External Supervisor
College of Nursing & Health Services, Flinders University (Flinders)		

DESCRIPTION

This research project is being undertaken as part of a PhD study by Andrea Fuller.

The purpose of this research project is to trial and evaluate a playgroup parent intervention that was developed from information received from focus groups that were conducted at a number of playgroups in Brisbane in May 2018.

You are invited to participate in this research project because you attend a playgroup that has expressed an interest to take part in the trial.

PARTICIPATION

Your participation will involve taking part in a 10 week parenting support intervention to be conducted at your playgroup at the usual playgroup time. There are a total of 5 sessions to be run fortnightly over the 10 weeks. You may attend any or all of the 5 sessions. During each session there will be 3 mini-sessions of approximately 15 minutes each, spread over your usual playgroup 2-hour session. Each mini-session will consist of a discussion/conversation with other participants on a particular parenting topic, facilitated by a trained peer facilitator. Topics will centre on parenting practices in respect to your child's eating, physical activity, screen time and sleep.

The program will be facilitated by a volunteer parent from your playgroup. Please refer to the Facilitator Information Sheet and/or contact the researcher if you would like to discuss volunteering for the role of program facilitator for your playgroup.

Once sufficient playgroups and participants have been recruited to take part in the research, playgroups will be randomized into either intervention or control groups. Playgroups in the intervention group will receive the intervention in Term 2, 2019 (commencing in the week of 23 April or 29 April 2019). Playgroups in the control group will receive the intervention in Term 3, 2019 (commencing in the week of July 15 or July 22, 2019).

Participants in both groups will be asked to complete an anonymous survey about their confidence in respect to some aspects of parenting (for example, dealing with fussy eating), and also their parenting practices in respect to their child's eating, physical activity and sleep. All participants will be asked to complete the same survey twice. Once in April 2019, and again in June 2019. This survey is expected to take 10-15 minutes to complete.

The questions are answered on a scale, ranging from, for example, "almost always" to "almost never". Questions may include:

1. How certain are you that you can limit your child's screen time?
2. How often do you encourage your child to eat everything on their plate?

For those in the intervention groups, participation will also involve completing a number of brief, anonymous feedback surveys about your experiences in taking part in the program. Questions will relate to what you liked or did not like about the program. They will be completed online and are expected to take 2-3 minutes to complete.

Your participation in this research project is entirely voluntary. If you agree to participate you do not have to complete any question(s) you are uncomfortable answering. Your decision to participate or not participate will in no way impact upon your current or future relationship with QUT, Flinders, or your playgroup, or Playgroup Queensland. If you do agree to participate you can withdraw from the research project or the playgroup program during your participation without comment or penalty. Any identifiable information already obtained from you will be destroyed.

EXPECTED BENEFITS

It is expected that this research project may directly benefit you as part of your participation in a program that offers parenting support and strategies in respect to parenting practices around your child's eating, physical activity, screen time and sleep.

RISKS

There are minimal risks associated with your participation in this research project. These include discomfort you may feel in participating in a group discussion and/or completing the surveys.

QUT provides for limited free psychology, family therapy or counselling services (face-to-face only) for research participants of QUT research projects who may experience discomfort or distress as a result of their participation in the research. Should you wish to access this service please call the Clinic Receptionist on **07 3138 0999** (Monday–Friday only 9am–5pm), QUT Psychology and Counselling Clinic, 44 Musk Avenue, Kelvin Grove, and indicate that you are a research participant. Alternatively, Lifeline provides access to online, phone or face-to-face support, call **13 11 14** for 24 hour telephone crisis support. For people aged up to 25, you can also call the Kids Helpline on **1800 551 800**.

If you have any concerns about your child's health, you can speak to a child health nurse on 13 HEALTH (**13 432 584**).

PRIVACY AND CONFIDENTIALITY

All comments and responses will be treated confidentially unless required by law, or regulatory or monitoring bodies, such as the ethics committee. The names of individual persons are not required in any of the responses.

Any data collected as part of this research project will be stored securely as per QUT's Management of research data policy.

CONSENT TO PARTICIPATE

We would like to ask you to sign a written consent form to confirm your agreement to participate.

QUESTIONS / FURTHER INFORMATION ABOUT THE RESEARCH PROJECT

If you have any questions or require further information please contact one of the listed researchers:

Andrea Fuller
Rebecca Byrne

**CONCERNS / COMPLAINTS REGARDING THE CONDUCT OF THE RESEARCH PROJECT**

QUT is committed to research integrity and the ethical conduct of research projects. However, if you do have any concerns or complaints about the ethical conduct of the research project you may contact the QUT Research Ethics Advisory Team on 07 3138 5123 or email humanethics@qut.edu.au. The QUT Research Ethics Advisory Team is not connected with the research project and can facilitate a resolution to your concern in an impartial manner.

**THANK YOU FOR HELPING WITH THIS RESEARCH PROJECT.
PLEASE KEEP THIS SHEET FOR YOUR INFORMATION.**

**Evaluation of an intervention targeting parenting practices associated
with obesity-related behaviours in young children attending community
playgroups**

QUT Ethics Approval Number 1900000011

RESEARCH TEAM

Andrea Fuller

Professor Stewart Trost

Dr Rebecca Byrne

Assoc. Professor Rebecca Golley

STATEMENT OF CONSENT

By signing below, you are indicating that you:

- Have read and understood the information document regarding this research project.
- Have had any questions answered to your satisfaction.
- Understand that if you have any additional questions you can contact the research team.
- Understand that you are free to withdraw without comment or penalty.
- Understand that if you have concerns about the ethical conduct of the research project you can contact the Research Ethics Advisory Team on 07 3138 5123 or email humanethics@qut.edu.au.
- Understand that non-identifiable data from this project may be used as comparative data in future research projects.
- Agree to participate in the research project.

Name _____

Signature _____

Date _____

PLEASE RETURN THE SIGNED CONSENT FORM TO THE RESEARCHER.

Appendix I – Facilitator post-session feedback survey example – Trial 1 and 2

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Page 1 of 1

Facilitator Session 2 - Limiting screens

Please complete the survey below.

Thank you!

- 1) Playgroup name _____
- 2) Date of session _____
- 3) How many parents (approximately) were at playgroup today? _____
- 4) How many people were present at conversation 1 - Establishing rules & limits around screentime? _____
- 5) How many people were present at conversation 2 - Alternatives to screens? _____
- 6) How much time was spent at conversation 1?
 Less than 10 minutes
 10-15 minutes
 Over 15 minutes
 No time for this conversation
- 7) How much time was spent at conversation 2?
 Less than 10 minutes
 10-15 minutes
 Over 15 minutes
 No time for this conversation
- 8) Were the planned key messages covered during conversation 1 (Decide on family screen-time rules and be consistent)?
 Yes
 No
- 9) Were the planned key messages covered during conversation 2 (Acknowledge barriers and plan ahead)?
 Yes
 No
- 10) Were participants encouraged to identify a specific strategy/idea to try at home?
 Yes
 No
- 11) Any other comments about today's session?

19/02/2020 17:25

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Appendix J – Parent post-session feedback survey example – Trial 1 and 2

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Page 1 of 2

Session 1 Parent Feedback Survey

Please complete the survey below.

Thank you!

Did you attend the "Supporting Parents at Playgroup" conversation/s at playgroup today on "Reducing stress at mealtimes"? Yes No

Thank you, no further responses are required. We hope you can attend the next session.

Overall, how did you feel after today's session? 1 = Very dissatisfied
 2
 3
 4
 5 = Very satisfied

Conversation 1 - Food refusal & child hunger/fullness

How useful was the group discussion during conversation 1? 1 = Not at all useful
 2
 3
 4
 5 = Very useful
 N/A - Did not attend

How useful were the suggestions made by the facilitator during conversation 1? 1 = Not at all useful
 2
 3
 4
 5 = Very useful
 N/A - Did not attend

Conversation 2 - Supporting child taste development

How useful was the group discussion during conversation 2? 1 = Not at all useful
 2
 3
 4
 5 = Very useful
 N/A - Did not attend

How useful were the suggestions made by the facilitator during conversation 2? 1 = Not at all useful
 2
 3
 4
 5 = Very useful
 N/A - Did not attend

04/10/2019 10:24

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Today's conversation/s overall

How much did you enjoy taking part in the conversation/s today?

- 1 = Not at all
- 2
- 3
- 4
- 5 = Very much

Do you have any further feedback or suggestions about either conversation or the session overall?

Appendix K – Baseline survey – Trial 1

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Page 1 of 18

Baseline Parent Survey

Thank you for taking the time to complete this survey. It takes 12-15 minutes to complete.

Please provide the following general information about you and your child/ren at playgroup

Your age Under 20 years
 20-24 years
 25-29 years
 30-34 years
 35-39 years
 40-44 years
 45-49 years
 50+ years
(Years)

How many children attend playgroup with you?
.....

Oldest or only child at playgroup gender Male
 Female
 Other
 Prefer not to say

Oldest or only child at playgroup Date of Birth
.....

Second child at playgroup gender Male
 Female
 Other
 Prefer not to say

Second child at playgroup Date of Birth
.....

Third child at playgroup gender Male
 Female
 Other
 Prefer not to say

Third child at playgroup Date of Birth
.....

What is your relationship to the child/ren at playgroup? Mother
 Father
 Carer
 Grandparent
 Other

Other
.....

What is your highest level of education? Secondary school
 TAFE and/or trade
 University degree
 Post-graduate study
 Other

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Other

What is your employment status?
Select all that apply

- Not working
- Working full-time
- Working part-time/casual
- Student full-time
- Student part-time
- Volunteer
- Other

Other

The rest of this survey is about your OLDEST child at playgroup.

These questions are about how you encourage your child to eat, and your use of food as a reward.

Select the best answer for you.

How often do you encourage your child to eat something using food as a reward? (For example, "If you finish your vegetables, you will get some fruit")

Never
 Rarely
 Sometimes
 Often
 Always

When your child refuses food they usually eat, do you encourage to eat by offering a food reward? (For example, dessert)

Never
 Rarely
 Sometimes
 Often
 Always

I use desserts as a bribe to get my child to eat his/her main course.

Never
 Rarely
 Sometimes
 Often
 Always

How often do you warn the child that you will take a food away if the child doesn't eat? (For example, "If you don't finish your vegetables, you won't get fruit")

Never
 Rarely
 Sometimes
 Often
 Always

When my child refuses food they usually eat, do you insist your child eats it?

Never
 Rarely
 Sometimes
 Often
 Always

I praise my child if he/she eats what I give him/her.

Never
 Rarely
 Sometimes
 Often
 Always

How often do you reason with the child to get him/her to eat? (For example, "Milk is good for your health because it will make you strong")

Never
 Rarely
 Sometimes
 Often
 Always

How often do you tell the child to eat something on the plate? (For example, "Eat your beans")

Never
 Rarely
 Sometimes
 Often
 Always

How often do you say something to show your disapproval of the child for not eating?

- Never
- Rarely
- Sometimes
- Often
- Always

If my child says "I'm not hungry", I try to get him/her to eat anyway.

- Disagree
- Slightly disagree
- Neither agree nor disagree
- Slightly agree
- Agree

The next questions will ask you about your use of electronic media (TV, iPad, computers etc) to control your child's behaviour. Please think about a typical week, and answer as accurately as possible.

How often do you offer TV, iPad or computer to your child as a reward for good behaviour?

- Never
- Very rarely
- Rarely
- Sometimes
- Often
- Very often

How often do you take away TV, iPad or computer time as a punishment for bad behaviour?

- Never
- Very rarely
- Rarely
- Sometimes
- Often
- Very often

How often does your child get extra TV, iPad or computer time as a reward?

- Never
- Very rarely
- Rarely
- Sometimes
- Often
- Very often

How often do you use TV time to control your child's behaviour? (For example: "If you don't stop that you will not be able to watch TV today.")

- Never
- Very rarely
- Rarely
- Sometimes
- Often
- Very often

For the next questions, please think about your own behaviours during a typical week, and answer the questions as accurately as possible.

During a typical week, how often does your behaviour encourage your child to be inactive?

- Never
- Very rarely
- Rarely
- Sometimes
- Often
- Very often

During a typical week, how often does your child hear you say that you are too tired to be active?

- Never
- Very rarely
- Rarely
- Sometimes
- Often
- Very often

During a typical week, how often do you play sports, active games, or do other physical activities with your child?

- Never
- Very rarely
- Rarely
- Sometimes
- Often
- Very often

During a typical week, how often does your child hear you talk about participating in a sport or being active?

- Never
- Very rarely
- Rarely
- Sometimes
- Often
- Very often

During a typical week, how often does your child see you doing, or going to do, something that is physically active? (For example, walking, biking, playing sports)

- Never
- Very rarely
- Rarely
- Sometimes
- Often
- Very often

The next questions are about you and your family's physical activity and active recreation and play. Physical activity includes both structured and unstructured activities. Please answer as accurately as possible.

I like being physically active with my child

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

My family is physically active.

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

How much do you enjoy physical activities or sports?

- Don't enjoy
- Sort of enjoy
- Really enjoy
- Thoroughly enjoy

How often does your family use physical activities or sports as a form of family recreation? (For example, going on bike rides together, walking, swimming)

- Rarely
- Once in a while
- Relatively often
- Frequently

How much do you use your own behaviour to encourage your child to be physically active?

- Almost never
- Occasionally
- Half the time
- Often
- Nearly always

The following questions are about how you encourage your child to be physically active. Please take your time and answer as accurately as possible. Your responses are important to us.

During a typical week, how often do you tell your child how being inactive can be unhealthy?

Never
 Very rarely
 Rarely
 Sometimes
 Often
 Very often

During a typical week, how often do you send your child outside to play so you can get things done around the house?

Never
 Very rarely
 Rarely
 Sometimes
 Often
 Very often

During a typical week, how often do you tell your child that physical activity is good for health?

Never
 Very rarely
 Rarely
 Sometimes
 Often
 Very often

During a typical week, how often do you praise your child for participating in sports or physical activity?

Never
 Very rarely
 Rarely
 Sometimes
 Often
 Very often

During a typical week, how often do you say things to encourage your child to do physical activities or play sports?

Never
 Very rarely
 Rarely
 Sometimes
 Often
 Very often

During a typical week, how often do you try to get your child to be physically active instead of watching TV/iPad?

Never
 Very rarely
 Rarely
 Sometimes
 Often
 Very often

During a typical week, how often do you say things to encourage your child to spend less time being inactive?

Never
 Very rarely
 Rarely
 Sometimes
 Often
 Very often

During a typical week, how often do you take your child to the park to play?

Never
 Very rarely
 Rarely
 Sometimes
 Often
 Very often

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During a typical week, how often do you transport your child to a place where he/she can be physically active or play sports?

- Never
- Very rarely
- Rarely
- Sometimes
- Often
- Very often

During a typical week, how often do you try to get your child to play outside when the weather is nice?

- Never
- Very rarely
- Rarely
- Sometimes
- Often
- Very often

During the last month, how many times have you taken your child to play at the park?

(Please write a number in the box)

The next questions are about how you control how much TV your child watches. TV includes DVDs, Netflix, Foxtel etc.

Please answer as accurately as possible.

I have control over how much TV my child watches

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

I am in charge of how much TV my child watches during his/her free time at home

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

I tightly monitor the time my child watches TV during the week (Monday - Friday)

- Strongly disagree
- Disagree
- Not sure
- Agree
- Strongly agree

I tightly monitor the time my child watches TV during the weekend (Saturday - Sunday)

- Strongly disagree
- Disagree
- Not sure
- Agree
- Strongly agree

The next 2 questions are about how you control the time your child spends playing on the computer. This includes computer games and apps on the iPad or iPhone.

I tightly monitor the time my child plays computer games during the week (Monday - Friday)

- Strongly disagree
- Disagree
- Not sure
- Agree
- Strongly agree

I tightly monitor the time my child plays computer games during the weekend (Saturday - Sunday)

- Strongly disagree
- Disagree
- Not sure
- Agree
- Strongly agree

For the next section, the questions will ask about screen-time. Please think about how much your child watches on average on a weekday or weekend day. Please write your answer in minutes (for example, 60 minutes if your child watches for 1 hour).

About how much time is your child allowed to watch TV each weekday?

_____ (Please report total minutes)

About how much time is your child allowed to watch TV each weekend day?

_____ (Please report total minutes)

About how much time is your child allowed to play computer games each weekday?

_____ (Please report total minutes)

About how much time is your child allowed to play computer games each weekend day?

_____ (Please report total minutes)

Now we will ask some questions about your child's sleep routines. Please answer as accurately as possible as your responses are important to us.

During the past month, how often did your child perform the same activities in the hour before going to bed?

- Almost never
- Occasionally
- Half the time
- Often
- Nearly always

During the past month, how often did your child perform events in the same order before going to bed? (For example, bath, brush teeth, read/listen to story, go to bed)

- Almost never
- Occasionally
- Half the time
- Often
- Nearly always

During the past month, how often did your child sleep in the same place? (For example, in his/her bed, in parent's bed, on couch)

- Almost never
- Occasionally
- Half the time
- Often
- Nearly always

During the past month, how often did your child go to bed at the same time (within 10 minutes)?

- Almost never
- Occasionally
- Half the time
- Often
- Nearly always

During the past month, how often did your child get put to bed by the same person?

- Almost never
- Occasionally
- Half the time
- Often
- Nearly always

In this section, please rate how certain you are on a scale of 0 to 10 in respect to the parenting situation described.

How certain are you that you can get your child to eat at least one serving of vegetables every day?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can get your child to eat at least one fruit every day?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can limit your child to eat take-away food for example hamburgers, pizza, or hot chips twice a month at the most?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can limit your child to eat sweets, ice cream, crisps, or cake/biscuits to once a week at most?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can limit your child to drink soft drinks or cordial to once a week at the most?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can be a good role model for your child when it comes to eating vegetables?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can be a good role model for your child when it comes to eating fruit?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can be a good role model for your child and not eat sweets, crisps, biscuits, cake or drink soft drinks more than once a week?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can get your child to be physically active outdoors several times a week?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can get your child to be outdoors even in bad weather?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can get your child to participate in organised physical activity at least once a week?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can get your child to be physically active (For example, playing outdoors) instead of watching TV or playing computer games?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can limit your child to watch TV, DVD or play on the computer, smartphone or tablet 2 hours a day at the most?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can walk with your child several times a week?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can be a good role model by being physically active yourself several times a week, for example by participating in sports, swimming or bike riding?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

For the final section of this survey, we are interested in how often have you searched online for information on the following topics over the last month (via web sites, online forums etc)?

Searched online during the past month, for information on fussy eating or information or strategies around child eating.

Never
 Once or twice
 3 or 4 times
 More than 4 times

Searched online during the past month for ideas on how to encourage your child to be physically active.

Never
 Once or twice
 3 or 4 times
 More than 4 times

Searched online during the past month for strategies to limit screen time.

Never
 Once or twice
 3 or 4 times
 More than 4 times

Searched online during the past month for strategies to improve your child's sleep.

Never
 Once or twice
 3 or 4 times
 More than 4 times

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Supporting Parents at Playgroup Program



Conversations about healthy child behaviours: eating, active play, screen time, sleep

- ◆ Be part of a trial program at your playgroup that supports parents with young children around:
 - "Fussy" eating
 - Screen-time
 - Encouraging movement and active play
 - Sleep
- ◆ The program is very informal and casual and fits into the playgroup environment.
- ◆ An experienced facilitator will assist the group to come up with ideas and strategies that mums/dads can try at home.
- ◆ 5 fortnightly conversations during the school term (Term 4, 2019 or Term 1, 2020).
- ◆ Developed from focus groups with parents at playgroups in May 2018.



If you would like more information please contact
Andrea Fuller (QUT PhD student) on [REDACTED]



Please tear-off and return to your playgroup contact person (CP1), Playgroup Queensland, or
Andrea Fuller ([REDACTED])

I am interested in taking part in the Supporting Parents at Playgroup trial at my playgroup.

Name.....Phone.....

Email address.....

Playgroup name.....

Appendix M – Baseline survey – Trial 2

Confidential

Page 1 of 9

Baseline Parent Survey

Before completing this short survey please read the information below and click "yes" to consent to be part of the study.

You will then be taken to the survey, which takes around 5 minutes to complete.

Thank you for expressing an interest in the Supporting Parents at Playgroup program trial. As part of the trial, we ask that you also consent to take part in a research project being undertaken as part of a PhD study by Andrea Fuller.

The purpose of this research project is to trial and evaluate a playgroup parent intervention that was developed from information received from focus groups that were conducted at a number of playgroups in Brisbane in May 2018.

Your participation will involve taking part in a 10 week parenting support intervention to be conducted at your playgroup at the usual playgroup time. There are a total of 5 sessions to be run fortnightly over the 10 weeks. You may attend any or all of the 5 sessions. During each session there will be 2 mini-sessions of 10-15 minutes each, spread over your usual playgroup 2-hour session. Each mini-session will consist of a discussion/conversation with other participants on a particular parenting topic, facilitated by a trained facilitator. Topics will centre on parenting practices in respect to your child's eating, physical activity, screen time and sleep.

Your playgroup will be randomised into either the intervention or control groups. Playgroups in the intervention group will receive the intervention in Term 4, 2019. Playgroups in the control group will receive the intervention in Term 1, 2020.

Participants in both groups are asked to complete an anonymous survey about their confidence in respect to some aspects of parenting (for example, dealing with fussy eating). All participants will be asked to complete the same survey again in December 2019. This survey is expected to take around 5 minutes to complete.

For those in the intervention groups, participation will also involve completing a number of brief, anonymous feedback surveys about your experiences in taking part in the program. Questions will relate to what you liked or did not like about the program. They will be completed online and are expected to take 2-3 minutes to complete.

Your participation in this research project is entirely voluntary. If you agree to participate you do not have to complete any question(s) you are uncomfortable answering. Your decision to participate or not participate will in no way impact upon your current or future relationship with QUT, or your playgroup, or Playgroup Queensland. If you do agree to participate you can withdraw from the research project or the playgroup program during your participation without comment or penalty. Any identifiable information already obtained from you will be destroyed.

BENEFITS

It is expected that this research project may directly benefit you as part of your participation in a program that offers parenting support and strategies in respect to parenting practices around your child's eating, physical activity, screen time and sleep.

RISKS


There are minimal risks associated with your participation in this research project. These include discomfort you may feel in participating in a group discussion and/or completing the surveys.

QUT provides for limited free psychology, family therapy or counselling services (face-to-face only) for research participants of QUT research projects who may experience discomfort or distress as a result of their participation in the research. Should you wish to access this service please call the Clinic Receptionist on 07 3138 0999 (Monday-Friday only 9am-5pm), QUT Psychology and Counselling Clinic, 44 Musk Avenue, Kelvin Grove, and indicate that you are a research participant. Alternatively, Lifeline provides access to online, phone or face-to-face support, call 13 11 14 for 24 hour telephone crisis support. For people aged up to 25, you can also call the Kids Helpline on 1800 551 800.

If you have any concerns about your child's health, you can speak to a child health nurse on 13 HEALTH (13 432 584).

PRIVACY AND CONFIDENTIALITY

All comments and responses will be treated confidentially unless required by law, or regulatory or monitoring bodies, such as the ethics committee. The names of individual persons are not required in any of the responses.

Any data collected as part of this research project will be stored securely as per QUT's Management of research data policy. 

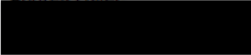
policy.

STATEMENT OF CONSENT

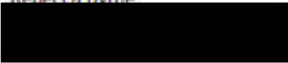
By clicking on "yes" below, you are indicating that you:

- Have read and understood the above information regarding this research project.
- Have had any questions answered to your satisfaction.
- Understand that if you have any additional questions you can contact the research team:

Andrea Fuller



Rebecca Byrne



- Understand that you are free to withdraw without comment or penalty.
- Understand that if you have concerns about the ethical conduct of the research project you can contact the Research Ethics Advisory Team on 07 3138 5123 or email humanethics@qut.edu.au.
- Understand that non-identifiable data from this project may be used as comparative data in future research projects.
- Agree to participate in the research project.

I consent to take part

- Yes
 No

Thank you for your interest in the Supporting Parents at Playgroup program. You will not receive any further emails. However, you may still take part in the program at your playgroup.

Please provide the following general information about you and your child/ren at playgroup

Your age

- Under 20 years
 20-24 years
 25-29 years
 30-34 years
 35-39 years
 40-44 years
 45-49 years
 50+ years
 (Years)

How many children attend playgroup with you?

.....

Oldest or only child at playgroup gender

- Male
 Female
 Other
 Prefer not to say

Oldest or only child at playgroup Date of Birth

.....

Second child at playgroup gender

- Male
 Female
 Other
 Prefer not to say

Second child at playgroup Date of Birth

.....

Third child at playgroup gender

- Male
 Female
 Other
 Prefer not to say

Third child at playgroup Date of Birth

.....

What is your relationship to the child/ren at playgroup?

- Mother
 Father
 Carer
 Grandparent
 Other

Other

.....

What is your highest level of education?

- Secondary school
 TAFE and/or trade
 University degree
 Post-graduate study
 Other

Other

.....

What is your employment status?
Select all that apply

- Not working
- Working full-time
- Working part-time/casual
- Student full-time
- Student part-time
- Volunteer
- Other

Other

.....

The rest of this survey is about your OLDEST child at playgroup.

Please rate how certain you are on a scale of 0 to 10 in respect to the parenting situation described.

How certain are you that you can get your child to eat at least one serving of vegetables every day?

0 = Not at all certain
 1
 2
 3
 4
 5
 6
 7
 8
 9
 10 = Certain to a very high degree

How certain are you that you can get your child to eat at least one fruit every day?

0 = Not at all certain
 1
 2
 3
 4
 5
 6
 7
 8
 9
 10 = Certain to a very high degree

How certain are you that you can limit your child to eat take-away food for example hamburgers, pizza, or hot chips twice a month at the most?

0 = Not at all certain
 1
 2
 3
 4
 5
 6
 7
 8
 9
 10 = Certain to a very high degree

How certain are you that you can limit your child to eat sweets, ice cream, crisps, or cake/biscuits to once a week at most?

0 = Not at all certain
 1
 2
 3
 4
 5
 6
 7
 8
 9
 10 = Certain to a very high degree

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How certain are you that you can limit your child to drink soft drinks or cordial to once a week at the most?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can be a good role model for your child when it comes to eating vegetables?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can be a good role model for your child when it comes to eating fruit?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can be a good role model for your child and not eat sweets, crisps, biscuits, cake or drink soft drinks more than once a week?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can get your child to be physically active outdoors several times a week?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can get your child to be outdoors even in bad weather?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can get your child to participate in organised physical activity at least once a week?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can get your child to be physically active (For example, playing outdoors) instead of watching TV or playing computer games?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can limit your child to watch TV, DVD or play on the computer, smartphone or tablet 2 hours a day at the most?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can walk with your child several times a week?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

How certain are you that you can be a good role model by being physically active yourself several times a week, for example by participating in sports, swimming or bike riding?

- 0 = Not at all certain
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10 = Certain to a very high degree

19/02/2020 17:33

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For the final section of this survey, we are interested in how often have you accessed information online on the following topics over the last month (via web sites, online forums etc)?

Searched online during the past month, for information on fussy eating or information or strategies around child eating.

Never
 Once or twice
 3 or 4 times
 More than 4 times

Searched online during the past month for ideas on how to encourage your child to be physically active.

Never
 Once or twice
 3 or 4 times
 More than 4 times

Searched online during the past month for strategies to limit screen time.

Never
 Once or twice
 3 or 4 times
 More than 4 times

Searched online during the past month for strategies to improve your child's sleep.

Never
 Once or twice
 3 or 4 times
 More than 4 times

**Appendix N – Written feedback provided post-intervention by Trial 1 control
group volunteer facilitators**

Facilitator A:

“Attendance has been 3/5 sessions for most parents and max of 4/5. Parents were keen to join for a talk when invited again around the morning tea table with kids eating or free play. Not engaging with conversation when child doing craft or painting when assistance from parent required supervision of young child on an activity. Support through education and listening empowered parents to be confident even after last parenting challenge. We are not alone.”

Facilitator B:

“It's been a valuable experience at playgroup. The parents that were actively engaged in most sessions were enthusiastic about the topics and wanted to know when the next session was. Those who preferred to listen or perhaps didn't want to engage I felt didn't feel pressured to do so. They were able to engage in the way that best suited them. As a facilitator I thoroughly enjoyed the process- to be able to use a different skill set that comes with facilitating conversations around set topics was something that has personally helped in my own professional development.”