Preparing for Life Early Childhood Intervention

Assessing the Early Impact of *Preparing for Life* at Six Months

EVALUATION OF THE

'PREPARING FOR LIFE'

EARLY CHILDHOOD

INTERVENTION PROGRAMME

By

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2012

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Acknowledgements

The *Preparing for Life* Team and the UCD Geary Institute would like to thank all those who participated and supported this research, especially the families participating in the *PFL* Programme and Evaluation.

Preparing for Life would particularly like to thank all members of UCD Geary Institute Evaluation Team over the last four years (Ailbhe Booth, Carly Cheevers, Maria Cosgrove, Sarah Finnegan, Olivia Joyner, Louise McEntee, Edel McGlanaghy, Kelly McNamara, Eylin Palamaro Munsell, Sarah Thompson), under the direction of Dr. Orla Doyle and the scientific advisory committee (Professor Colm Harmon, Professor James Heckman, Professor Cecily Kelleher, Professor Sharon Ramey, Professor Sylvana Cote, and Professor Richard Tremblay) for their work in bringing this report to life. The *PFL* Evaluation Team also would like to thank Judith Delaney, Caitriona Logue, Seong Moon and Keith O'Hara for contributing to the report and Mark Hargaden for IT support. We also would like to thank all the local organisations, including Sphere 17, the Darndale Belcamp Village Centre, Project West, Finglas and St. Helena's Resource Centre, Finglas, who offered work space in which to conduct interviews with participants.

We thank our funders The Atlantic Philanthropies and the Department of Children and Youth Affairs and acknowledge the advice and guidance given by staff of both organisations. We also thank our Expert Advisory Committee for their support and guidance.

We are most grateful to the Northside Partnership Board, CEO and staff team as well as the *PFL* Board Sub-Group, *PFL* Planning and Steering Groups for their on-going encouragement and support. We appreciate the generosity of all the agencies, organisations and individuals who have given so willingly of their time and expertise in supporting *PFL* throughout the planning and implementation phases.

Finally we thank the members of the *PFL* staff team over the past 4 years (Val Smith, Sarah Jane Leonard, Melanie Murphy, Susan Cullen, Eva Rigo, Vicky Monkhouse, Sandra O'Neill, Cindy Lawson, Ann Loughney, Gemma Cooper, Bianca Toeneboen, Alma Jane O'Donnell and Heather Alexander) who have brought the *PFL* programme to life.

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Executive Summary

Preparing for Life (*PFL*) is a prevention and early intervention programme which aims to improve the life outcomes of children and families living in North Dublin, Ireland, by intervening during pregnancy and working with families until the children start school. The *PFL* Programme is being evaluated using a mixed methods approach, incorporating a longitudinal randomised control trial design and an implementation analysis. The experimental component involves the random allocation of participants from the *PFL* communities to either a high support treatment group or a low support treatment group. Both groups receive developmental toys, facilitated access to preschool, public health workshops, and have access to a support worker. Participants in the high treatment group also receive home visits from a trained mentor and group parent training using the Triple P Positive Parenting Programme. The *PFL* treatment groups are also being compared to a 'services as usual' comparison group (*LFP*), who do not receive the *PFL* Programme.

Recruitment and Baseline Characteristics

In total, 233 pregnant women were recruited into the *PFL* Programme between January 2008 and August 2010. Randomisation resulted in 115 participants assigned to the high treatment group and 118 participants assigned to the low treatment group. In addition, 99 pregnant women were recruited into the comparison group. The population based recruitment rate was 52%. Baseline data, collected before the programme began, was available for 104 and 101 high and low *PFL* treatment group participants respectively, and 99 comparison group participants. Tests of baseline differences between the high and low *PFL* treatment groups found that the two groups did not statistically differ on 97% of the measures analysed, indicating that the randomisation process was successful. The aggregate *PFL* group and the *LFP* comparison group did not statistically differ on 75% of the measures; however, the comparison group was of a relatively higher socioeconomic status.

Six Month Report

The aim of this report is to determine whether the *PFL* programme had an impact on parent and child outcomes at and before six months, and to provide a detailed review of implementation practices in the programme regarding attrition, dosage, participant engagement, and programme effectiveness/satisfaction from the perspectives of participants and *PFL* staff.

Impact of PFL at Six Months: Main Results

In total, 257 six month interviews ($n_{\text{Low}} = 90$; $n_{\text{High}} = 83$; $n_{LFP} = 84$) were completed. The main results compared the six month outcomes of the high treatment group to the six month outcomes of the low treatment group across eight main domains: child development, child health, parenting, home environment and safety, maternal health and pregnancy, social support, childcare and service use, household factors and socioeconomic status (SES), incorporating 160

outcome measures. Consistent with the programme evaluation literature, there were limited significant differences observed between the high and low treatment groups at six months. However, many of the outcomes were in the hypothesized direction, with the high treatment group reporting somewhat better outcomes than the low treatment group. Of the 160 individual outcomes analysed, there were significant differences between the high and low treatment groups on 23 measures (14%). There were no significant effects in the domains of child development and household factors/SES. The domains with the most positive effects were social support, home environment and safety, and parenting. Specifically, children in the high treatment group compared to those in the low treatment group had more appropriate eating patterns, had a higher level of immunization rates, had more parental interactions, and parent-child interactions were of a higher quality. Additionally, children in the high treatment group were exposed to less parental hostility, a safer home environment, and more appropriate learning materials and childcare. Moreover, mothers in the high treatment group were more likely to be socially connected in their community and less likely to be hospitalized after birth. The results of the multiple hypotheses testing strengthen these findings by showing that the high treatment group reported higher scores on the quality of the home environment and in the domain of maternal physical health, and lower scores on parental stress compared to the low treatment group.

Impact of PFL at Six Months: Interactions & Sub-group Results

The interaction and sub-group analysis was conducted to determine whether the *PFL* programme had a varying impact on girls or boys, first time or non-first time mothers, lone or partnered parents, mothers with higher or lower cognitive resources, and families with high or low familial risk. The results indicated that the programme had differential impacts with some groups benefitting more from the programme than others. For example, there was suggestive evidence that the programme benefited mothers with relatively higher cognitive resources, mothers with multiple children, and families who have experienced familial risk.

Impact of PFL at Six Months: Comparison Group Results

As expected, the comparison of the six month outcomes of the two *PFL* treatment groups and the comparison group (*LFP*) found there were more significant differences in the outcomes of the high treatment group versus the comparison group than in the outcomes of the low treatment group versus the comparison group. Specifically, of the 151 individual outcomes analysed, there were positive significant differences between the high treatment group and the comparison group on 32 measures (21%), with most effects in the domains of social support, parenting and the home environment. A number of these effects remained significant in the multiple hypothesis analysis. In addition, there were positive significant differences between the low treatment group and the comparison group on 17 measures (11%), with most effects in the domains of social support, the home environment, and household factors/SES. However, very few of these effects remained significant in the multiple hypothesis analysis. Overall, the results of the high treatment group and comparison group analysis support the main findings, such that the additional support provided to the high treatment group appeared to have some positive effects at six months, while

the results of the low treatment group and comparison group analysis suggest that the low treatment is having a lesser impact on participant outcomes at six months.

PFL Implementation Analysis

- ***Attrition***

On average, 10% of the sample officially dropped out of the programme between the baseline assessment and six months ($_{HIGH}$=13%, $_{LOW}$=6%, $_{LFP}$=10%) and 8% of the sample were classified as disengaged ($_{HIGH}$=9%, $_{LOW}$=10%, $_{LFP}$=6%). Very few individual participant characteristics were associated with programme attrition and disengagement.

- ***Dosage***

Families in the high treatment group received an average of 14 home visits by the *PFL* mentors between programme intake and six months, with each visit lasting about one hour on average. The frequency and duration of the visits did not differ significantly across the pre- and post-natal periods. The majority of participants reported meeting their mentor twice a month (68%). Few individual participant characteristics were associated with the frequency or duration of home visits. The only factors consistently associated with participant engagement were gestational age upon programme entry, cognitive resources, and vulnerable attachment style.

- ***Satisfaction***

Overall participant satisfaction with the programme was high. As expected, the high treatment group reported greater satisfaction with the programme than the low treatment group. The high treatment group reported greatest satisfaction with having received the type of help they wanted, followed by satisfaction regarding the child's progress and overall satisfaction with the programme. The low treatment group reported that they were most satisfied with the child's progress and child behaviour.

- ***Qualitative***

As part of the *PFL* process evaluation, focus groups were held with 23 programme participants and individual interviews were conducted with 7 *PFL* staff members. The findings from this qualitative analysis indicated that both participants and programme staff feel that the *PFL* programme is of benefit to families in the community. Both participants and staff cite several core factors that contribute to the programme's perceived success. These include rapport between mentors and participants, respect for participant time, clear and concise informational materials, and the flexibility to meet participant needs within the *PFL* framework. Additionally, those in the high treatment group reported more benefits from the programme than did those in the low treatment group. This finding indicates high programme model fidelity.

- ***Contamination***

A contamination analysis was conducted to determine whether the low treatment group received all or part of the additional services designed for the high treatment group. This analysis found that the potential for contamination was high as participants were in regular contact with each other and shared materials. However, direct measures of contamination suggest that these practices did not translate into improved parenting knowledge for those in the low treatment group. These findings indicate that the level of contamination in the *PFL* programme up to six months was quite low and does not bias the six-month results.

Conclusion

The six month evaluation of *Preparing for Life* suggests that the programme is progressing well. Although, as found in other studies of home visiting programmes, there were limited significant differences reported between the high and low *PFL* treatment groups and the *PFL* treatment groups and the comparison group at six months. However, many of the relationships were in the hypothesized direction, with the high treatment group reporting somewhat better outcomes than the low treatment group. There were some significant findings in the domains of parenting, the quality of the home environment and social support across all groups, which correspond directly to information on the *PFL* Tip Sheets delivered to participants during this period. However, the programme had no significant impact on key factors such as pregnancy behaviour, infant birth weight, breastfeeding, and child development. In regards to implementation, attrition was relatively low during this period, yet the level of engagement was less than anticipated. Overall, participant satisfaction was high and the qualitative findings suggest that participants, most notably those in the high treatment group, found the programme enjoyable, informative and beneficial. One of the main findings to emerge from the quantitative analyses was that mothers with relatively higher cognitive resources received a greater number of home visits and may have benefited more from participation in the *PFL* programme overall. These findings will be investigated in more detail in later reports.

CHAPTER 1: Introduction and Background of the *PFL* Programme and Evaluation

The intergenerational transmission of socioeconomic inequalities in children's health and cognitive, behavioural, and emotional development emerge early and can persist through life (Najman et al., 2004; Shonkoff & Phillips, 2000). Evidence suggests that targeted, early intervention programmes aimed at disadvantaged children and their families are an effective means of reducing these inequalities. *Preparing for Life* (*PFL*) is a prevention and early intervention programme which aims to improve the life outcomes of children and families living in North Dublin, Ireland. The programme is being evaluated by the UCD Geary Institute and this evaluation aims to provide evidence on the effectiveness of such early interventions. This chapter describes the objectives and theoretical rationale of the *PFL* Programme and Evaluation, as well as the aims and structure of the report.

1.1 Description and Objectives of the *PFL* Early Childhood Intervention

PFL is a community-led initiative operated by the Northside Partnership (NSP) in Dublin, Ireland. The programme is jointly funded by The Atlantic Philanthropies (AP) and the Department for Children and Youth Affairs. The *PFL* Programme aims to improve levels of school readiness of young children living in several designated disadvantaged areas of North Dublin, by intervening during pregnancy and working with families until the children start school. *PFL* is a community-based programme and was developed over a five year period between 2003 and 2008 in response to anecdotal evidence that children from this area were lagging behind their peers in terms of both cognitive and non-cognitive skills at school entry. The need for the *PFL* Programme was instigated by those working in the local community who recognised that there was a need to provide parents with structured support to improve their children's school readiness skills. Thus, the development of *PFL* was a bottom-up initiative involving 28 local agencies and community groups who worked collaboratively to develop a programme that was both tailored to meet the needs of the local community and was grounded in empirical evidence. For more information on the development of the *PFL* Programme please refer to the report '*A Process Evaluation on the Development of the Preparing for Life Programme'* (*Preparing for Life* Evaluation Team, 2009) which is based on an analysis of semi-structured interviews with fifteen key individuals involved in the development of the programme.

The original *PFL* catchment area in North Dublin included the communities of Belcamp, Darndale and Moatview including Newtown Court and the Traveller Community. Due to the relatively slow uptake rate within these communities, the *PFL* catchment area was expanded to include the areas of Ferrycarrig, Glin, and Greencastle in January, 2009. A second expansion was initiated in late June, 2009 to include additional communities in Dublin 17 and Dublin 5. According to Census data from 2006, there are approximately 7,000 people living in this *PFL* community, with one third of children living in families dependent on social welfare. The area had an unemployment rate of 17% in 2006, which was approximately three times the national average according to data from the 2006. In 2006, 66% of adults living in the area were early school leavers compared with a national average of 38%. Additionally, in a 2008 survey, 11% of

adults stated they went on to third level education, which is well below the national average of approximately 29%, and 75% of respondents stated that they live in local authority housing (McArtain, 2009). The area also has a high proportion of lone parents, with about 47% of mothers being classed as lone mothers compared to the national incidence of lone motherhood of 29%. Of the 233 total participants recruited by the *PFL* programme, 172 (74%) are from the original catchment area, 39 (17%) are from the first expansion area, and 22 (9%) are from the second expansion area.

Although originally based on anecdotal evidence, recent quantitative research has provided findings to support the hypothesis that children from this community display low school readiness. Specifically, a representative survey assessing the school readiness of children aged four to five years old attending the primary schools in the *PFL* catchment areas found that teachers rated children in the *PFL* communities as displaying significantly lower levels of school readiness than a Canadian norm on the domains of physical health and well-being, social competence, emotional maturity, language and cognitive development, communication and general knowledge (Doyle & McNamara, 2011). In addition, the school readiness capabilities of children living in this area appear to be consistently low over time as the teachers indicated that less than 50% of children entering school in the *PFL* catchment area were *definitely ready* for school in 2004 (Murphy et al., 2004) and again in 2009 and 2010 (Doyle & McNamara, 2011). Collectively, this body of research highlights the need for a school readiness intervention in these communities.

The purpose of the *PFL* Programme is to improve documented low levels of school readiness by assisting parents in developing skills to help prepare their children for school. As such, the *PFL* Programme operates under a holistic definition of school readiness composed of five dimensions including: 1) physical health and well-being; 2) socio-emotional development; 3) approaches to learning; 4) language development and emergent literacy; and 5) cognition and general knowledge.

School readiness is important across a wide range of developmental areas as each dimension of school readiness may have consequences for a child's social, physical and educational outcomes. In particular, developmental problems in childhood are associated with negative life outcomes in adulthood. Poor school readiness has been linked to later academic failure (Raver, 2003), poor socio-emotional adjustment (Arnold et al., 1999; Hinshaw, 1992) and poor life outcomes such as unemployment (Ross & Shillington, 1990) and teenage pregnancy (Brooks-Gunn, 2003). School readiness has been described as a foundation on which all later learning is built and it has been argued that children who develop well at earlier stages and are ready to start school are in a position to elicit interactions and experiences that accelerate their subsequent development and facilitate their achievement (Heckman, 2000).

1.2 Description of *PFL* Programme

Preparing for Life is a multi-dimensional programme which provides a range of supports to participating families from pregnancy until school entry. It is a manualised programme which shares some characteristics with other international early childhood programmes such as the Nurse Family Partnership programme, yet is a distinct home-grown programme. On recruitment,

participants were randomly assigned to either a low supports treatment group or a high supports treatment group. Figure 1.1 illustrates the design of the *PFL* Programme and Evaluation.

High Treatment Group Supports

Participants in the high treatment group avail of a home-visiting mentor support service. Each family has an assigned mentor who visits the home for between 30 minutes and two hours starting during pregnancy and continuing until the child starts school. Originally, it was anticipated that each family would receive a weekly home visit. However, early on in the implementation process it became evident that weekly home visits were not achievable from the families' point of view. Therefore the programme changed this weekly requirement, such that the frequency of the visits depends on the needs of the families, with the majority of families receiving fortnightly visits, and some monthly.

The home visits are facilitated by trained mentors with a cross section of professional backgrounds including education, social care, youth studies, psychology, and early childcare and education. Although the professional qualifications of the mentors are diverse, each mentor completed extensive training on the *PFL* Programme Manual. The role of the mentors is to build a good relationship with parents, provide them with high quality information and to be responsive to issues that arise. Through these efforts the *PFL* Programme aims to enable parents to make informed choices and connect them to other community services (*Preparing for Life* & The Northside Partnership, 2008). The mentors focus on five general areas related to child development: 1) pre-birth; 2) nutrition; 3) rest and routine; 4) cognitive and social development; and 5) mother and her supports. These areas were selected during the development phase as they were highlighted as areas of need in this community.

The aim of the home visits is to support and help the parents with key parenting issues using a set of *PFL* developed Tip Sheets. The Tip Sheets are colourful representations of information related to child development presented in a clear, concise manner and were developed by *PFL* staff based on available information from local organisations such as the Health Service Executive, the Department of Health and Children, and Barnardos Children's Charity. The Tip Sheets were designed at a reading level of a 12 year old and are used to facilitate the home visiting sessions. The Tip Sheets are given to the participant after discussion with the mentor and remain with the participant to serve as an on-going parenting resource. The Tip Sheets are designed to be delivered based on the age of the child and the needs of the family, however, the participants must have received the full set of Tip Sheets by the end of the programme.

Secondly, participants in the high treatment supports group also participate in group parent training using the Triple P Positive Parenting Programme (Sanders, Markie-Dadds, & Turner, 2003). Triple P aims to improve positive parenting through the use of videos, vignettes, role play, and tip sheets in a group-based setting for eight consecutive weeks (two hours per week for the first four weeks followed by three weeks of phone support and a final two hour group session on week eight). The group-based component of the Triple P programme has been subject to multiple rigorous evaluations which have demonstrated positive effects for both parents and children (Sanders, Markie-Dadds, Tully, & Bor, 2000). The Triple P programme is delivered to participants in the high treatment group when their children are at least two-years old. Therefore,

the results of this six month report do not include the Triple P treatment component of the *PFL* Programme.

Participants in the high treatment group can also avail of baby massage through individual or group sessions with one of the mentors until their baby is approximately 10 months old. There are three individual baby massage sessions and four group-based baby massage sessions, followed by a refresher session. Finally, the high treatment group are invited to coffee mornings hosted by the mentors.

Low Treatment Group Supports
Families in the low treatment group have access to an Information Officer who acts as the point of contact for parents in relation to accessing information both on *PFL* events and other service provision in the area. The information officer meets with the family before birth and contacts the family at various intervals, such as when sending developmental packs, and when the child is due to begin crèche. Details about coffee mornings and other community events are sent via group text or online. Families may contact the information officer at any time with queries regarding services for their child. However, the Information Officer may not provide the participants in the low treatment group with any information related to parenting or child development.

Common Supports
Families in both the high and low treatment groups receive developmental packs annually to the value of approximately ~€100pa. The first developmental pack includes a number of safety items, such as corner guards, angle latches, and heat sensitive spoons, plus a baby gym/play mat. The second pack includes developmental appropriate toys such as puzzles, activity toys, and bricks. The third pack includes cookery/construction sets, puzzles and memory games. The fourth pack includes a magnetic game, a doctor's case, a lace-up shoe and a tea set. The fifth pack is still under development.

Both groups are also encouraged to attend two public health workshops or programmes in the community. The Stress Control Programme, which is run by external facilitators, involves six one-hour weekly sessions which focuses on enabling individuals to identify how they consciously and subconsciously feed their stress, as well as describing what stress is, and the indicators of stress. The programme also teaches techniques and strategies to manage stress. Participants receive a set of booklets and a relaxation CD. For more details on this programme please see www.glasgowsteps.com.

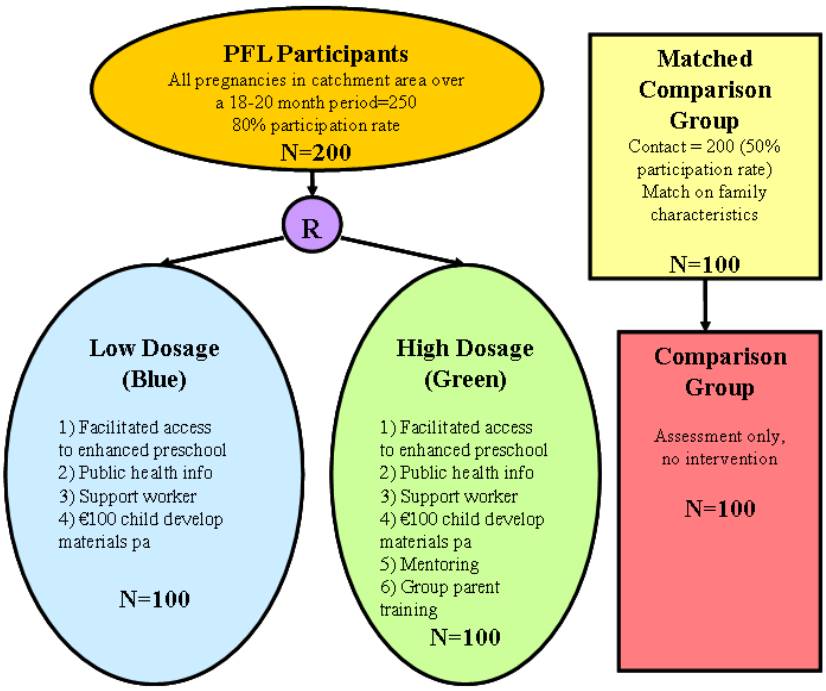
The second health programme offered is the Healthy Food Made Easy programme, which is facilitated by one of the mentors and involves six two hour sessions. The aim of the programme is to improve nutritional knowledge, attitudes and behaviour by learning about basic nutritional theories and participating in practical cookery sessions. It is a peer led programme which emphasises group learning through discussion, worksheets and hand-outs, quizzes, problem solving games, food preparation and cookery.

A preschool place for one-year has also been reserved for all *PFL* children in the local childcare centres. *PFL* covers the cost of this for those families experiencing exceptional financial

difficulty. However, it should be noted that all *PFL* children will now be eligible for a new Government scheme which provides every three year old child in Ireland with access to a free preschool place for one year.

Participants are given a directory of local services and have access to a *PFL* support worker who can help them connect to additional community services if needed. Finally, both treatment groups receive a framed professional photograph of their child as well as programme newsletters and special occasion (e.g., birthday) cards.

Figure 1.1
Illustration of the PFL Programme experimental design and evaluation.



1.3 Theoretical Framework of the *PFL* Programme

The *PFL* Programme Manual outlines a logic model and theory of change which are grounded in several psychological theories of development. Specifically, the programme is supported by the theory of human attachment (Bowlby, 1969), socio-ecological theory of development (Bronfenbrenner, 1986), and social-learning theory (Bandura, 1977). Collectively, these theories suggest that a model of providing support to parents will improve parent and child outcomes while empowering families and local communities.

1.4 *PFL* Logic Model and Theory of Change

As outlined in the *PFL* Programme Manual (*Preparing for Life* & The Northside Partnership, 2008), the logic model reflects the theory of change endorsed by the *PFL* Programme which is based on knowledge about child development and evidence concerning what works for whom, when, and why. Essentially the logic model is focused on how and why the proposed patterns of services might be expected to alter the trajectories of children participating in the programme. The *PFL* logic model is based on the hypothesis that all children will be better prepared to start school if they and their families receive enhanced pre-school and childcare services and agencies better target and integrate their services. The model further hypothesises that adding intensive support for families through one-to-one mentoring, combined with group parent training, and public health messages, will increase the positive effects of the *PFL* Programme. The *PFL* logic model is presented in Table 1.1 and describes the inputs, activities, outputs and outcomes of the programme while illustrating the connections between desired outcomes and programme services.

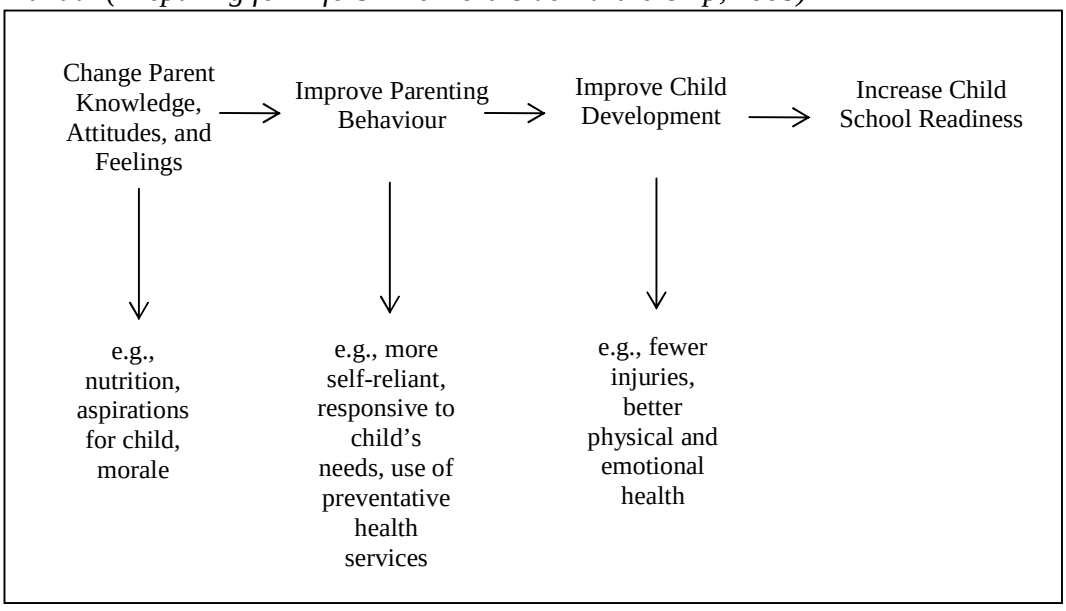
Table 1.1
PFL Logic Model

Inputs	Activities	Outputs	Short Term Outcomes (2007-11)	Medium Term Outcomes (2011-12)	Long Term Outcomes (2017)
• Investment by AP • Investment by OMCYA • Support from local organisations • *PFL* Plan Report	• Improving parenting skills to promote child development through: 1. Mentoring 2. Group training 3. Quality childcare/pre-school provision 4. Public Health promotion • Developing and integrating services through: 1. Quality pre-school programmes including increasing capacity to meet demand and re-designing existing services 2. Agency-*PFL* annual agreements • Evaluation of activities and outcomes	• Programme Manual Developed & Reviewed • Mentors trained and operating family caseloads • Parent training courses established • Quality preschool curriculum in place • Preschool/childcare capacity increased to ensure available place for all in *PFL* • Programme of public health promotion developed in conjunction with Health Promotion Service • Early intervention activities and treatment developed • Service agreements between *PFL* and agencies in place • Evaluation reports produced & disseminated • Programme administered to a high standard	• Year on year improvements (0 -5 years) in children's physical, psychological and emotional health, and in their educational, speech and motor skills • Year on year improvements in parent's psychological health, aspirations for their child, and their parenting skills • Programme of public health promotion sustained • Existing services for children and families in the area better co-coordinated and better meeting identified needs	• Improved school readiness as children start school • Improved enjoyment of parenting • The successful elements of *PFL* extended to all newborns in the DBM area and to other disadvantaged areas	• Gains for children and parents in the programme sustained into late childhood • *PFL* a primary influence on: 1. National policy for prevention and early intervention 2. Integrated service delivery at local area level

In line with the *PFL* logic model, the *PFL* Programme has proposed a theory of change explaining the factors which influence school readiness. The theory of change, illustrated in Figure 1.2, hypothesises that the one-to-one mentoring component of the *PFL* Programme will promote change in parents' knowledge, attitudes and well-being, ultimately influencing the child's development. For example it is hypothesised that parents involved in the programme will learn more about healthy child development and how to nurture it, they will develop higher aspirations for their children, they will have better physical health themselves and their self-confidence will increase. These factors will have a positive impact on parental psychological well-being and morale, which in turn will contribute to increased enjoyment of parenting and the development of a more positive relationship and attachment style to their children.

Furthermore, the *PFL* Programme asserts that the improved knowledge, attitudes and well-being of parents will contribute to changed behaviour. For example, parents will provide better stimulation and nutrition for their children and be more likely to use preventive health services (and other services) in an effective and timely fashion. In sum, the *PFL* theory of change proposes that families will become more self-reliant through participating in the *PFL* Programme, ultimately promoting healthier child development. For example, the enhanced stimulation and nutrition will improve children's cognitive skills and physical health. The greater use of preventive health services will help prevent injuries to the child and promote appropriate height and weight, all of which will contribute to greater school readiness for children participating in the *PFL* Programme.

Figure 1.2
Summary of theory of change for one-to-one mentoring as outlined in the PFL Programme Manual (Preparing for Life & The Northside Partnership, 2008)



1.4.1 Attachment Theory

The *PFL* Programme focuses on changing parental attitudes to facilitate stronger attachment between the parent and child (*Preparing for Life* & The Northside Partnership, 2008). Attachment during infancy is related to cognitive and non-cognitive skills later in childhood (Dyer Harnish, Dodge, & Valente, 1995) as infants who develop secure attachments with regular caregivers may form internal working models characterised by responsiveness which shape future interactions with those around them. Similar to other home-visiting programmes, the *PFL* Programme asserts that changing such attitudes will help create a stronger parent-child attachment, which will contribute to better child development (*Preparing for Life* & The Northside Partnership, 2008). Evidence shows that children with secure attachments to their parents are better able to take advantage of the opportunities that school offers, develop better social skills and have grater emotional stability (Marcus & Sanders-Reio, 2001; Stacksa & Oshiob, 2009). The *PFL* Programme works with mothers to facilitate competent and confident parenting which is characterised by providing nurturance (or a nurturing environment), protection, and ultimately assisting in the development of secure attachment bonds between parent and child. Additionally, the *PFL* Programme acknowledges the continuous nature of development. As such, the *PFL* Programme recognises that secure attachment bonds between parent and child have the capacity to influence not only early school readiness, but healthy lifelong development.

1.4.2 Socio-ecological Theory

It is important to examine and address the multiple contexts of the developing child (Bronfenbrenner, 1986). Adaptation in one ecological domain of functioning is embedded within larger domains of functioning and each of these domains is interconnected. In line with the logic model which hypothesises that child development will be enhanced through operating at a community level, the *PFL* Programme works under a socio-ecological theory of development as it incorporates multiple contexts of development into programme delivery. Specifically, the *PFL* Programme takes a holistic approach to programme delivery through reaching out to mothers, partners, grandparents, siblings, and other individuals involved in the child's life whenever possible. Additionally, the *PFL* Programme offers public health workshops which are open to everyone in the community focusing on subjects such as nutrition and stress control. Furthermore, the *PFL* Programme acknowledges that effective prevention and early intervention requires cooperation between family serving services and agencies. Therefore, the programme has supported the implementation of the Síolta programme, a National Quality Framework for Early Childhood Education in local early childhood care and education centres. The *PFL* programme has initiated interagency collaboration among state health, education, and social services in the community. Working within the larger community context is fundamental to the successful delivery of the *PFL* Programme.

1.4.3 Social Learning Theory

Social learning theory posits that children learn through an on-going dynamic exchange of cognitive, behavioural, and environmental inputs that are observed through the behaviour of others as well as interactions with others in their environment (Bandura, 1977). According to this theory, human beings actively process information; therefore they are able to accurately assess the costs and benefits of behaviour. Observational learning is a key component of this theory. In this sense, parents serve as models for their children, teaching through their own behaviour. As

the *PFL* Programme works with the parents to improve parenting behaviour by educating parents to make informed choices, it has the potential to affect child development. As parents begin to adopt healthy and socially acceptable behaviours, they serve as examples for their children. In turn, children begin to engage in healthier behaviours and interactions.

1.5 Home Visiting Programmes

Home visiting is one of the most commonly used approaches in preventive interventions designed to serve families with young children. Its popularity has been driven by the results of programmes, such as the Nurse-Family Partnership, which demonstrated long-term benefits for high risk parents and their children. In general, the goals of home visiting programmes are to provide parents with information, emotional support, access to other community services, and direct instruction on parenting practices (Howard & Brooks-Gunn, 2009). These programmes are generally designed to address the challenges inherent in serving the needs of children and families living in poverty and disadvantaged communities. Home visiting programmes allow service providers to more easily reach hard-to-access populations, thus removing significant logistical challenges that might deter families from participating in centre-based forms of intervention (Astuto & Allen, 2009; Sweet & Appelbaum, 2004).

As home visiting is a method of service delivery and not necessarily a theoretical approach, individual programmes differ with respect to the age of the child, the risk status of the family, the range of services offered, the intensity of the home visits, and the content of the curriculum that is used in the programme. Furthermore, programmes vary in terms of who provides services (social professionals, usually social workers or health professionals, typically nurses), how effectively the programme is implemented, and the range of outcomes observed. Home visitors may act as literacy teachers, parenting coaches, role models, and experts on topics related to parent and child health and well-being. The visitor may be a source of social support or act as resource providers, linking families to social supports and providing them with referrals to other resources in the community, such as mental health or domestic violence services. The common goal of all home visiting programmes however is to deliver services in the home that alter parenting practices such that there is a measurable and long-term benefit for those children served (Howard & Brooks-Gunn, 2009).

1.5.1 Effectiveness of Home Visiting Programmes

The key component of the *PFL* programme is the home visiting service. The findings regarding the effectiveness of home visitation programmes on family and child outcomes are mixed. For example, Gomby, Curloss, and Behrman (1999) report that the impact of home visiting programmes is neither consistent nor great in magnitude. However, as more research becomes available, it is increasingly apparent that home visitation is a viable vehicle for service delivery and may have benefits, most notably in terms of improving parenting practices (Howard & Brooks-Gunn, 2009). The challenge to synthesising the home visiting literature is that home visiting programmes are quite diverse, differing in terms of design, implementation, administration and sample size (Nievar, Van Egeren & Pollard, 2010). Furthermore, few studies demonstrate strong programme effects early in childhood. Rather, long term effects in late adolescence and into adulthood are more commonly reported. Gomby (2005) conducted a review

of home visiting programmes, which were similar to the *PFL* Programme. Key findings from that study include:

- Home visiting programmes can produce benefits for children and parents, but the benefits are modest in magnitude (0.1-0.2 of a standard deviation in effect size).
- Home visiting programmes are most beneficial for families where either the need or the perceived need is greatest. Some studies suggest that the mothers categorized as high risk (e.g., low income teen mothers, those with low IQ or those with mental health problems) may benefit most.
- Programmes that offer home visiting in conjunction with centre-based programmes produce the largest and most long-lasting results, compared to programmes that offer home visiting services alone. In particular, centre-based programmes with a parenting training component have been found to improve child vocabulary, reading and math skills, and overall IQ. Additionally, some of these improvements have been found to last into the teen years.
- Parenting programmes that involve both parents and pre-school staff are more successful in addressing behavioural problems than programmes that involve only parents.

Kahn and Moore (2010) reviewed the impact of 66 rigorously evaluated programmes, all of which included a home visiting component. Effects across several domains were reviewed, such as overall physical health, externalising behaviour, cognitive development, social skills, mental/emotional health, parenting skills, parent/child relationship, child maltreatment, substance use and reproductive health. Overall this study found that 32 out of the 66 programmes had a positive impact on at least one measured outcome. Of the 66 programmes, 35 home visiting programmes specifically targeted early childhood, with 17 having an impact on at least one outcome. Almost all the programmes reviewed included parenting skills education during home visits. The authors concluded that effective programmes include high intensity early childhood interventions that last for more than a year with an average of four or more home visits per month and programmes that utilize therapists/social workers to teach parenting skills. They reported mixed findings regarding programmes that utilised trained non-professionals as home visitors, those that targeted teen mothers, those that started before birth and those that provided a combination of parenting support and referrals to other services. Gomby (2007) makes it clear that the findings from home visiting programmes may be mixed as home visiting is a general service strategy not a specific intervention and therefore contextual factors such as programme content and family and community environment may impact results.

1.5.2 Evidence on Short-term Effectiveness of Home Visiting Programmes

There is conflicting evidence on the early effectiveness of home visiting programmes within the first six months of a child's life. Some investigations of six month outcomes find no significant differences between intervention and control groups, while others find significant improvements in parent and child outcomes at 6 months and 12 months of age (Culp, Blankemeyer & Passmark, 1996; Culp, et al., 2004; Jungmann, et al, 2011; Shute & Judge, 2005; Heinicke, Fineman, Ruth, Recchia & Guthrie, 1999; Wasik, Ramey, Bryant & Sparling, 1990).

In a recent review, Avellar and Paulsell (2011) noted mixed results on the effectiveness of home visiting programmes at or before 6 months. This review identified seven home visiting programmes: Early Head Start-Home Visiting, Family Check-Up, Healthy Families America

(HFA), Healthy Steps, Home Instruction for Parents of Preschool Youngsters (HIPPY), Nurse Family Partnership (NFP) and Parents as Teachers (PAT), which meet the criteria for evidence-based early childhood home visiting service delivery models. Each of these programmes were evaluated using randomised controlled trials and quasi-experimental designs that were rated as either high or moderate in quality by trained reviewers. Several studies which met this criteria reported significant early outcomes. Love et al. (2001) showed that early participation (6-15 months) in the Early Head Start - Home Visiting programme significantly increased parental participation in education or job training activities. In addition, an investigation of Nurse Family Partnership (NFP) programme by Olds and colleagues (2002) found that at six months of age, nurse visited infants were less likely to exhibit emotional vulnerability in response to fear stimuli than infants in a control group. Other studies examining the Healthy Steps programme found that intervention children were significantly more likely to attend age-appropriate health visits and to be immunised on time at one and two months of age (Guyer et al., 2003). At 2-4 months, parents in the Healthy Steps intervention group were more likely to be feeding their babies appropriately and placing their babies in a safe sleeping position (Minkovitz et al., 2001).

Other evaluations find evidence that home visiting programmes can have a positive impact on pregnancy and early infancy. Results from a German pilot home visiting project, Pro Kind, found that at six months there was a significant difference in cognitive development between treatment and control groups, with children in the Pro Kind treatment group showing better cognitive and psycho motor development (Jungmann et al., 2011). An evaluation of a Cincinnati home visitation programme found that children whose mothers did not receive home visitation were 2.5 times more likely to die during infancy than children whose families participated in the programme (Donovan et al., 2007). Moreover, Black, Dubowitz, Hutcheson, Berenson-Howard and Starr (1995) found that at the end of a one-year intervention for underweight children consisting of either clinical care alone or clinical care plus home intervention, children in both groups improved in weight for age, weight for height, and height for age, however children in the home intervention group had better receptive language over time and more child-oriented home environments.

Home visiting programmes have been found to have early direct benefits for parents as well. An evaluation of Starting Well, an intensive home visiting programme, found that at six months treatment parents were less likely to be at risk of depression and were more likely to be registered with a dentist (Shute & Judge, 2005). Culp et al. (1996) examined the Parent Education/Home Visitation Program, which provided weekly in-home education to mothers. They found significant improvements in parental knowledge of child and parent roles in the family, as well as significantly improved safety in the home at six months. Culp et al. (2004) investigated Community-Based Family Resource Service (CBFRS) programmes across five counties in Oklahoma, America and found significant differences at six months regarding parents understanding of developmental expectations and the use of non-corporal punishment. This study also found that mothers were more accepting of their children and the home environment was improved at six months (Culp et al., 2004).

High-quality published studies of other home visiting programmes, such as the Family Check Up, HFA, HIPPY and PAT, either did not report any significant early outcomes or did not assess

early outcomes (Shaw, Dishion, Supplee, Gardner & Arnds, 2006; Anisfeld, Sandy & Gutterman, 2004; Baker & Piotrkowski, 1996; Wagner & Spiker, 2001).

Table 1.2 reflects the outcomes from home visiting programmes within the first six months postpartum. The primary source of information for the table was the Home Visiting Evidence of Effectiveness (HomVEE) website (http://homvee.acf.hhs.gov/). This site was launched by the U.S. Department of Health and Human Services to conduct a thorough and transparent review of the home visiting research literature and provide an assessment of the evidence of effectiveness for home visiting programme models that target families with pregnant women and children from birth to age five. Trained reviewers evaluated randomised controlled trials and quasi-experimental designs for each model and authors were given the opportunity to respond to missing information.
The table contains results from studies that were rated as either:

(1) High: random assignment studies with low attrition of sample members and no reassignment of sample members after the original random assignment, and single case and regression discontinuity designs that meet the What Works Clearinghouse (WWC) design standards, or
(2) Moderate: random assignment studies that due to flaws in the study design or analysis (e.g. high sample attrition) do not meet the criteria for the high rating, matched comparison group designs, and single case and regression discontinuity designs that meet WWC design standards with reservations.

In addition, the *PFL* evaluation team conducted an extensive literature search according to the criteria outlined by HomVee. The table consists of findings observed at or before six months postpartum from the sources after the year 1989.

Table 1.2
Evaluation of Early Outcomes for Home Visiting Programmes.

Programme	Author	Sample Size	Outcome	Measures used	Sig. Finding	Effect	Timing
Healthy Families America	Lee et al., (2009)	501	Child Health	Low Birth Weight	Birth weight	Favourable	Birth
	Anisfeld et al., (2004)	359	Child Development & School Readiness	ASQ (communication, gross motor, fine motor, social, composite score), Bayley (MDI – mental development index & PDI – psychomotor development index)	None	None	6 months
	Anisfeld et al., (2004)	354	Maternal Health	MSSI (Perceived Social Support)	None	None	6 months
	Anisfeld et al., (2004)	354	Family Economic Self-Sufficiency	Maternal Employment/Education	None	None	Pre-birth, 6 months
	Anisfeld et al., (2004)	354	Positive Parenting Practices	NCAST (Nursing Child Assessment Satellite Training)	None	None	6 months
	LeCroy & Crysik, (2011)	180	Maternal Health	Alcohol Use, Using Birth Control, Use of resources, Emotional loneliness, Pathways to goal	Use of resources	Favourable	6 months
	LeCroy & Crysik, (2011)	180	Positive Parenting Practices	Inappropriate expectations, Lack of empathy, belief in corporal punishment, Reversing roles, Oppressing child's independence (AAPI-2), Safety practices, Mother's reading	Safety practices	Favourable	6 months
	LeCroy & Crysik, (2011)	180	Reductions in Juvenile Delinquency, Family Violence, and Crime Outcomes	Family Violence	None	None	6 months
Healthy Start	Stabile & Graham, (2000)	478-487	Child Health	Birth Weight, Pre-term Birth, Poor birth outcome	None	None	Birth

Healthy Steps	Johnston, Huebner, Tyll, Barlow & Thompson (2004)	257	Child Health	Breastfeeding, Breastfeeding Support	None	None	3 months
	Johnston et al., (2004)	257	Maternal Health	CES-D score, Psychosocial Profile, Support Behaviour Inventory, Household Drug/Alcohol Concern, Household Smoke Free	None	None	3 months
	Johnston et al., (2004)	257	Positive Parenting Practices	Played with baby daily, Parenting sense of competence, Role satisfaction, KIDI score, Knowledge of sleep positions, Endorsed appropriate discipline, Home safety index, Safe-sleep practices, Read with infant in past week, Self-efficacy	None	None	3 months
	Guyer et al., (2003)	1950-2086	Child Health	Continuation of breastfeeding, Hospitalisation since birth, One month Well-Child Care visit, DTP vaccination	One month well-child care visit and DTP vaccination	Favourable	1 & 2 months
	Guyer et al., (2003)	1987	Maternal Health	Mother resumed smoking	None	None	2-4 months
	Minkovitz et al., (2001)	1987	Positive Parenting Practices	Car in back seat, Lowered water temperature., Gave baby cereal, Showed picture books daily, Followed at least 2 routines, Played with baby daily, Sleep position, Gave baby water	Sleep position and Giving the baby water	Favourable	2-4 months
Nurse Family Partnership (NFP)	Olds et al., (2002)	543-605	Child Development & School Readiness	Infant vulnerability (fear stimuli), Infant low vitality (joy stimuli, anger stimuli), Irritable temperament	Infant vulnerability: fear stimuli	Favourable	6 months

	Kitzman, Olds et al., (1997)	1139	Child Health	Birth weight, Gestational age, 5-minute Apgar, In uterine growth, Preterm delivery	None	None	Birth
	Nguyen, Carson, Parris & Place (2003)	154-156	Child Health	Gestational age, Birth weight		Favourable (*Statistical significance not reported)	Birth
	Kitzman, Olds et al., (1997)	1139	Family Economic Self-Sufficiency	Used other community services, In school during pregnancy, Employed during pregnancy	Used other community services	Favourable	36th week of pregnancy
	Kitzman, Olds et al., (1997)	1139	Maternal Health	Gestational weight gain, Systolic blood pressure, Diastolic blood pressure, Visits (standard prenatal care, obstetrical evaluation), Number of; hospitalizations, Gardnerella infections, yeast infections, sexually transmitted diseases, Pregnancy-induced hypertension	Number of yeast infections and pregnancy induced hypertension	Favourable	36th week of pregnancy
Starting Well	Shute & Judge, (2005)	359	Child Health	Dental registration	Dental registration	Favourable	6 months
	Shute & Judge, (2005)	359	Maternal Health	Edinburgh Postnatal Depression Scale (EPDS) & EPDS for women at risk of postnatal depression	EPDS scores for women at risk of postnatal depression	Favourable	6 months
	Shute & Judge, (2005)	359	Positive parenting practices	HOME inventory (total score)	None	None	6 months
ProKind	Jungman et al., (2011)	755	Child Development & School Readiness	Cognitive development (MDI), Psychomotor development (PDI)	Cognitive development	Favourable	6 months
	Jungman et al., (2011)	755	Child Health	Gestational age, Birth weight	None	None	Birth
	Jungman et	755	Maternal Health	Smoking behavior,	None	None	36th week of

	al., (2011)			Screening during pregnancy			gestation
Community Based Family Resource Service Programmes (CBFRS)	Culp et al., (2004)	354	Positive Parenting Practices	Massachusetts Safety Checklist, Adult-Adolescent Parenting Inventory (AAPI); Parenting knowledge , HOME inventory	Parenting knowledge (developmental expectations, noncorporal punishment), HOME inventory (acceptance and organization subscale)	Favourable	6 months
	Culp et al., (2004)	354	Linkages & Referrals	Active utilization of community services	Active utilization of community services	Favourable	6 months
Family Care	Armstrong, Fraser, Dadd & Morris, (1999)	181	Child Health	Breastfeeding, Parent questionnaire (Intention to vaccinate against disease, Sudden Infant Death Syndrome - risk factor knowledge & preventative health practice), Utilisation of medical services, Accidental injury	None	None	6 weeks
	Armstrong et al., (1999)	181	Positive Parenting Practices	HOME inventory	HOME (multiple subscales & total score)	Favourable	6 weeks
	Armstrong et al., (1999)	181	Maternal Health	Edinburgh Postnatal Depression Scale (EPDS), Parenting Stress Index (PSI)	EPDS scores, PSI (child reinforces parent)	Favourable	6 weeks
Resources, Education and Care in the Home (REACH)	Barnes-Boyd et al., (1996)	372	Child Health	Incidence of preventable health problems	Incidence of preventable health problems		7 to 15 days after birth
Early Intervention Program for Adolescent Mothers	Koniak-Griffen et al., (2000)	121	Child Health	Birth weight, percentage premature, No. days for birth related infant hospitalization, Additional days rehospitalisation, Total no. days infant rehospitalisation in 1st 6	Additional days of rehospitalisation, Total no. days infant rehospitalisation during 1st 6 weeks	Favourable	Intrapartum, 6 weeks postpartum

				weeks			
	Koniak-Griffen et al., (2000)	121	Maternal Health	Prenatal health problems, No. prenatal visits, Substance use, Internal Social competence, External social competence	External social competence	Unfavourable	6 weeks postpartum
	Koniak-Griffen et al., (2000)	121	Family Economic Self-Sufficiency	Education outcome, Education transition	Education outcome, Education transition	Favourable	6 weeks postpartum
	Koniak-Griffen et al., (2000)	121	Positive Parenting Practices	Nursing Child Assessment Teaching Scale (NCATS: mother's score, total score)	None	None	6 weeks postpartum

Favorable impact. A statistically significant impact on an outcome measure in a direction that is beneficial for children and parents

Unfavorable or ambiguous impact. A statistically significant impact on an outcome measure in a direction that may indicate potential harm to children and/or parents.

1.6 Description and Objectives of the *PFL* Impact Evaluation

The *PFL* Programme is being evaluated by the UCD Geary Institute using a mixed methods approach, incorporating a longitudinal experimental design and implementation analysis. The experimental component involves the random allocation of participants from the *PFL* communities to either a low or high supports treatment group for the duration of the five year programme. The *PFL* treatment groups also are being compared to a 'services as usual' comparison group, who do not receive the *PFL* Programme. This comparison group was identified using quasi-experimental methods. Specifically, hierarchal cluster analysis was used to identify communities that rank closely to the *PFL* community in terms of standard socioeconomic demographics such as education, employment, and percentage living in social housing, but do not receive any intervention.

The impact evaluation collects data on children's physical health and motor skills, social and emotional development, and behaviour, learning, literacy and language development, and on mother's pregnancy behaviours, physical and psychological health, cognitive ability, personality, and parenting skills from pregnancy onwards. Data are collected from all three groups at baseline (t0), and when the child is six months (t1), 12 months (t2), 18 months (t3), 24 months (t4), three years (t5), and four years old (t6). In addition to these data collection time points, maternal cognition is assessed one time throughout the duration of the programme (usually between t0 and t1) using the Wechsler Abbreviated Scale of Intelligence (WASI, Wechsler, 1999). Although the mother is the primary informant in all waves of data collection, information is also obtained from fathers, the *PFL* child, and other independent data sources, such as maternity hospital records. The current report provides a description of maternal responses obtained through face to face structured interviews at t1, when the *PFL* child was approximately six months old.

Parallel to the impact evaluation, an implementation analysis is being conducted using a multi-sequenced design, integrating focus group methods with *PFL* participants and semi-structured interviews with programme staff to assess programme implementation and fidelity. In addition, implementation data recorded by programme staff (using a Database Management System) are also being tracked on an on-going basis to measure attrition, programme dosage and service provision. The current report provides information on the implementation of the *PFL* Programme and examines programme dosage for participating families.

1.7 Hypotheses

As illustrated in the logic model and theory of change, the primary aim of the *PFL* Programme is to change parent knowledge, attitudes, and feelings leading to improved parenting behaviour, which will then positively impact child development, ultimately increasing a child's school readiness. However, *PFL* also hypothesises that the programme will have an effect on other child and family outcomes (e.g. social support, service use, maternal health and well-being). Therefore, *PFL* may affect both primary and secondary outcomes. In effect, secondary outcomes may serve as mediators or explanatory factors that may help to clarify the relationship between the *PFL* Programme and any observed effects on parenting skills or child school readiness.

Our hypotheses regarding the effectiveness of the *PFL* Programme on the primary and secondary outcomes at six months of age are informed by the evidence described above on the early impact of home visiting programmes. The most recent and comprehensive review of home visiting programmes, the Home Visiting Evidence of Effectiveness (HomVEE) as described above, identified eight domains in which home visiting may be effective – child development and school readiness, child health, family economic self-sufficiency, linkages and referrals, maternal health, positive parenting practices, reductions in child maltreatment and family violence, and reductions in juvenile delinquency. Based on the *PFL* Logic Model, of the aforementioned factors, we have identified primary outcomes as child development and school readiness, child health, and positive parenting practices. Secondary outcomes include various components of the other five domains.

As shown above, very few rigorous evaluations of home visiting programmes either report or identify significant differences between the treatment and control groups at or before six months. Only two studies identified treatment effects on child development concerning infant vulnerability and cognitive development. Several studies found treatment effects on child health, most notably in terms of birth weight, vaccinations, dental registration, and rehospitalisation, although these effects were not consistent across all studies. Similarly, a number of studies had an impact on positive parenting practices, in terms of the safety practices, appropriateness of baby sleeping position, parenting knowledge, and the home environment. However, more non-significant treatment effects than significant treatment effects were reported in this domain.

Regarding the secondary outcomes, several studies report positive findings however these were not consistent across programmes. One study reported treatment effects on family economic self-sufficiency in the realm of education and two studies found effects on linkages and referrals and use of community services. In regards to the maternal health domain, one of the programmes reported an effect on diet, infections, self-efficacy, and others found effects on postnatal depression, and use of resources. However it is important to note that there were far more non-significant treatment effects found in this domain at six months. Only one of the programmes reviewed family violence and found no effects. However, none of the programmes reviewed measured child maltreatment at six months. Similarly, the *PFL* evaluation did not directly evaluate indicators of child maltreatment or family violence and crime at 6 months. However, factors known to be associated with child maltreatment, such as child safety and the quality of the home environment (Geeraert, Van den Noortgate, Grietens, & Onghena, 2004; Gutterman, 1997) were assessed.

Overall, based on previous findings, we expect to find few significant treatment effects on outcomes of interest at six months. Although individual participants may have benefited from the *PFL* programme and there may be some effects for certain measures, given the mixed findings of similar studies, it is unlikely that multiple hypothesis testing will reveal significant group differences at six months.

1.8 Description of 6 Month Survey and Data Collection Process

Between December 2008 and September 2011, a second comprehensive interview was conducted by the *PFL* Evaluation Team, within two weeks before or after each *PFL* baby reached six months of age. In total, 257 six month interviews (n_{Low} = 90; n_{High} = 83; n_{Comp} = 84) were completed. The average age of the target child at time of completion was 6.3 months old (*SD* = 2.4 weeks). Twenty *PFL* participants (n_{Low} = 6; n_{High} = 14) and 9 comparison participants dropped out of the evaluation after completing the baseline interview, but prior to completing a six month interview. A comprehensive analysis of attrition rates may be found in Chapter 6 of this report. Interviews lasted approximately one to one and a half hours and were conducted using a Computer Assisted Personal Interviewing (CAPI) technique in which the interview was pre-programmed on a laptop computer to ensure accurate routing of questions and reduce errors associated with data entry. Although home interviews were encouraged, participants had the option of conducting the interview either in her home or in a local community centre. The majority of participants in the high treatment group (79.5%) and the low treatment group (85.6%), as well as the comparison community (89.3%) completed the interview in their homes. Each participant was given a €20 shopping voucher after the six month interview was completed as a thank you for taking the time to complete the interview. In addition, fathers within the *PFL* cohort were invited to self-complete a six month questionnaire. Of the 93 self-complete questionnaires distributed to fathers, 32 questionnaires were returned. This represents 34.4% of all distributed father questionnaires and 13.7% of all *PFL* participants. Due to the relatively low number of father responses, this report will concentrate on maternal responses.

During this interview the interviewer asked some of the questions that were asked during the baseline interview as well as several new questions, particularly in relation to the *PFL* child. The repeated questions included family demographics and socio-economic profile, maternal physical and mental health, psychological well-being, health behaviour, family relationships, parenting beliefs, social support system, and use of health and social services. Questions new to the six month questionnaire included items related to the child including child demographics, child health, motor skills, cognitive development, behavioural and emotional functioning, temperament, and social emotional development. In addition, questions regarding parental stress, the home environment, and child care arrangements were asked to gain a full picture of the child's context. The six month survey was divided into ten modules, each containing questions with a common theme.

1. Your Baby's Development
2. Your Baby
3. Your Health
4. Your Thoughts on Parenting: Part 1
5. Update on Your Life
6. Your Other Children
7. Your Social Support Network
8. Your Thoughts on Parenting: Part 2
9. Your Home Environment
10. Closing

This report focuses on eight domains incorporating 25 categories and 160 outcome measures. The domains and categories within each domain are – child development (ASQ scores & difficult temperament; ASQ cut-off scores), child health (child physical health; mother's health decisions for her child; sleep routines), parenting (Parental Locus of Control; Condon Maternal Attachment Scale; Parental Stress Inventory; Parental Cognition and Conduct Towards the Infant Scale; all parenting measures), home environment and safety (Home Observation for Measurement of the Environment; safety), maternal health and pregnancy (maternal physical health; maternal mental health; substance use during pregnancy; current substance use), social support (satisfaction with father involvement; social support measures), childcare and service use (childcare measures; service use measures), and household factors and socioeconomic status (household factor measures; parental education; maternal employment; paternal employment; household finances).

1.9 Aims and Overview of Report

The aims of this report are twofold. First, to determine whether the *PFL* programme has an impact on parent and child outcomes at and before six months, and second to provide a detailed review of implementation practices in the *PFL* programme regarding attrition, dosage, participant engagement, and programme effectiveness/satisfaction from the perspectives of participants and *PFL* staff. As future waves of data collection are completed, the data presented here will be used to conduct longitudinal analyses to examine the impact of the programme on changes in mother and child behaviour over time.

The report is organised as follows. Chapter Two provides a brief review of the recruitment rate and baseline characteristics of participants. Chapter Three describes the methodology employed in the analysis. Chapter Four presents the results comparing the *PFL* high treatment group and the *PFL* low treatment group on all primary outcome domains (child development, child health, parenting) and secondary outcome domains (home environment and safety, maternal health, social support, childcare and service use, family economic self-sufficiency). It also presents the results from the sub-group analyses examining whether the *PFL* programme has differential effects by gender, primiparous status, marital status, risk status and maternal cognitive resources. Chapter Five presents the results comparing the two *PFL* treatment groups to the community comparison group. Chapter Six presents an implementation analysis of the *PFL* Programme between programme intake and six months. Chapter Seven presents results from participant focus groups and interviews with *PFL* staff. Chapter Eight presents an analysis of contamination in the *PFL* Programme. Chapter Nine summarises and concludes the results from both the quantitative and qualitative analyses.

CHAPTER 2: Recruitment and Baseline Analysis

This chapter summarizes the *PFL* recruitment process and analysis of the baseline data. In-depth information on these processes is available in the report entitled *Preparing for Life Early Childhood Intervention Impact Evaluation Report 1: Recruitment and Baseline Characteristics* (Doyle, et al., 2010).

2.1 Recruitment

The inclusion criteria for the *PFL* Programme and Evaluation were based on geographical residence and pregnancy status, and included both primiparous and non-primiparous women. The original *PFL* catchment area was expanded in January 2009 to include the areas of Ferrycarrig, Glin, and Greencastle and in late June, 2009 to include additional communities in Dublin 17 and Dublin 5. These areas were all chosen due to their demographic similarity on key socio-demographic characteristics. Additionally, all expansion areas were geographically close to the original *PFL* catchment area. Of the 233 total participants recruited by the *PFL* programme, 172 (74%) are from the original catchment area, 39 (17%) are from the first expansion area, and 22 (9%) are from the second expansion area. Recruitment into the *PFL* Programme and comparison communities began in late January, 2008 and was finalised in September, 2010. In total, 233 women, with 118 randomly assigned to the low treatment group and 115 randomly assigned to the high treatment group, from the *PFL* catchment area and 99 women from the comparison community were recruited.

Recruitment into the *PFL* Programme and Evaluation occurred through one of two sources: 1) in the maternity hospital or 2) in the community. According to public health nurse records, the population-based recruitment rate for the *PFL* cohort, *based on all live births during the recruitment phase*, was 52%. 22% of pregnant women in the area were not identified in the recruitment phase and a further 26% were approached and not interested in participating. The sample-based recruitment rate for the *PFL* cohort, *based on all approached eligible participants during the recruitment phase*, was 67%. The sample-based recruitment rate for the comparison community was 36%.

2.2 Description of Baseline Analyses

Upon joining the programme, a baseline assessment was conducted with all participants. As this report focuses on the first wave of outcome data, collected when the *PFL* child was approximately six months old, a brief discussion of the baseline characteristics of the sample is essential. Baseline analyses included data from 205 *PFL* participants, 101 from the low treatment group and 104 from the high treatment group, and 99 community comparison participants. Differences in baseline characteristics between the low and high *PFL* treatment groups and the aggregate *PFL* cohort and the comparison community across a wide range of parental and family characteristics and behaviours were conducted and are reported, in detail, elsewhere[1]. In total,

[1] For a detailed report of baseline characteristics, please refer to (Doyle, McNamara, Cheevers, Finnegan, Logue, & McEntee, 2010). http://ideas.repec.org/p/ucd/wpaper/201050.html

baseline differences on 123 measures were analysed for the low and high treatment groups and differences in 114 measures were analysed for the combined *PFL* group and the comparison community. The low *PFL* treatment group and the high *PFL* treatment group did not statistically differ on 97% of these measures, thus indicating that the randomisation process was successful and suggesting that the low and high *PFL* treatment groups were similar at baseline, before the intervention began. The aggregate *PFL* group and the comparison community did not statistically differ on 75% of these measures. However, measures where differences emerged suggest that the comparison community is a relatively higher socioeconomic status cohort. Chapter 6 of the report will document in details where these differences emerged and outlines the procedures used to take account of these initial baseline differences. A summary these results are presented in Table 2.1.

Table 2.1
Summary of Permutation Tests Examining Differences at Baseline

	Proportion of Measures Not Significantly Different at Baseline	
Chapter	*PFL* Low – *PFL* High	*PFL* – Comparison Community
Parental Demographics, Education, and Employment, and Household SES Indicators	33/33	27/33
Maternal Well-being and Personality	24/24	18/24
Maternal Health and Pregnancy	35/35	26/35
Cognition, Thoughts About Parenting, and Intentions for Baby	10/13	6/13
Social Support	17/18	9/9
TOTAL **NOT** STATISTICALLY DIFFERENT	119/123 (97%)	86/114 (75%)

2.3 Key Recruitment and Baseline Analysis Findings

- Inclusion criteria for the *PFL* Programme were based on geographical residence and pregnancy status.

- Recruitment into the *PFL* Programme and comparison communities began in late January, 2008 and was finalised in September, 2010. In total, 233 *PFL* participants were recruited into the programme, with 118 assigned to the low treatment group and 115 assigned to the high treatment group. Additionally, 99 participants were recruited from the comparison community.

- Recruitment into the *PFL* Programme occurred through one of two sources: 1) in the maternity hospital or 2) in the community.

- The population-based recruitment rate for the *PFL* cohort, *based on all live births during the recruitment phase*, was 52%.

- The sample-based recruitment rate for the *PFL* cohort, *based on all approached eligible participants during the recruitment phase*, was 67%.

- The sample-based recruitment rate for the comparison community, *based on all approached eligible participants during the recruitment phase,* was 36%.

- The low *PFL* treatment group and the high *PFL* treatment group did not statistically differ on 97% of baseline measures.

- The aggregate *PFL* group and the comparison community did not statistically differ on 75% of baseline measures, with the direction of results suggestive that the comparison community is a relatively higher socioeconomic status cohort.

CHAPTER 3: Methodology of Analyses

This chapter describes the methodology used in Chapters 4 and 5 to conduct the outcomes analysis of the six-month data. It also describes how the tables of results in Chapters 4 and 5 can be interpreted.

3.1 Data Preparation

3.1.1 Handling Missing Data

While participants were encouraged to answer all questions during the six-month interview, there were cases in which participants either could not provide a response to a question or did not wish to provide a response. This non-response resulted in missing data on some items. Overall, the extent of missing information in the six-month data is very low; less than 4.3 per cent of data were missing for each psychometric scale. In order to account for missing data, interpolation methods were used. Note that such methods were only used for standardised psychometric scales, as it is possible to utilise information within that scale to replace the missing data. In cases where data were missing on single item measures, observations with missing data were excluded from the analysis. On average, 99 per cent of data were present for single item measures.

For the standardised scales, such as the Parenting Stress Index, missing data were imputed using responses that mothers had provided on other items within the standardised scale. The method involved replacing missing items with the group mean for that item and then adjusting for variation in responses on that item. As responses on the standardised measures were on continuous scales e.g. 0-100, it was possible to calculate means. Specifically, the average response to a given item was calculated for each of the three groups (low treatment, high treatment, and comparison community). Missing items were then replaced with the corresponding group mean. As replacement using only the group mean may lead to under-estimation of the variance, the missing data for standardised scales were imputed using the mean plus a random residual value. The number of respondents for whom items were imputed ranged from zero (*WHO5 Well-Being Index*) to eleven (*Parental Stress Index*) resulting in an overall imputation average of 2 observations for the standardised scales.

3.1.2 Multiple Imputation and Missing Data for Home and SHIF Measures

While the overall level of missing data in the six month interview was low, there was a substantial amount of missing data on the Home Observation for Measurement of the Environment (HOME) and Supplement to the HOME Scale for Impoverished Families (SHIF). The HOME/SHIF measures the stimulation potential of the child's home environment and is based on direct observations and questions elicited by the interviewer. The missing data on the HOME/SHIF measures arose for three reasons. First, the child was not present or was asleep when the interview took place, which was the case in about 25% of interviews. As some of the HOME/SHIF items were based on observations of interactions between the parent and child it is necessary that the child is present in order to provide a score for these items. Second, the interview was not conducted in the home for about 15% of interviews. As some of the items are based on materials available within the home, the interviewer was not able to provide scores on these items when the interview took place outside the home. Third, the interviewer could not

score certain items, which, for our sample, is negligible in scale. These missing observations meant that, in some cases, a significant number of missing values were generated for the overall HOME/SHIF measures, ranging from 0.4% to 31% of the total sample size. We cannot, however, assume that the observations were missing at random for the first two cases outlined above, as there may be an element of self-selection by parents who either did not want the interview to be conducted in the home or did not want their child to be present for the interview. In these cases, it was necessary to use imputation methods to account for missing data in the sample. This was achieved via a multivariate normal regression approach. The covariates used in the imputation process were based on those measures that the respondents significantly differed in terms of the probability that the interview was conducted in the home, the probability that the child was present, and the overall HOME scores. Overall, the mean and dispersion of the imputed and non-imputed data were quite similar.

3.1.3 Standardised Scale Reliability

Cronbach's alpha (α) coefficients (Cronbach, 1951) were calculated for all standardised scales used in this report and are reported in the text along with the description of these scales. Cronbach's alpha measures the intercorrelations between items of the various psychometric scales; it provides an indicator of the internal consistency or reliability of the measure (Cronbach, 1951) and provides an indication of how closely items that make up a latent variable or scale are related. In terms of interpretation, a Cronbach's alpha value of 0.7 or higher is considered evidence of sufficient dependability (Breakwell, 2006). Alphas for each standardized measure used in this evaluation are discussed in detail in the sections that follow.

3.2 Outcomes Analysis

The raw data collected as part of the six month interviews was used to generate 160 outcome measures which were included in the outcomes analysis. Both continuous and binary measures were used in this report. While many measures, such as age, are treated as continuous in the analysis, all categorical measures, such as parental education levels, were dichotomized for ease of analysis and interpretation. Measures that were dichotomised are noted throughout in the instrument descriptions in Chapter 4.

3.2.1 Permutation Testing of Hypothesis

The small sample size of *PFL* calls into question the validity of applying classical tests, such as those based on the *t*, *F*, and *Chi-square* statistics, to determine programme impact, i.e., when comparing the outcomes of the high treatment group to the outcomes of the low treatment group. Classical statistical tests rely on the assumption that sample sizes are large, and produce inferences, based on p-values that are only valid for large samples. These tests can be unreliable when the sample size is small. As the sample size of the *PFL* evaluation is relatively small, all the analyses comparing the six month outcomes of the high treatment, low treatment and comparison groups uses an alternative approach called Permutation-based hypothesis testing. This approach has been found to be appropriate for small samples and was used to analyse data for a similar evaluation of the Perry Preschool Program by Heckman and colleagues (2010).

In general, the overall outcome for participants from any programme is a function of two possibilities: either receiving the treatment or not receiving the treatment, based on being in the

treatment or control groups, respectively. The issue for programme evaluation in observational studies is that we cannot directly observe both outcomes at the same time. In addition, attempts to isolate the direct effect of a programme can be confounded by participant self-selection into the treatment or control groups. Randomised controlled trials are structured to eliminate this self-selection problem, where the outcome from either group is statistically independent of actually receiving the treatment.

In essence, permutation tests involve testing a null hypothesis, (i.e., the hypothesis that the programme had no impact), using permutations of the data. Taking permutations of the data means randomly shuffling the data so that treatment assignment of some participants is switched between the treatment and control group. The null hypothesis of no-treatment effect is equivalent to the statement that the distribution of outcomes of the treatment and control groups are the same. If the null hypothesis is true and there are no real differences in the outcomes of the treatment and control group, then taking permutation of the data does not change the distribution of either outcome i.e. on average, the real data looks the same as the permuted data. Thus, we can test for the presence of a treatment effect by testing the equality of distributions between the treatment and control outcomes, whereby the joint distribution of outcomes and treatment is invariant to permutation of its elements. In practice, the permutation testing procedure compares a test statistic computed on the original (pre-permutation) data with a distribution of test statistics computed on re-samplings of that data. The measure of programme effectiveness, the *p*-value, is computed as the fraction of re-sampled data which yield a test statistic greater (or less, depending on the direction of the test) than that yielded by the original data.

Monte Carlo permutation tests, based on 1,000 replications (i.e. the data are shuffled 1,000 times), using a regression framework were used to compare the outcomes of the high treatment group and low treatment group and as well as the sub-group analysis. The regression framework calculated the difference between group means, while also accounting for the spread of responses. For the purposes of this report they may be interpreted in the same way as a standard t test.

3.2.2 Conditional Permutation Testing

As discussed in the previous section, the mechanics of the permutation testing procedure rely on the exchangeability properties of the joint distribution of outcomes and treatment assignment i.e. we assume switching treatment conditions does not matter. When this testing is applied to a randomized sample, the exchangeability property can be easily achieved. In a situation where the exchangeability property is not obvious, a conditional inference can be implemented using a revised version of permutation-based test that relies on restricted classes of permutations. This procedure uses *the conditional exchangeability property* and tests the distribution of outcomes being independent of treatment assignment, conditional on a set of conditioning variables on which the joint distribution of outcomes and treatment assignment is exchangeable. Heckman et al. (2010) applied this procedure to an empirical analysis where the randomization was compromised so that the exchangeability property was not guaranteed.

This procedure first partitions the sample into subsets, where each subset consists of participants with common background measures. Such subsets are termed *orbits* or *blocks*. Under the null hypothesis of no treatment effect, treatment and control outcomes have the same distributions

within an orbit. Equivalently, treatment assignments are exchangeable (and therefore permutable) with respect to the outcome for participants who share common pre-programme characteristics. Thus, the valid permutations swap labels *within* conditioning orbit and standard permutation methods are modified.

However, invoking conditional exchangeability decreases the number of valid permutations within the strata of the conditioning variables; the small sample size prohibits very fine partitions of the available conditioning variables. In general, nonparametric conditioning in small samples introduces the serious practical problem of small or even empty permutation orbits. To circumvent this problem and obtain restricted permutation orbits of reasonable size, we assumed a linear relationship between some of the baseline measures in the conditioning variables and the outcome. We partitioned the data into orbits on the basis of variables that are not assumed to have a linear relationship with outcome measures. The method regresses the outcome on a set of variables for which there is assumed to be a linear relationship, and then permutes the residuals from this regression within orbits defined by variables for which we do not assume the existence of a linear relationship. This method is referred to as the Freedman–Lane procedure (Freedman & Lane, 1983). In a series of Monte Carlo studies, this procedure has been found to be the more statistically sound (Anderson and Legendre, 1999).

Conditional permutation tests, based on 1,000 replications tests, are used in Chapter 5 to compare the outcomes of the *PFL* treatment group to the comparison community group.

3.2.3 Stepdown Procedure for Multiple Hypothesis Testing

As 160 outcome measures are considered in this report, it is possible that we may fail to reject some of these null hypotheses by chance (e.g. we may identify a significant difference between the high and low treatment groups on certain outcomes when there is, in fact, no significant difference). Multiple hypothesis testing allows us to test for the joint significance of multiple outcomes at the same time, thus minimising the likelihood of finding treatment effects that are false. The multiple hypothesis method that we use is called the stepdown procedure.

To illustrate the stepdown procedure, consider the null hypothesis of no treatment effect for a set of, say, K outcomes jointly. The complement of the joint null hypothesis is the hypothesis that there exists at least one hypothesis out of K that we reject. We apply the analysis of Romano and Wolf (2005) and its extension by Heckman et al. (2010). Their methods control for overall error rates for vectors of hypotheses using the family-wise error rate (FWER), the probability of yielding one or more false positives out of a set of hypotheses tests, as a criterion.

The procedure begins by considering the set of K null hypotheses, where each hypothesis postulates no treatment effect of a specific outcome. Smaller values of the test statistic provide evidence against each null hypothesis. The first step is a joint test of all null hypotheses. To this end, the method uses the maximum of the set of statistics associated with hypotheses being jointly tested. The next step compares the computed test statistic with the -quantile of its distribution and determines whether the joint hypothesis is rejected or not, where is the target level of FWER for which we want to control. If we fail to reject the joint null hypothesis, then the algorithm stops. If we reject the null hypothesis, then we iterate and consider the joint null hypothesis that excludes the most individually statistically significant outcome—the one that is

most likely to contribute to rejection of the joint null. The method 'steps down' and is applied to a set of $K - 1$ null hypotheses that excludes the set of hypotheses previously rejected. In each successive step, the most individually significant hypothesis—the one most likely to contribute to the significance of the joint null hypothesis—is dropped from the joint null hypothesis, and the joint test is performed on the reduced set of hypotheses. The process iterates until only one hypothesis remains. By doing this, we obtain K adjusted *p*-values that correct each single-hypothesis *p*-value for the effect of multiple hypothesis testing.

The validity of this procedure follows from the analysis of Romano and Wolf (2005), who provide general results on the use of stepdown multiple-hypothesis testing procedures. Similar to traditional multiple-hypothesis testing procedures, such as the Bonferroni or Holm procedures, this exhibits *strong FWER control*, in contrast with the classical tests like the *F* or *Chi-square*. The procedure generates as many *p*-values as there are hypotheses. Thus it provides a way to determine which hypotheses are rejected. In contrast with traditional multiple-hypothesis testing procedures, the stepdown procedure is less conservative. The gain in power comes from accounting for statistical dependencies among the test statistics associated with each individual hypothesis. For more information on this method please refer to Lehmann and Romano, 2005; Romano and Wolf, 2005; and Heckman et al. (2010).

3.2.4 Effect Size

The permutation tests provide a statistical method for determining whether a statistically significant relationship exists in the data. In order to understand the magnitude of the relationship, the effect sizes were calculated using Cohen's d. Cohen's d calculates the difference between the mean values of two groups, while accounting for the distribution of the values. The effect size statistics can be interpreted as follows: a Cohen's d ranging from 0.0 to 0.2 is deemed a small effect; values ranging from 0.2 to 0.8 represent a medium effect; and values greater than 0.8 illustrate a large effect (Gravetter & Wallnau, 2004). These effect sizes can be compared to the effect sizes reported in other similar programmes to provide a contextual interpretation to the findings.

3.3 Description of Outcome Tables

The following information is included in the outcomes tables presented in Chapters Four and Five. Each follows the same format. This section provides a reference for interpreting outcomes tables.

- *N* represents the number of respondents who are included in the analysis.
- *M* defines the mean, or average value, of responses. This statistic represents the average response of all participants who answered the question of interest. For binary variables, this value can be interpreted as the proportion of the sample who reported being in the category described.
- *SD* is the standard deviation. This is calculated by, firstly, summing up the difference between each observed response and the average response. This sum is then divided by the total number of observations to derive the average difference between responses and the mean. It serves as a useful indication of how varied the responses were.
- *Low/High/LFP* subscripts attached to the summary statistics (*N*, *M*, and *SD*) indicate the subgroups for which the summary statistics have been calculated. The mean responses for

the low *PFL* treatment group (low), high *PFL* treatment group (high), and the comparison group (*LFP*) are compared in multiple ways. The data are first grouped by *PFL* treatment status (low treatment and high treatment) to examine six-month differences within the *PFL* cohort and secondly, the high treatment group is compared to the comparison community group, and thirdly the low treatment group is compared to the comparison community group.

- The individual *p-value* represents the probability of observing differences between the two groups by chance. In cases where there is a statistically significant difference between the two groups, a *p*-value is presented which indicates the likelihood that the group difference could have randomly occurred. Consistent with the literature, a *p*-value of less than .05 is considered to be significant. A *p*-value of less than 0.05 (5%), 0.01 (1%), or .001 (0.1%) conveys that the probability that the difference between the two groups is due to chance is less than 5%, 1%, or 0.1%, respectively. Given that this is a six-month comparison, low *p*-values (i.e., significant results) would be a positive result indicating that the high treatment group is outperforming the low treatment group, and the *PFL* groups are outperforming the comparison group. *p*-values are presented for significant differences only. Non-significant differences are denoted by *ns*.
- The *p-value* from the Step Down test may be interpreted in the same manner as the individual *p-value* discussed above. Each *p-value* in the Step Down test represents the joint test of all outcomes included in that category. For example, the *p-value* corresponding to the first outcome in that category represents a test of the joint significance of all outcomes included in that category. The next p-value corresponding to the second outcome in that category represents the test that all remaining outcomes in that category are jointly significant, excluding the first outcome in that category. Similarly, the *p-value* corresponding to the third outcome in that category represents a test of the joint significance of all the outcomes remaining in that category, excluding the first two outcomes. Note that all outcomes in the tables are organised according to their individual *p-values*, such that the measure with the smallest *p-value* is listed first and the outcome with the highest *p-value* is listed last within that category. Thus, the ordering of the outcomes in the tables (within categories) is indicative of the strength of the treatment effects.
- *Effect size (d)* illustrates the magnitude of the group difference. While the *p*-value allows the reader to determine whether or not there is a statistically significant difference between groups, it does not indicate the strength of the difference. As the strength of a relationship can provide valuable information, the effect size was calculated using Cohen's *d*.

CHAPTER 4: Main Results – High and Low Treatment Groups

4.1 Introduction

This chapter presents the main results comparing the six month outcomes of the high treatment group to the six month outcomes of the low treatment group. The analysis focused on eight main domains – child development, child health, parenting, home environment and safety, maternal health and pregnancy, social support, childcare and service use, and household factors and socioeconomic status. Each domain is presented separately in sections 4.2 to 4.10. Each section includes a) a review of the literature examining the relevance of that domain for the *PFL* evaluation and the effectiveness of previous home visiting programmes on that domain, b) a description of the instruments used to measure the domain, c) the statistical results, in both text and table format, comparing the high and low treatment groups on that domain. As there were no statistical differences, on average, between the high treatment group and the low treatment group before the programme began, any identified statistical differences between the two groups at six months is indicative of a programme effect i.e. the additional supports provided to the high treatment group between programme entry and six months were effective at improving outcomes in that specific domain.

The tables report the number of participants included in the analysis (*N*), the average score (*M*) and the variability from the average (*SD*), for both the high and low treatment groups separately. They also report whether the difference between the high treatment group and the low treatment group is statistically significant for each individual outcome included in the domain. An outcome where there is no statistical difference between the two groups is indicated with a 'ns' representing 'not significant'. An outcome where there is a statistical difference between the two groups is indicated with the p value (p^1) showing the level of statistical significance i.e. p<.10, p<.05, and p<.01. The table also reports whether the outcomes are jointly significant within their respective Step Down categories, this is indicated in the same way as the individual outcomes (p^2). Finally, the table reports the size of the difference between the high and low treatment group for each outcome (*d*). In addition to the tables, each section also provides a written explanation of the results. The text describes how many of the outcomes in the domain were in the hypothesized direction. However, it only provides detailed information on the outcomes that were statistically significant.

Finally, section 4.11 presents a description of the interaction and sub-group analysis. The interaction and sub-group analysis was conducted to determine whether the impact of the *PFL* programme differed for certain groups of participants. Specifically, it examined whether the *PFL* programme had a greater impact on girls or boys, primiparous or multi-primiparous mothers, lone parents or partnered parents, higher or lower cognitive resource mothers, and high or low familial risk. The analyses were conducted using the same methods described above. The interaction analysis included an additional term in the model which tested whether the high and low treatment groups differed regarding the sub-group of interest e.g. gender. If the interaction analysis indicated that there was a statistical difference between the high and low treatment groups by gender, the sub-group analysis was conducted. The sub-group analysis involved dividing the sample by the sub-group of interest e.g. girls and boys, and conducting separate analysis for the two groups e.g. girls in the high treatment group were compared to girls in the

low treatment group. The results of the sub-group analysis are presented in the same manner as the main results described above.

4.2 Child Development

Infant development is reflected in the skills expected at a particular age and stage of life. Although it is generally accepted that infants do not automatically develop skills but require opportunities and support to develop appropriately, there are many different theories of development. There are elements of maturation in the developmental process; the infant cannot perform certain tasks until they grow physically or, according to Piaget, reach the next innate stage of mental development. There are also biological processes that contribute to development. The synaptic plasticity and pruning processes which take place in the brain during infancy make this a critical period in the emergence and development of skills and abilities which the infant will use for the rest of their life (Johnson, 2010). The school of Behaviourism and the Vygotsky approach conceive of parents as having a large role in their child's development. These theories view social and parental interaction as necessary for learning. An individual's environment is said to account for fifty per cent of the variance of psychological characteristics (Carr, 2006). As such, the negative consequences of neglect exemplify how lack of parental care and stimulation can have detrimental developmental effects. These effects can compound as genetic vulnerability, pre-natal and perinatal complications and consequences of subsequent bodily insults, injuries and illness can lead to multiple problems later in life (Carr, 2006).

Home visiting interventions have reported mixed success in improving developmental outcomes for infants. Many studies do not measure developmental outcomes in 6 month old infants, and those that do, do not observe positive effects until the infant is 36-48 months old. As noted earlier, child development is cumulative and the development of fundamental skills early in life may lead to improved developmental outcomes at a later stage. Educating parents about child development outcomes and milestones can influence their perception of their infant's ability and impact the amount of stimulation they provide to their infant (Lee, 2005).

Measuring whether an infant has met the milestones expected for his/her age is important in order to identify whether the infant may be struggling and require more support. Below we describe the different areas of development and provide a review, based on previous evidence, on the impact of home visiting interventions on each area of development. There is wide variance in the age at which individual infants meet their milestones and the ages mentioned below are cited as the average expected age.

Physical Development: Gross and Fine Motor Skill

Physical development in humans is proximodistal, such that the trunk develops before the limbs. Similarly, gross motor skills emerge before fine motor skills. That is, arm co-ordination is achieved before the fingers can be co-ordinated (Carr, 2006). Physical development is directly impacted by nutrition, disease and trauma, and indirectly by socio economic status (Carr, 2006). Motor skill development, like all facets of development, has a genetic component, yet it also can be enhanced through experience and practice, particularly if the caregiver actively promotes progression.

Gross motor skills measured at 6 months include aspects of locomotive and postural movement; sitting, adopting the crawling position, lifting legs up high whilst lying down, rolling and standing with support. All motor movement is a learning process and there is large variation in age at which infants develop gross motor skills (Smitsman & Corbetta, 2010). Infants can push their head and shoulders up while lying on their stomach at around 3 months, roll from their back to their stomach, and get their arms out from under themselves at 6 months (Carr, 2006). Infants can sit unaided, and may lean on their hands while sitting, before they can sit upright, a skill which can develop between 4 and 9 months olds (Smitsman & Corbetta, 2010; WHO, 2006) or according to Carr (2006) at 6 months. Standing, while supported by two hands, and getting into a crawling position are both expected between 5 and 11 months (WHO, 2006), whereas walking with assistance can emerge as early as 6 months, or not until 14 months (Smitsman & Corbetta, 2010). Some infants can stand alone at 7 months. By age 1, upright locomotion (walking) is expected (Smitsman & Corbetta, 2010). With such a wide variance in meeting physical milestones, it can be difficult to identify developmental delays..

Reaching with one or both hands, grasping and object manipulation are indications of fine motor skills which can be measured at 6 months. They typically develop after co-ordination of the arms and legs has been achieved. Infants initially 'pre-reach', that is orient their arms towards an object when their head and trunk are supported, and at 4 months they begin voluntary reaching, which is more goal directed (Smitsman & Corbetta, 2010). At 3 months they may be able to grasp for an object with both hands before being able to hold an object in the centre of their hand with their fingers closed around it (Carr, 2006). Hofsten and Ronnqzist (1988, as cited in Smitsman & Corbetta, 2010) studied infant grasping and found that 5 month olds closed their hand just before they encountered an object, but 9-13 month olds began to close their hand earlier, and could also fit their hand to the scale of the object. At 9 months infants are able to pick up a small object, such as a button with their thumb and forefinger a feat of reaching, grasping and hand eye co-ordination which depends on the above mentioned fine motor skills being honed (Carr, 2006). The infant may attempt to carry out this manoeuvre at 6 months, using a raking motion to pick up a small object.

Home visiting interventions may influence physical development indirectly, through providing parental support and education which reduces the likelihood of neglect or physical abuse. Neglect can interrupt physical development through inadequate nutrition (English, 1998; Zero to Three, 2000), lack of adequate supervision resulting in physical injury and refusal or delay in seeking adequate medical attention for the child when required (Perry, Colwell & Schick, 2002). Mothers who completed the Healthy Start home visiting programme were less likely to report neglectful behaviour (Duggan et al., 2004) and there were fewer incidences of physical abuse amongst mothers who completed the 'enhanced' programme which included a problem solving element (Bugental et al., 2002). However, there were no reported differences in physical, mental or psychomotor development (Duggan et al., 1999).

Another study found that preterm infants whose mothers received a home visiting intervention were significantly heavier than the control group at 4 months (Field, Widmayer, Stinger & Ignatoff, 1980). Furthermore these mothers had higher expectations and a more realistic concept of appropriate developmental milestones. This is important as lower developmental expectations are related to infant developmental delay as the infant is not exposed to new experiences or encouraged to develop (Field et al., 1980). Finally, the study of the Child Health Supervision

intervention found no differences between the intervention and control group in the infants' first two years (Gutelius, Kirsch, MacDonald, Brooks & McErlean, 1977).

Cognitive Development: Communication and Problem Solving Skills

While speech does not develop until about the age of 2, infants do communicate their emotions and needs from birth (Lock & Zukow-Goldring, 2010). Crying is the initial means of communication, however by 3 months old, infants have more control over the noises they make, and interact with their caregiver by looking at them (Lock & Zukow-Goldring, 2010). As infants approach 6 months, they gain more control over their own attention and can echo sounds in a 'back and forth' manner which mirrors conversation (Lock & Zukow-Goldring, 2010). Infant communication at 6 months of age is measured through the infant's ability to make sounds, such as squeals, grunting, growling and da/ba/ka sounds, as well as the ability to engage in rudimentary communication patterns, such as turn taking with sounds, and looking towards a parent calling their name. Burnham and Mattock (2010) discovered that 6 month old infants can hear vowels as well as make basic vowel based sounds. Language development in general is enhanced by social exposure to conversation and speech. In situations where the infant is not exposed to much daily language and communication, for example when their mother is depressed, infants can display less communicative behaviour (Reddy, Hay, Marray & Trevarthen, 1997).

Problem solving in infants is difficult to assess, as their physical development may not be advanced enough to follow through with a 'solution' to their problem. Yet there are conflicting theories. Smitsman and Corbetta (2010) do not expect the use of implements (for example a stick to extend reaching distance) until at least 12 months as it requires many cognitive skills that younger infants may not have, such as the knowledge of objects, representational skills, the ability to identify goals and, the physical dexterity to complete the task. Baillargeon, Graber, DeVos and Black (1990 as cited in Bremner, 2010) argue that a 5 month old may have the ability to identify the steps necessary to retrieve a hidden object, yet they lack goal direction and thus cannot carry out the steps successfully.

Rudimentary behaviours which may be indicative of problem solving development can be measured at 6 months. Reaching for a toy indicates that the infant is aware of the object's permanence and is goal oriented enough to use their arms to get it. Passing a toy back and forth from one hand to another, putting toys in the mouth, and banging a toy up and down are all skills expected to emerge at 6 months (Carr, 2006). Turning to where a toy was dropped and trying to move to get a toy are further examples of basic problem solving that are evident at 6 months. Johnson (2010) refers to Piaget's finding that infants below eight months tend to behave in an 'out of sight, out of mind' manner when it comes to locating objects as they tend not to be able to locate an object if it is hidden in a different place to where it was previously placed. The ability to search elsewhere for an object of interest is a more advanced skill.

There is wide variance in the measurement of cognitive development across home visiting programmes, both with regards to the scales used and the age at which the infants are assessed. There are also mixed findings regarding whether cognitive testing early in childhood is predictive of later functioning. For example, a comparison of IQ at age 8 and results of neurodevelopmental tests at age 1 indicated modest prediction of later developmental difficulties (McGrath, Wypij, Rappaport, Newburger & Bellinger, 2004). However, the validity of using

infant tests to predict early IQ is questioned by Andersson, Sonannder & Sommerfelt (1998) as the assessment measures used at 6 months often do not contain scales which are directly comparable with later assessments. The predictive aspect also varies by gender due to a greater stability in the development characteristics of girls, than boys (Auerbach et al, 1995 as cited in Andersson, Sonnander & Sommerfelt, 1998). This hinders prediction of the child's likely IQ and early identification of those at risk for developmental difficulties who would benefit from early intervention. Thus, cognitive assessment in early childhood is not necessarily predictive, or indeed determinative of an infant's future IQ/cognitive profile, especially as interventions and maturation play a role.

There are also mixed results regarding the impact of home visiting interventions on cognitive functioning. *Child Health Supervision* found no differences between the intervention and control group in the infants' first two years on the *Bayley Scales for Mental and Motor Development*, although there was a significant difference between the groups on the *Stanford Binet Intelligence Test*, at age 3, and less so at age 4 (Gutelius, Kirsch, MacDonald, Brooks & McErlean, 1977). *Early Head Start* reported significantly higher scores on the *Bayley Scales of Infant development; mental developmental index* at age 2 and this was sustained at age 3, however the infants were not assessed at 6 months, nor was there any follow up post intervention (Love et al., 2002). *Nurse Family Partnership* (NFP) also reported contrasting results. In one NFP site there was no difference between the intervention and control group's IQ at 34 or 46 months at post-intervention (Olds, Henderson & Kitzman, 1994). There were also no differences in infant IQ scores at 12 and 24 months for mothers who smoked, however significant differences emerged for this group at 36 and 48 months (Olds, Hensderson & Tatelbaum, 1994).

There have been many studies on the impact of home visiting interventions on the cognitive development of low birth weight/premature infants. At the age of 4 months, pre-term infants scored lower than full term infants on mental skills, motor skills and development, yet by 16 months they had caught up to the developmental levels of the full-term infants, after a home visiting intervention which applied a transactional model focusing on the quality of interactions between mother and child (Barrera, Rosenbaum & Cunningham, 1986). Similarly, Rauh, Achenbach, Nurcombe, Howell & Teti (1988) found that early intervention for infants with low birth weight had a positive impact on the cognitive scores at 48 months, but that this was not apparent at 6, 12 or 24 months. However, another study found that preterm infants whose teenage mothers received a home visiting intervention scored higher than the control group at 8 months on the *Bayley Scales for mental development* (Fieldet al., 1980). Rauh et al., (1988) provided suggestions for the lack of effects at younger ages in a study of early intervention with low birth weight infants. They suggest that the tests may not be sensitive enough for younger infants, the intervention effects may not have been evident at early stages, although it still had an impact as it 'set patterns' for longer term progress, and the control group experienced a decline in their test scores, which when compared with the increasing scores for children with low birth weight, resulted in a comparable significant difference rather than an extreme improvement at this age (Rauh et al., 1988). The latter explanation is viewed in light of a study of outcomes for pre-term infants which found that without intervention, pre-term infants performed significantly poorer in cognitive assessment at age 6 than children who were born at full term (Wolke & Meyer, 1999)

Overall, the literature raises questions about the impact of home visiting interventions on cognitive development. In particular there is a lack of evidence on whether home visiting interventions truly have an impact on the cognitive development of young infants, whether the cognitive differences emerge later, or whether there are benefits at a younger age but they are not measureable either due to the assessment tools or the nature of early cognitive development.

Personal, Social, and Emotional Development

Infants develop awareness of themselves as distinct individuals through exploration and movement. Grabbing their foot and putting it in their mouth displays the infant's awareness that they can control their foot, hand and mouth. Pivoting or crawling (depending on gross motor development) to reach an object indicates that the infant is aware that they have to move themselves. Attachment behaviour emerges at 6 months, where the infant becomes aware that the caregiver is a separate person to them and they seek proximity to their caregiver, along with a wariness of strangers (Bowlby, 1988 as cited in Carr, 2006). Infant behaviour when facing a mirror can indicate differing levels of social interaction, for example whether the infant smiles/coos at themselves, or reaches out to pat their image. There is some uncertainty as to whether infants recognise their image as themselves, with Rochat (2010) indicating that signs of self-recognition in mirrors and photographs may occur at 21 months. Turn taking is an important social skill and is especially apparent in infants when playing games such as peek-a-boo.

As previously described, infant social and emotional behaviours are often learnt through social interaction, and emotional competence is defined as managing or regulating one's emotions to obtain desired goals in a way that is acceptable to others (Carr, 2006). While infants learn how to express and cope with emotions from their parents, there is also a direct impact as infants mirror the emotional state of their mothers (Rochat, 2010). Family values and culture play a role in the social and emotional norms for the infant, and similar behaviours which are acceptable at one stage of development may not be later on. How parents respond to emotional expression, such as how they react to tantrums, may determine what forms of emotional expression the child learns to be effective and acceptable. Similarly exposure to the use of communication and interaction in social situations will lay the foundation for the infant social skills. Infants in their first year develop rudimentary self-soothing skills, such as rocking and feeding. They also use basic communication skills to seek attention from others and there is an increase in non-verbal emotional expression (Carr, 2006). From birth infants can express disgust and interest, at one month they can smile, at four months they can display sadness and anger and at 9 months they can express fear. As infants view and mimic emotional expression in others (Rochat, 2010), parental behaviours are important models for regulation and expression of these emotions (Carr, 2006). Therefore, parental response to infant temperament can directly impact emotional development (Carr, 2006).

Home visiting interventions have had mixed results in relation to emotional development and very few studies appear to measure the impact of interventions on this area of development during early infancy. *Early Head Start* reported improvements for infants at age 3 in the areas of emotional and social development and improvements were greater according to how early the parents became involved with the intervention, that is, those who became involved during pregnancy reported greater improvements (Love et al., 2002). The *Transactional Model of Early Home Intervention* displayed an improvement in social competence at 16 months old, which was predicted by social competence scores at 8 months, and emotional security scores at 12 and 16

months old (Barrera, Doucet & Kitching, 1990). Improvements in attachment are associated with improved social and emotional development, particularly with infants whose mothers are depressed. A home visiting intervention that began when infants were approximately 5.5 months reported improvements in maternal attachment at 12 and 18 months (Van Doesum, Riksen-Walraven, Hosman, & Hoefnagels, 2008). In contrast, NFP reported that home visits had no impact on mother-child interaction or emotional regulation at the age 4 follow-up (Olds, Robinson et al., 2004). There were no reports of the impact of NFP on emotional development at earlier stages of infancy. Other aspects of social and emotional development studied by *Child Health Supervision* are shyness, toilet training, sleep habits and self-confidence, which were improved at age 3. However, there was no report of infant social and emotional development at 6 months (Gutelius et al., 1977).

There are mixed reports of the impact of home visiting interventions on child development, with some having a positive impact on different facets of infant development, and not others. In addition, very few evaluations measure child development at 6 months or report effects at this age. Therefore, the impact of home visiting programmes on infant development may not be realised or measureable by 6 months. It is therefore difficult to predict impact of the *PFL* programme on infant development at 6 months.

4.2.1 Child Development Instruments

Ages and Stages Questionnaire

Child development was assessed using the six month version of the *Ages and Stages Questionnaire* (ASQ; Squires et al., 1999). The ASQ was designed as an effective screening measure for young children who were considered to be at risk for developmental delay. Research comparing children's scores on the ASQ with their performance on standardized development tests such as the Bayley Scales of Infant Development, the Stanford-Binet Intelligence Scale, and the McCarthy Scales of Children's Abilities indicate an 83% level of overall agreement across questionnaires, with a range of 76%-91% (Squires, Potter, & Bricker, 1999). The ASQ child monitoring system consists of 19 screening questionnaires at specific age intervals ranging from four to 60 months of age and provides scores across five domains of child development, with each domain comprising six items. *Communication (*α = .35) measures the child's babbling, vocalisation, listening and understanding. The *gross motor* domain *(*α = .50) measures the child's arm, body and leg movements. The *fine motor* domain *(*α = .43) assesses the child's finger and hand movements. *Problem solving (*α = .47) measures the child's learning and playing with toys. Finally, the *personal-social* domain *(*α = .55) provides a rating of solitary social play with toys and other children. During the interview, the interviewer asked the mother questions related to different activities the child is capable of. The mother responded by indicating if her child exhibits the behaviour *regularly*, *sometimes*, or *not yet*. If the mother did not know whether her child was capable of the behaviour, the interviewer asked the mother to test the behaviour during the interview using the ASQ toolkit if appropriate.

Domain scores represent the sum of all six items in that domain, resulting in a possible range from zero to 60 with higher scores indicative of greater development. In addition, the ASQ provides age-specific standardised cut-off points for each domain (communication=29.0; gross motor=19.5; fine motor=27.5; problem solving=37.0; and personal-social=27.5). In line with these cut-off scores, a binary variable was calculated for each domain illustrating if the child

scored below the cut-off point. Those children who score below the cut-off point on a domain are considered to be at risk of developmental delay in that domain.

Ages and Stages Questionnaire: Social-Emotional
Children's social-emotional development was assessed using the *Ages and Stages Questionnaire: Social-Emotional* (ASQ:SE; Squires, Bricker, & Twombly, 2003). The ASQ:SE *(*α =.51) is a screening tool used alongside the ASQ to identify children from six to 60 months of age who are in need of further social and emotional behavioural assessment. Questions on the ASQ:SE pertain to self-regulation, compliance, communication, adaptive functioning, autonomy, affect, and interaction with people. During the interview, the interviewer asked the mother questions related to different behaviours the child displays. The mother responded by indicating if her child exhibited the behaviour *most of the time*, *sometimes*, or *never*. Additionally, the mother indicated if the behaviour was a concern for her. Scores to each item were rated on a zero to 10 scale and an additional five points was added to the score for every indication that the behaviour was a concern for the mother. Scores were summed to provide a total ASQ:SE score, with a possible range of zero to 285. Higher scores indicate that children may be at risk of poor social-emotional development. In addition, the ASQ:SE provides a cut-off score of 45 and suggest children with scores above this cut-off may be at risk. In line with this cut-off score, a binary variable was calculated to illustrate if the child was at risk of poor socio-emotional development.

Difficult Temperament
Seven items were used to assess the temperament of the *PFL* child. Specifically, the mother was asked questions related to how well her baby behaves and was instructed to answer each item on a zero to six point scale. These seven items *(*α =.68) were taken from the Quebec Longitudinal Study of Child Development (QLSCD) and are originally based on the Infant Characteristics Questionnaire (Bates, Freeland, & Lounsbury, 1979)**.** Scores to each item were summed providing a total possible range of zero to 42, with higher scores indicative of more difficult child temperament.

4.2.2 Child Development Results
ASQ Scores and Difficult Temperament
Within the ASQ Scores and Difficult Temperament category, five of the seven child development measures were in the hypothesized direction. However, the differences between the high and low treatment groups were not statistically significant for any of the seven measures. In addition, the step down test showed that the joint effect of all seven measures in the ASQ Scores and Difficult Temperament category was not statistically significant.

ASQ Cut-off Scores
Within the ASQ Cut-off Scores category, which measures the proportion of children at risk of development delay in each group, four of the six measures were in the hypothesized direction. However, these differences were not statistically significant for any of the six measures included in this category. In addition, the step down test showed that the joint effect of all six measures in the ASQ Cut-off Scores category was not statistically significant.

Table 4.1
Results for High and Low Treatment Groups: ***Child Development***

Variable	N (n_{HIGH}/ n_{LOW})	M_{HIGH} (*SD*)	M_{LOW} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
ASQ Scores & Difficult Temperament						
ASQ Gross Motor Score	173 (83/90)	40.78 (11.93)	38.50 (12.99)	ns	ns	0.18
ASQ Communication Score	173 (83/90)	53.07 (7.84)	51.78 (8.49)	ns	ns	0.16
*Difficult Temperament *(negative outcome)*	173 (83/90)	11.70 (5.71)	12.21 (5.50)	ns	ns	0.09
ASQ Personal Social Score	173 (83/90)	46.69 (12.10)	45.94 (13.57)	ns	ns	0.06
*ASQ Social-Emotional Score *(negative outcome)*	173 (83/90)	14.76 (10.68)	15.17 (13.75)	ns	ns	0.03
ASQ Fine Motor Score	173 (83/90)	50.78 (9.48)	51.39 (10.17)	ns	ns	0.06
ASQ Problem Solving Score	173 (83/90)	51.87 (9.39)	52.56 (9.92)	ns	ns	0.07
ASQ Cut-off scores						
*ASQ Social Emotional Cut-off *(negative outcome)*	173 (83/90)	0.01 (0.11)	0.04 (0.21)	ns	ns	0.19
*ASQ Gross Motor Cut-off *(negative outcome)*	173 (83/90)	0.01 (0.11)	0.04 (0.21)	ns	ns	0.19
*ASQ Communication Cut-off *(negative outcome)*	173 (83/90)	0.00 (0.00)	0.01 (0.11)	ns	ns	0.15
*ASQ Personal Social Cut-off *(negative outcome)*	173 (83/90)	0.06 (0.24)	0.10 (0.30)	ns	ns	0.15
*ASQ Fine Motor Cut-off *(negative outcome)*	173 (83/90)	0.01 (0.11)	0.01 (0.11)	ns	ns	0.01
*ASQ Problem Cut-off *(negative outcome)*	173 (83/90)	0.08 (0.28)	0.08 (0.27)	ns	ns	0.02

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

4.3 Child Health

Sickness and ill health is a normal part of growth and development. In the United States it is estimated that within the first year of life babies have an average of seven respiratory illnesses (Bee, 1995). Research suggests that poor health in infancy is associated with lower chances of survival and also further health and social difficulties later in life (Barker, 1990). In recent years a growing body of literature identifies the importance of early childhood health as a predictor of future outcomes, such as educational attainment and employment (Oreopoulos, Stabile, Walld & Roos, 2008). Poor infant health and poor health in later life places a huge economic burden on the health system (Oreopoulos et al., 2008). Home visitation can play an important role in health promotion during infancy and participation in home visiting programmes has been linked with

favourable child health outcomes such as reduced accident rates (Larson, 1980), and an increase in age-appropriate health screenings and dental examinations (Hale, Seitz & Zigler, 1990). Some studies also indicate that home visiting can have a positive impact on non-birth related hospitalisations during the first 24 months (Koniak-Griffen et al., 2003), however there is insufficient evidence to determine the effects of home-visiting interventions on rates of hospital admission (Bull, McCormick, Swann & Mulvihill, 2004).

Birth and Infant Weight

Low birth weight is described as one of the most important determinants of new-born health (Collins, Dunkel-Schetter, Lobel & Scrimshaw, 1993) and is often used to measure the infant's well-being. Complications in pregnancy and poor attendance at antenatal visits (Raatikainen, Heiskanen, & Heinonen, 2007) are risk factors for low birth weight. Low birth weight is itself a significant risk factor for adverse health outcomes for childhood diseases, including type-2 diabetes and ischemic heart disease, as well as cognitive difficulties (Frederick Williams, Sales, Martin, & Killien, 2008). Low birth weight can affect cognitive abilities leading to poorer performance on IQ tests (Saigal, Szatmari, Rosenbaum, Campbell, & King, 1991; O'Brien Caughy, 1996), lower academic performance in the future (McCormick, Workman-Daniels, & Brooks-Gunn, 1996), increased likelihood of need for special education or grade retention (Ross, Lipper, & Auld, 1991), and poorer language and social skills (Hack, Klein, & Taylor, 1995). It also can lead to a higher incidence of behavioural problems such as increased attention deficit (Pharoah, Stevenson, Cooke, & Stevenson, 1994).

Recent research has examined infant weight and its relationship to later outcomes. This research suggests that abnormal weight during infancy has a strong influence on future outcomes (Euser et al., 2005; Fall, Vijayakumar, Barker, Osmond, & Duggleby, 1995). For example, low weight at one year of age is associated with the risk of developing metabolic and cardiovascular disease in later life (Fabricius-Bjerre et al., 2011) and more early post natal and late infancy weight gain is associated with higher BMI scores, percentage body fat and more abdominal fat at age 19 (Euser et al., 2005). Some studies also indicate that being overweight at two years of age may predict being overweight 10 years later (Worobey, Lopez & Hoffman, 2009).

Investigations on the impact of home visiting programmes on birth weight have reported mixed results; some positive impacts have been demonstrated through the Healthy Families New York programme which focuses on social support, health education and access to services (Lee et al., 2009) and through programmes which target teenage parents and women who are moderate to heavy smokers (Barnett, 1993). Barrera et al. (1986) found that pre-term infants performed worse than full term infants on mental, motor and general developmental skills aged 4 months, but that these differences were no longer apparent at 16 months, after participation in a home visiting intervention. However, the Infant Health and Development Program (IHDP) reported that while an intervention with a home visiting component had positive effects on IQ for those in the low birth weight stratum, the intervention effects were not sustained for those in the lighter low birth weight stratum after age five (McCormick et al., 2006). Bull et al. (2004) argue that while home visiting programmes have demonstrated some positive impacts for low birth weight children they have generally failed on replication.

Immunisations

Immunisations and vaccinations have been developed to decrease the occurrence of some diseases and in particular have drastically reduced the burden of childhood diseases (Kent Zimmerman, Middleton, Timko Burns, Clover & Kimmel, 2007; Kimmel, Timko Burns, Wolfe & Kent Zimmerman, 2007). The rates of immunisation have been increasing with most infants having received a full complement of immunisations by 35 months, however research indicates that not all immunisations are being received at the recommended ages and that age appropriate immunisation rates are particularly low in infants between three and seven months (Stille, Christison-Lagay, Bernstein & Dworkin, 2001). Factors associated with partial immunisation include teenage or lone parenthood, large family size, maternal smoking during pregnancy and living in a disadvantaged area (Samad et al., 2006). Findings indicate that home visiting can have a significant impact on immunisation rates (Barnes-Boyd, Fordham & Nacion, 2001; Johnston, Huebner, Anderson, Tyll & Thompson, 2006). Yet there is insufficient evidence to fully determine the effect of home visiting interventions on immunisation (Bull et al., 2004).

Infant Feeding

During infancy there is a rapid transition from a diet of milk to a varied diet (Grummer-Strawn, Scanlon & Fein, 2008). It is generally recommended that infants are exclusively breastfed for the first six months followed by the introduction of complementary foods and continued breastfeeding thereafter (Lande et al., 2003). Although the benefits of breastfeeding are well-documented for both mother and child (Fergusson & Woodword, 1999; Beaudry, Dugour & Marcoux, 1995), it is not widely practiced in Ireland as breastfeeding initiation rates range from 38% to 55% (UCD School of Public Health and Population Science, 2010). A survey of breast feeding rates in the US found that while 85% of respondents reported initiating breastfeeding only 50% continued to breastfeed at 6 months, and many of those who breastfed used formula concurrently (Grummer-Strawn et al., 2008). Additionally, low socioeconomic status populations (Economic and Social Research Institute, 2006), younger mothers (Fitzpatrick, Fitzpatrick, & Darling, 1994), and mothers with lower education (Ward, Sheridan, Howell, Hegarty, & O'Farrell, 2004), are less likely to breastfeed in Ireland. Feeding behaviours during infancy play an important role in weight gain, with infants who are breastfed less intensively during early infancy having increased odds of excess weight in late infancy (Li, Fein & Grummer-Strawn, 2008). A study by Worobey et al. (2009) suggests that many infants are being regularly overfed as indicated by feeding frequency and parents' insensitivity to hunger cues. Due to the important role nutrition plays in child development, many home visiting programmes attempt to influence rates of breastfeeding and also infant nutrition through parent education (Wasik & Bryant, 2001). Some interventions have proven successful in promoting breastfeeding, a Promotion of Breastfeeding Intervention Trial (PROBIT) in Belarus found that the experimental intervention increased the duration and degree of breastfeeding in the first year of life (Kramer et al., 2001). There is also some weak evidence to suggest a positive impact of home visiting interventions on children's diets, the rates of breastfeeding three months after delivery (Bull et al., 2004; Haire-Joshu et al., 2008) and the number of mothers who attempt to breastfeed (Kitzman et al., 1997).

Intergenerational Breastfeeding

Breastfeeding can be a daunting process and in recent years many mothers have chosen not to or to stop breastfeeding for both personal and professional reasons (Ahluwalia, Morrow & Hsia, 2005), in spite of evidence which identifies the benefits of breastfeeding for infant health and development (Ferguson & Woodword, 1999). Support from relatives and friends is likely to play

an important role in the choice to initiate and continue breastfeeding (Ekström, Widström & Nissen, 2003). Research indicates the infant's grandmother can influence parenting decisions on the initiation and continuance of breastfeeding by transmitting knowledge and confidence or the normality of breastfeeding (Grassley & Eschiti, 2008). A study of breastfeeding initiation and duration among poor women in south-eastern United States found that breastfeeding beyond one month was associated with the mother having been breastfed or having breastfed a previous infant (Meyerink & Marquis, 2002).

Infant Crying Patterns

Crying is a method by which an infant can communicate their needs and is usually used to promote proximity and contact with the caregiver (Bell & Salter Ainsworth, 1972; Bowlby, 1971). There are large variations in infant crying depending on the child such that some infants do not cry at all and others may cry for about 15 minutes per hour (Van Ijzendoorn & Hubbard, 2000). Evanoo (2007) reports that crying usually follows a pattern whereby crying progressively increases after birth and peaks at six weeks of age and then declines until three months of age, where a lower level of crying continues until one year. Crying durations usually range from 20 minutes to three and a half hours with longer durations occurring at six weeks of age (Evanoo, 2007). Crying is normal behaviour for healthy infants; however persistent crying can be very stressful on caregivers (Keefe, Karlson, Lobo, Kotzer & Dudley, 2006). For this reason, infant crying has been linked to infant abuse, particularly shaken baby syndrome, in vulnerable populations (Bradshaw, 2010; St. James Roberts, 2007). It is also one of the primary reasons that parents seek health care for their infant child (Evanoo, 2007). Generally consistency and promptness of maternal response is associated with a decline in frequency and duration of infant crying (Bell & Salter Ainsworth, 1972), however other studies suggest that the more frequently mothers ignored their infants cry in the first nine weeks the less frequently their infants cried in the following nine weeks (Van Ijzendoorn & Hubbard, 2000). Home visiting programmes which include a component to help parents deal with infant crying show effectiveness in preventing a deterioration in the quality of mother-child interaction (Van Doesum, Riksen-Walraven, Hosman & Hoefnagels, 2008), however Keefe et al. (2006) found that although a home visitation intervention by nurses reduced stress related to parent-child interactions, it was not effective in reducing overall parenting stress (Keefe et al., 2006).

Infant Sleeping Patterns

The development of optimal sleep patterns is essential for normal growth, development, emotional health and immune functioning (Finn Davis, Parker & Montgomery, 2004). Sleeping through the night and night waking are common parental concerns during the first year of life (Anders, 1979). The sleeping patterns of infants also change rapidly during the first year with the greatest change in sleep patterns occurring in the first three months (Henderson et al., 2011). Sleep studies suggest that at three weeks of age sleep is distributed over the 24 hour period between feedings. As the infant develops, sleep is distributed in the nocturnal period, with the critical period for the development of consolidated night-time sleep occurring at four to six weeks of age (Coons & Guilleminault, 1982). Moore and Ucko (1957) conducted the first in depth analysis of children's sleep and found that by three months 70% of infants slept from midnight until 5am without disturbing their parents, this increased to 83% by six months and 90% by nine months. Similarly, research into infant sleep patterns suggests that many infants sleep through the night by three months and almost all do so by six months (Eaton-Evans &

Dugdale, 1988; Henderson et al., 2010), However, breastfed infants are more likely to wake at night during their first year (Eaton-Evans & Dugdale, 1988). While many parents report that their infants sleep throughout the night, observational data suggests that few infants sleep undisturbed for 12 hours. Most infants have short periods of wakefulness where they either alert their caregivers by crying or self-soothe and return to sleep (Anders, Halpern, & Hua, 1992).

Evidence suggests that other factors such as parental strategies for putting the infant to sleep and sleep location have an impact on infant sleeping patterns. At three weeks of age most infants are already asleep when they are put down for the night, however this pattern changes as the infant develops a more regular sleep pattern (Anders et al., 1992). Excessive amounts of both passive (standing by the cot) and active (hugging, rocking, feeding) physical comforting are associated with sleep problems (Morrell & Cortina-Borja, 2002). In particular, research indicates that parental presence when the infant falls asleep is associated with increased night waking (Mindell, Meltzer, Carskadon & Chervin, 2009; Sadeh, Tikotzky & Scher, 2010; Adair, Bauchner, Philipp, Levenson & Zuckerman, 1991), while infants who are awake when placed in their crib are more likely to return to sleep independently after night waking (Anders et al., 1992). While research into sleep has identified patterns of sleep development in infants and effective parental strategies for aiding infant sleep, research into sleep location is less harmonious. Many studies suggest that infants who fall asleep alone in the crib and sleep in a crib in a separate room are more likely to sleep through the night with less waking (Mindell et al., 2009; Sadeh, 2004). However Ball (2003) argues that sleeping norms in the UK do not reflect behaviours worldwide; therefore it is important not to overlook the advantages of co-sleeping, a habit common in some non-western cultures, which facilitates breastfeeding.

4.3.1 Child Health Instruments

General Health

A variable representing the overall general health of the baby was asked with response options given on a five point scale ranging from *excellent* to *poor*. This measure was dichotomised to create a binary variable denoting whether the baby had ill health (*poor*, *fair*) or not (*good, very good, excellent*). The number of health problems the baby had was assessed by asking the participant whether her baby had ever been taking to the GP, Health Centre, or Casualty for any problems on a list of 13 possible options. A variable denoting the total number of health problems the baby had was created by summing the number of child health problems endorsed by the mother. Mothers were asked how many days old the baby was when he/she left hospital after he/she was born. Participants were also asked whether or not their baby had ever stayed overnight in hospital in the last 6 months for any illness. Participants were also asked how much of a problem their baby's breathing had been over the last 30 days with response options ranging from *none* to *extreme.* A binary variable indicating whether the baby had experienced any breathing problem was created (*mild/moderate/severe/extreme* versus *none*).

Birth and Infant Weight

Mothers were asked about the baby's birth weight and current weight. The response options to these questions were given in pounds and ounces. In order to make the responses comparable, all responses were converted into grams and two continuous measures were generated indicating the baby's birth weight and current weight in grams. In addition, the birth weight variable was used to generate two binary variables indicating whether child had low birth weight (<2500 grams)

and whether the child had high birth weight (>4000 grams). Finally, a binary variable was created denoting whether the mother knew the child's current weight or not.

Immunisations
Participants were asked about the vaccinations their child had received. Two binary variables denoting whether the baby had received all recommended vaccinations up until 4 months and all recommended vaccinations up until 6 months were created. In addition, a binary variable indicating whether the child had ever been vaccinated was created.

Infant Feeding
Participants were asked to rate how many times per day their baby eats including overnight feedings. Four response options were given: *3-5 times, 6-10 times, 11-15 times,* or *16 or more times per day*. A binary variable illustrating whether the baby ate more or less than 6 times per day was constructed. The participant was also asked whether she had ever fed her baby any of the following foods: *water, breast milk, commercial infant formula, cow's milk, fruit juice, juice with added water, team infant cereal, vegetables, fruits, meat,* or *other*. A binary variable denoting whether or not the foods the baby ate were suitable for a six month old was then created.

Breastfeeding
Mothers were asked several questions relating to breastfeeding including whether they ever tried to breastfeed their baby, if they were still breastfeeding, and at what age they stopped both exclusively and non-exclusively breastfeeding (that is they continued to breastfeed baby but also gave him/her other food or drink). The first two questions were simple *yes/no* questions while the latter 2 questions were continuous variables with response options given in *weeks, months,* or *days*. In order to make responses similar across all participants, the answers to both questions were converted into *weeks*. Finally, the mothers were asked whether they themselves were breastfed as a baby. The response options to the latter included *yes, no* or *don't know*. All *don't know* responses were set to *no* responses and a resulting binary variable denoting whether the mother was breastfed as a baby or not was created.

Crying Patterns
A binary variable was used to assess whether the mother found her baby's crying to be a problem. Additionally mothers were asked if they had ever left their baby to "cry out" with the following response options: *yes once, yes a few times, yes frequently,* or *no.* These response options were dichotomised to create a binary variable denoting whether the mother ever left her baby to cry (*no* versus *yes once/yes a few times/yes frequently*).

Sleeping Patterns
Mothers were asked a host of questions regarding their baby's sleeping patterns. They were asked whether their baby had any difficulty falling asleep at night. The response options to this question were *never, sometimes, often*, or *always*. A binary variable denoting whether or not the baby ever had any difficulty falling asleep was constructed (*never* versus *sometimes/often/always*). Mothers were also asked how long it takes their baby to go to sleep with response options given on a five point scale ranging from *less than 15 minute* to *60 minutes or more*. These response options were dichotomised to form a binary variable denoting whether

it took the baby less than or more than 15 minutes to go to sleep. Parents were asked whether their baby slept undisturbed through the night most of the time. Those participants who answered *yes* to this question were subsequently asked since what age their baby slept undisturbed through the night. There were fourteen response options to this question ranging from *birth to less than 2 weeks old* to *older than 6 months*. A binary variable was created denoting whether the baby had slept undisturbed before or after the age of 3 months. Participants were also asked how many hours in a row their baby sleeps at night. There were six response options ranging from *less than 4 hours* to *8 hours and more*. Response options were dichotomised to create a binary variable indicating whether the baby slept less than or more than 8 hours in a row. Participants were also asked to rate on a three point scale how much of a problem their baby awakening has been. A binary variable was created indicating whether it had been *not much* of a problem or *somewhat/quite a bit* of a problem. Additionally, mothers were asked to report on what they usually do when they put their baby to bed. The three response options were dichotomised to denote whether the participant would usually *Lull him/her to sleep before putting him/her down/Put him/her to bed awake and stay with him/her until he/she falls asleep* or *put baby to bed awake and let him fall asleep on his own*. Finally mothers were asked where their baby generally sleeps. The four possible response options were divided into *In your bedroom AND in your bed/Shares his/her bedroom with another family member (brother, sister, grand-parents etc)* and *Alone in his/her bedroom/In your bedroom BUT not in your bed* to form a binary variable.

4.3.2 Child Health Results

Child Health

None of the six measures in the Child Health category were in the hypothesised direction or indicated statistically significant differences between the high and low treatment groups. There was, however, one statistically significant difference between the high and low treatment groups in a non-hypothesized direction regarding breathing problems. Infants in the low treatment group were less likely to have a breathing problem than infants in the high treatment group, with 22% of mothers in the high treatment group reporting that their child had a breathing problem within the last 30 days, compared with 14% of mothers in the low treatment group ($p<.10$, $d=0.19$). Overall, the step down test showed that the joint effect of all six measures in the Child Health category was not statistically significant.

Mother's Health Decisions for Her Infant

Within the Mother's Health Decisions for her Infant category, seven of the nine measures showed differences in the hypothesised direction and three of these measures were statistically significant – eats appropriate food, immunizations at 4 months, and appropriate frequency of eating. First, 87% of mothers in the high treatment group reported feeding their baby foods that were suitable for a six month old, compared with 77% of mothers in the low treatment group ($p<.05$, $d=.26$). Second, 96% of infants in the high treatment group had received all vaccinations up to four months, compared with 88% of infants in the low treatment group ($p<.05$,$d=.32$). Third, 77% of mothers in the high treatment group reported feeding their babies more than 6 times per day, compared with 63% of mothers in the low treatment group ($p<.05$, $d=0.30$). Overall, the step down test showed that the joint effect of all nine measures in the Mother's Health Decisions category was not statistically significant.

Sleep Routines

Three of the eight measures in the Sleep Routine category were in the hypothesised direction, however none of these differences were statistically significant. There was, however, one statistically significant difference between the high and low treatment groups in a non-hypothesized direction regarding the appropriateness of the infants sleeping location. 90% of high treatment parents report that children slept alone in their own bedroom or in their mother's bedroom, but not in her bed, compared with 99% children in the low treatment group ($p<.01$, $d=.39$). This indicated that children in the high treatment group were more likely to have an inappropriate sleeping location such as sleeping in their mother's bed or sharing a bedroom with another sibling. The step down test showed that the joint effect of all eight measures in the Sleep Routines category was not statistically significant.

Non Step Down Measures

Five of the seven measures which were not included in the above Step Down categories were in the hypothesized direction, however, none indicated a statistically significant differences between the high and low treatment groups.

Table 4.2

Results for High and Low Treatment Groups: ***Child Health***

Variable	N (n_{HIGH}/ n_{LOW})	M_{HIGH} (*SD*)	M_{LOW} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Child Health						
*Age (in days) left hospital *(negative outcome)*	173 (83/90)	3.23 (7.03)	3.16 (3.72)	ns	ns	0.01
Birth weight (grams)	170 (80/90)	3319 (589)	3338 (613)	ns	ns	0.03
Good health since birth	173 (83/90)	0.93 (0.26)	0.93 (0.25)	ns	ns	0.02
*Stayed in hospital during first 6 months *(negative outcome)*	173 (83/90)	0.10 (0.30)	0.09 (0.29)	ns	ns	0.03
*No. of health problems taken to GP/health centre/casualty *(negative outcome)*	173 (83/90)	1.37 (1.62)	1.28 (1.09)	ns	ns	0.07
*Problem breathing *(negative outcome)*	173 (83/90)	0.22 (0.41)	0.14 (0.35)	ns~	ns	0.19
Mothers Health Decisions for her Infant						
Baby eats appropriate food	173 (83/90)	0.87 (0.34)	0.77 (0.43)	p<.05	ns	0.26
Necessary immunizations at 4 months	172 (82/90)	0.96 (0.19)	0.88 (0.33)	p<.05	ns	0.32
Appropriate frequency of eating	173 (83/90)	0.77 (0.42)	0.63 (0.48)	p<.05	ns	0.30
*Leave baby to cry *(negative outcome)*	173 (83/90)	0.41 (0.49)	0.46 (0.50)	ns	ns	0.09
Necessary immunizations at 6 months	172 (82/90)	0.35 (0.48)	0.31 (0.47)	ns	ns	0.09
Mother breastfed as a baby	171 (81/90)	0.15 (0.36)	0.12 (0.33)	ns	ns	0.08
*Baby's crying a problem *(negative outcome)*	173 (83/90)	0.12 (0.33)	0.11 (0.32)	ns	ns	0.03
Attempted breastfeeding	173	0.24	0.22	ns	ns	0.04

	(83/90)	(0.43)	(0.42)			
Knows baby's weight	173 (83/90)	0.41 (0.49)	0.48 (0.50)	ns	ns	0.14
Sleep Routines						
Appropriate sleep preparation	173 (83/90)	0.48 (0.50)	0.39 (0.49)	ns	ns	0.19
*Time to sleep (>15 mins) *(negative outcome)*	172 (82/90)	0.29 (0.46)	0.33 (0.47)	ns	ns	0.09
*Baby awakening a problem *(negative outcome)*	173 (83/90)	0.24 (0.43)	0.23 (0.43)	ns	ns	0.02
Sleeps more than 8 hrs per night	171 (83/88)	0.76 (0.43)	0.78 (0.41)	ns	ns	0.06
Sleeps undisturbed through the night	173 (83/90)	0.75 (0.44)	0.77 (0.43)	ns	ns	0.05
*Difficulty falling asleep *(negative outcome)*	173 (83/90)	0.45 (0.50)	0.38 (0.49)	ns	ns	0.14
Sleeps undisturbed by 3 months	173 (83/90)	0.36 (0.48)	0.46 (0.50)	ns	ns	0.19
Appropriateness of sleeping location	173 (83/90)	0.90 (0.30)	0.99 (0.11)	ns~	ns	0.39
Non Step Down Measures						
Current weight (grams)	77 (34/43)	7534 (1664)	7529 (1820)	ns	~	0.00
*Low birth weight (<2500 grams) *(negative outcome)*	170 (80/90)	0.10 (0.30)	0.07 (0.25)	ns	~	0.12
*High birth weight (>4000 grams) *(negative outcome)*	170 (80/90)	0.08 (0.27)	0.11 (0.32)	ns	~	0.12
Ever vaccinated	173 (83/90)	0.99 (0.11)	1.00 (0.00)	ns	~	0.16
Baby still breastfed	40 (20/20)	0.10 (0.31)	0.00 (0.00)	ns	~	0.47
Age (in weeks) exclusive breastfeeding ends	40 (20/20)	4.04 (7.32)	3.34 (5.28)	ns	~	0.11
Age non-exclusive breastfeeding ends	38 (18/20)	4.23 (6.37)	4.22 (5.77)	ns	~	0.00

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

4.4 Parenting

Parental Locus of Control

Parental locus of control refers to the parents' belief in their ability to control the development and behaviour or their child (Koeske & Koeske, 1992). It may affect the parent–child relationship (Chandler, Wolf, Cook, & Dugovics, 1980), incidents of child abuse (Ellis & Milner, 1981), parents' perceptions of the sources of their children's problems (Harris & Nathan, 1973), and child–adult communication patterns (Bugental, Caporeal, & Shennum, 1980). It has

also been associated with a range of child outcomes such as child locus of control (Barling, 1982) and child personality characteristics (Ollendick, 1979). Parents with an internal locus of control believe that they have a strong influence on their children (Campis, Lyman, & Prentice-Dunn, 1986) and thus approach parenting using problem-solving strategies, setting appropriate boundaries, rewarding good behaviour, and correcting poor behaviour. In contrast, parents with an external locus of control believe that outside influences, including peer groups, society, luck, and factors inherent to the child, such as temperament, personality, and/or developmental stage impact children and that therefore, they have little power to influence their child's behaviour (Campis et al., 1986). Such parents often approach parenting emotionally and may avoid various aspects of parental responsibilities. In addition, researchers have demonstrated that parents with an external locus of control are more likely to be authoritarian in their parenting styles (Janssens, 1994), while their children may exhibit more externalising behaviour problems (Campis et al., 1986; Hagekull, Bohlin, & Hammarberg, 2001; Roberts, Joe, & Rowe-Hallbert, 1992). However, it is not clear in which direction the relationship operates, as parental locus of control may have an impact on parenting behaviours (e.g. Hagekull et al., 2001) and raising a child with behavioural difficulties may contribute to the adoption of an external locus of control (Roberts et al, 1992).

Parental Attachment

Attachment style develops in childhood and stays consistent into adulthood. Four categories of attachment style have been identified (Ainsworth, Blehar, Waters & Wass, 1978; Cassidy & Shaver, 1999) based on Bowlby's attachment theory (1969). The four attachment styles are; secure, avoidant, anxious-ambivalent and disorganized. These categories describe patterns of interaction between infants and caregivers, and subsequently the infant's view of people and the world around them. For example, a child with a secure attachment style would seek proximity to their caregiver when distressed, is reassured by the caregiver and then resumes exploration of their environment. This style is associated with a parent-infant relationship where the parent is in tune with their infant's needs, responds appropriately, and the infant thus views them as a 'secure base'. The other three attachment styles would be categorized as 'insecure'. Avoidant attachment style describes an infant who avoids their parent when upset, as they have learned that the caregiver won't/can't meet their needs. Anxious-ambivalent attachment refers to a child who seeks proximity to the parent but is not reassured by this contact and becomes clingy, perhaps due to inconsistent care giving. Disorganized attachment style describes a mix of the previous two behaviours, and is associated with early trauma.

Parental attachment style is believed to be a continuity of the attachment relationship experienced in childhood, i.e. the parent's relationship with their own primary caregiver. According to this model, a secure child becomes a secure adult, an avoidant child becomes a dismissive adult, an anxious-ambivalent child becomes preoccupied and a disorganized child becomes a fearful adult (Carr, 2006). There are, however a multitude of factors which can impact how the parent interacts with their infant and the specific attachment relationship that develops between them. For example, maternal postnatal depression increases the likelihood of an insecure attachment style developing between child and caregiver (Bifulco et al., 2004). Furthermore, there is evidence that social adversity and low SES can contribute to parenting difficulties and can exacerbate attachment difficulties, particularly in relation to parental depression (Bifulco et al., 2004; Murray et al., 1996).

Parental attachment styles can also affect child behaviour. Attachment is strongly related to a child's expectations of other people and the world around them and thus has a significant influence on future interactions with peers and the development of healthy adult relationships (Clarke & Symons, 2009; Murray, Fiori-Cowley, Hooper, & Cooper, 1996). An avoidant attachment relationship may be associated with child distress and further, a parent with an avoidant attachment style may be less likely to comfort their child (Edelstein et al., 2004; Rholes, Simpson, & Blakely, 1995). Insecure parental attachment has been associated with ambivalence about having children and with more negative parent-child relationships (Rholes, Simpson, Blakely, Lanigan, & Allen, 1997).

While insecure attachment styles are not pathological in and of themselves, secure attachment is optimum. A high intensity insecure attachment style is cited as a risk factor for cognitive and emotional difficulties, psychiatric disorders, anxiety and psychosocial maladjustment during adolescence (Pickover, 2002; Vivona, 2000).

A number of home visiting programmes have reported no difference in attachment styles between parents in the intervention group and those in the control group (Barnard et al., 1988; Barrera et al., 1986; Black, Dubowitz, Hutcheson, Berenson-Howard, & Starr, 1995; Booth, Mitchell, Barnard, & Spieker, 1989; Kitzman et al., 1997; Siegel, Bauman, Schaefer, Saunders, & Ingram,, 1980; Thompson, Cappleman, Conrad, & Jordan, 1982). In a meta-analysis of home visiting programmes, Kendrick et al. (2000) reported that none of the studies examined found a difference between the groups in terms of mother-child attachment. This suggests that parental attachment may be difficult to modify in a home visiting context.

Parenting Stress

A number of studies have reported that children of highly stressed parents are at risk for a number of negative outcomes, such as poor vocabulary skills (Noel, Peterson, & Jesso, 2008), a greater number of problem behaviours (Guthermuth-Anthony et al., 2005; Patterson, 1983), and insecure infant attachment (Jarvis & Creasey, 1991; Vaugn, Egeland, Sroufe, & Waters, 1979). However, there is some debate over the nature of this association. There is evidence of a direct link between parenting stress and child outcomes (Crnic, Gaze, & Hoffman, 2005; Guthermuth-Anthony et al, 2005), yet, the majority of studies suggests that parental stress has an indirect effect on children which is mediated by parenting behaviour and the quality of parent-child interactions. Parents who report higher levels of stress have been found to have less positive affective relationships with their children during the toddler and preschool period (Belsky, Woodworth, & Crnic, 1996; Jain, Belsky, & Crnic, 1996; Pett, Vaughn-Cole, & Wampold, 1994), to be more authoritarian in their parenting styles, and less involved with their children (Belsky et al., 1996; Bolger, Mitchell, Barnard, & Spieker,1989; Deater-Deckard & Scarr, 1996). However, it is also likely that child behaviour affects parental stress (Crnic & Low, 2002). Moreover, negative parenting practices may increase the likelihood that children develop behaviour problems which in turn may activate a cycle of negative parent-child interactions and place additional stress on parents (Mash & Johnston, 1990; Patterson, 1983; Short & Johnston, 1997; Webster-Stratton, 1990).

Reducing parent stress is often an important aim of home visiting programmes as it may improve caregiver well-being and child outcomes. Yet early childhood interventions based on home visiting programmes report mixed results with regards to reducing parental stress (Kahn & Moore, 2010). Interventions focused explicitly on parenting stress have reported that levels of stress can be reduced through cognitive and behavioural therapies, particularly if the intervention has a component which focuses on parent education (Dihoff et al., 1994; Felner et al., 1994, McBride, 1991; Pisterman et al., 1992). While most of these studies measure stress for parents of older children, Kaaresen, Ronning, Ulvund and Dahl (2006) report that an early intervention which started with mothers in the hospital directly after birth, reduced parenting stress in mothers and fathers of pre-term infants at 6 months of age. In contrast, other early home visiting programmes have reported no significant differences in parenting stress between the intervention and control groups at either one or two years postpartum (Landsverk et al., 2002;Love et al., 2001).

Parenting Behaviour/Attitudes

Key dimensions of parenting include constructs reflecting parental acceptance, responsiveness, emotional warmth, demandingness and control (Cummings, Davies, & Campbell, 2000; Maccoby & Martin, 1983). Parenting styles characterised by a combination of high responsiveness and high control are most often associated with positive child outcomes (e.g., Baumrind, 1991; Hetherington, Henderson, & Reiss, 1999; Taylor, Clayton, & Rowley, 2004), while those associated with low responsiveness and high control are commonly associated with negative developmental outcomes (Petito & Cummins, 2000). Promoting sensitive and responsive parenting to high risk families may reduce the risk of poor developmental outcomes, as well as prevent child abuse and neglect.

There are conflicting reports regarding the effectiveness of home visiting programmes in changing parenting behaviour and attitudes. A meta-analysis by Kendrick et al. (2000) reported that the majority of home visiting programmes had a significant impact on parenting, in relation to parental knowledge of developmental milestones (Field et al, 1980), parental interactions, responsiveness to the child (Barnard et al, 1988; Field et al, 1980; Larson, 1980; Olds, Henderson & Kitzman, 1994) and belief in corporal punishment (Huxley and Warner, 1993). In addition, more recent research has demonstrated that at risk mothers who participated in home visiting programmes during pregnancy displayed lower risk of potential child abuse (Guthrie, Gaziano, & Gaziano, 2009). However, a number of programmes reported no significant impacts on parent-child interactions, parental warmth (Barrera et al, 1986; Black et al, 1995; Kitzman et al, 1997), and discipline practices (Johnston et al, 2004; Wasik, Bryant, & Lyons, 1990).

Parenting programmes may also have an impact on parental locus of control (i.e. whether or not parents feel life factors and events are within their control or outside of their control), however, the reported effects in the literature are mixed. It is possible that parents with an external locus of control may be less inclined to engage in parenting programmes as they believe that their child's behaviour is out of their control. Yet Roberts et al. (1992) found no support for this hypothesis, reporting that scores on the Parental Locus of Control (PLOC) scale were not related to engagement in a clinic based parenting programme. In addition, they found that parents who completed the programme scored higher on measures of internal locus of control following treatment. In contrast, Emond et al. (2002) reported no difference in locus of control between

treatment and control mothers in a home visiting programme for first time parents from disadvantaged areas.

Activities/Interactions with Baby

Children learn social skills through interactions with others (Vygotsky, 1978) and interactions with parents are particularly associated with long-term developmental and behavioural outcomes (Tamis-LaMonda, Bornstein, & Baumwell,2001). Much of the research on parent interactions with their children has focused on storybook reading. Shared reading is an important source of mother-child verbal interactions and is associated with early school readiness factors, such as language development and social emotional development (Bus, Van Ijzendoorn & Pellegrini, 1995; Neuman, 1997; Raikes, Pan et al., 2006; Tomopoulos et al., 2006; Weinberger, 1996). Wood (2002) reported that frequency of storybook reading was associated with later reading attainment, vocabulary, and short term memory. In addition, pre-school children's knowledge of nursery rhymes may contribute to reading development (McLean, Bryant & Bradley, 1987). Singing to children has been found to contribute to language development (Trevarthen, 1987; Papousek, 1996), emotional communication (Trehub & Nakata, 2002) and cultural identity (Trevarthon, 2002). While early infant-parent interactions involving game playing provide a context for learning conversational turn-taking and contingent responsivity (Field, 1979). Although much of the research is conducted with children aged one year and older, Tomopoulos et al. (2006) reported that toys provided to 6 month old children were predictive of 21 month receptive language. However, reading activities at 6 months of age did not predict cognitive or language development.

A number of factors may have an impact on the level of interaction between parents and infants. Parents of children over one year of age from low SES backgrounds are likely to have lower levels of interaction with their children than those from higher SES backgrounds (Hart & Risley, 1992; Walker, Greenwood, Hart, & Carta, 1994), however, the level of interaction with infants under one year of age appears to be roughly the same across socioeconomic levels (Fouts, Roopnarine, Lamb, & Evans, 2010; Fouts, Roopnarine, & Lamb, 2007; Leyendecker, Lamb, Schölmerich & Fricke, 1997). Parental mental health has also been associated with parent-child interactions, with parents who display depressive symptoms being less likely to engage in positive parent-infant interactions (Paulson, Dauber, & Leiferman, 2006).

There is some evidence that early interventions may have a positive impact on promoting parent-child interactions. For example, several studies have found that interventions which involve encouraging parents to read to their pre-school children help promote reading attainment later in childhood (Justice & Ezell, 2000; Neuman, 1996; Wade & Moore, 2000). In addition, Nelson, Wissow, & Cheng (2003) report that information on shared book reading, parent-child interactions, sleep patterns, and injury prevention provided by paediatricians is associated with increased frequency of reading and improved quality of parent-child interactions. In contrast, a small number of studies have reported that early interventions aimed at parents of very young infants have little impact on child development (Johnston et al., 2004; Minkovitz et al., 2001).

4.4.1 Parenting Instruments

Parental Locus of Control

The *Parental Locus of Control Scale* (PLOC; Campis, Lyman, & Prentice-Dunn, 1986) consists of 47 items. Twenty of these items representing the four items from each of the five domains with the highest factor loadings are used in the *PFL* evaluation. The PLOC yields five domains related to an individual's locus of control as it relates to their role as a parent. The *parental efficacy* domain (α = .45) includes items related to parents' perceptions of their parental ability, and the ability of parents in general in dealing with children, while the *parental responsibility* domain (α = .48) examines parents' belief as to who is responsible for their child and their child's behaviour. The *child control of parent's life* domain (α = .47) measures the extent to which parents feel their life is influenced by their child and the *parental belief in fate* domain (α = .53) assesses parents' belief that luck is a factor in the outcomes from a parent-child relationship. Finally, the *parental control of child's behaviour* domain (α = .54) measures the amount of control the mother believes she has over her child. Mothers rated how much they agreed with each statement on a 5-point likert scale ranging from one representing *strongly disagree* to five representing *strongly agree*. A total PLOC score representing the sum of scores on all items (α = .61) was also calculated. The possible range of the PLOC score is from 20 to 100 with higher scores indicative of a more external locus of control and lower scores indicating an internal locus of control. Internal locus of control is considered a positive attribute as it reflects an individual's belief that they are primarily responsible for the outcomes in their lives, while individuals with a strong sense of external locus of control generally tend to be more negative about the world around them. Therefore lower scores on the PLOC are considered positive.

Parental Attachment

The *Condon Maternal Attachment Scale* (CMAS; Condon & Corkindale, 1998) is a 19-item (α = .68) measure of the mother's subjective feelings toward her infant in the first year of life. THE CMAS provides a total score of maternal attachment as it relates to the mother's pleasure in proximity to her child, the mother's acceptance of the child and lack of resentment about the infant's impact on her life, the mother's tolerance of the child or absence of hostile feelings towards the infant, the mother's sense of competence and satisfaction in caring for the infant, her sense of the infant as her own, and her sense of patience. Mothers were presented with each question and instructed to select the option that best represents how she feels. Responses to each question were rescaled to range from one to five, with higher scores representing stronger attachment. The total score was calculated by summing all items, providing a range of scores from 19 to 95. Additionally, three subscales comprising *quality of attachment* (9 items, α = .59), *absence of hostility* (5 items, α = .60) and *pleasure in interaction* (5 items, α = .35) were calculated to represent the mean of responses to items in that subscale.

Parenting Stress

The short version of the *Parenting Stress Index* (PSI; Abidin, 1995) consists of 36 items which are completed by mothers. The PSI provides a *total score* (36 items, α = .93) and three subscales measuring potential factors related to parental stress. *Difficult child* (12 items, α = .87), which indicates behavioural characteristics of the child, as perceived by the mother, *parenting distress* (12 items, α = .87), and *parent-child dysfunctional interactions* (12 items, α = .89). Mothers were asked to rate how much they agree or disagree with each item on a 5 point likert scale ranging from *strongly disagree* to *strongly agree*. Responses to both the overall stress score and the three subscales were summed to generate representative scores, resulting in a possible scoring range of 36 to 180 for the total stress score, 12 to 60 for the child behavioural problems, parenting distress, and parent-child dysfunctional interactions subscales with higher scores representing

higher levels of stress. A binary variable was calculated to represent the proportion of mothers scoring above 90. Mothers scoring above this cut-off score were considered to have clinically significant stress levels.

Parental Behaviours/Attitudes

The *Parental Cognition and Conduct Toward the Infant Scale* (PACOTIS; Boivin et al., 2005) is a 26-item (α = .69) is a multifaceted self-report tool yielding scales on five domains which measure parents' perceptions about their parental role and their involvement in certain parenting practices. The *parental self-efficacy* (6 items, α = .82), and *perceived parental impact* (5 items, α = .68) domains include statements pertaining to beliefs about parenting competence and their impact on the child, while the *parental hostile-reactive behaviours* (7 items, α = .73), *parental overprotection* (5 items, α = .60), and *parental warmth* (5 items, α = .78) domains assess parents' involvement in different types of behaviour with their child. Boivin et al. (2005) state that parental overprotection refers to 'excessive concern for the safety and protection of the child and is deemed to be a negative parenting characteristic. Mothers rated each item in relation to how much they think, feel, or do on an 11 point scale ranging from zero denoting *not at all what I think, feel, or do* to 10 meaning *exactly what I think, feel, or do.* Scores for each domain represent an average of the responses to each item in that domain resulting in a scoring range from 0 to 10. Therefore, scores in the parental self-efficacy and perceived parental impact domains indicate a greater belief in parental ability and in the impact of parent behaviours on child behaviours. Higher scores in the parental hostile-reactive behaviours, parental overprotection, and parental warmth domains indicate greater use of these behaviours. Parental hostile-reactive behaviour and overprotection are seen by the authors of the measure as negative aspects of parenting, while warmth is seen as a positive dimension of parenting. Following the Quebec Longitudinal Study of Child Development, 4 additional questions were added to the PACOTIS scale. These additional questions (α = .63) assess how the mother compares her baby to other six month old babies; specifically how endearing, curious, cute and intelligent their baby is compared with other babies of the same age. Response options were given on an 11 point scale ranging from zero representing *not at all what I think* to ten meaning *exactly what I think.* An average of all responses was calculated resulting in a score ranging from 0 to 10 with higher scores indicating that the mother has a higher opinion of her own baby when compared with other babies of the same age.

Activities/Interactions with Baby

Mothers were asked 16 questions (α = .74) relating to how often they did certain activities (e.g., singing songs, dancing, telling stories) with their baby. These items were taken from the *My Baby and Me* program and *Parenting for the First Time* program (Centres for the Prevention of Child Neglect, 2000). Answers were given on a 6 point scale ranging from 0 representing *not at all* to 5 signifying *more than once a day*. A scale representing the frequency of the mother's interaction with her baby was created by taking an average of all responses, with higher scores indicating more interaction.

4.4.2 Parenting Results

Parental Locus of Control

All five of the Parental Locus of Control (PLOC) subscales were in the hypothesised direction, however there were no significant differences between the high and low treatment group on these subscales. In addition, the step down test showed that the joint effect of the five PLOC subscales was not statistically significant.

Maternal Attachment

One of the three Condon Maternal Attachment Scale (CMAS) subscales was in the hypothesised direction, however there were no significant differences between the high and low treatment group on any of the three subscales. In addition, the step down test showed that the joint effect of the three CMAS subscales was not statistically significant.

Parenting Stress Inventory

Two of the three Parenting Stress Inventory (PSI) subscales were in the hypothesised direction, however there was only one statistically significant effect found for the Parent-Child Dysfunctional Interaction subscale. The Parent-Child Dysfunctional Interaction subscale measured the mother's perception of the quality of her interactions with the child; higher scores were indicative of a more dysfunctional relationship between the mother and her child. The high treatment group scored an average of 16.94 on this subscale while the low treatment group scored an average of 18.40 ($p<.05$, $d=.28$) indicating that the low treatment group was more likely to engage in dysfunctional interactions with their child. In addition, the step down test showed that the joint effect of the three PSI subscales was statistically significant ($p<.10$), indicating that there is a significant difference in parenting stress between the low and high treatment groups. The joint effect finding is driven by the significant results found for the Parent-Child Dysfunctional Interaction subscale.

Parental Cognition and Conduct Towards the Infant Scale

Of the six subscales within the Parental Cognition and Conduct Towards the Infant Scale (PACTOIS), four of the subscales were in the hypothesized direction and two subscales, the Baby Comparison and the Parental Hostile-Reactive Behaviour subscales, were statistically significant. The high treatment group scored an average of 7.52 on the Baby Comparison subscale while the low treatment group scored an average of 7.04 ($p<.05$, $d=.26$). This indicates that high treatment mothers were more likely than low treatment mothers to regard their baby more highly compared with other babies of the same age. The high treatment group scored an average of 0.80 on the Parental Hostile-Reactive Behaviour subscale compared with 1.04 for the low treatment group ($p<.10$, $d=.20$), indicating that the high treatment group were less likely to react in a hostile manner towards their child. Finally, the step down test showed that the joint effect of the six PACTOIS subscales was not statistically significant.

All Parenting Measures

Three of the four measures in the overall Parenting category were in the hypothesized direction and one of these effects was statistically significant - the Interaction with Baby scale. The high treatment and low treatment groups differed significantly on the frequency of their interactions with their child, with mothers in the high treatment group interacting more frequently with their child. On average, mothers in the high treatment group scored 2.79 on this scale, compared with an average score of 2.66 for mothers in the low treatment group ($p=<.10$, $d=.22$). The step down

test showed that the joint effect of the four Parenting measures in this category was not statistically significant.

Non Step Down Measures

The Parenting Stress Inventory cut-off score was in the hypothesized direction and indicated a significant difference between the high and low treatment group. The high treatment mothers were less likely to have clinically significant stress levels compared to low treatment mothers. 1% of mothers in the high treatment group score above the Parenting Stress Inventory cut-off point compared to 6% of mothers in the low treatment group (p<.10, d=.24).

Table 4.3

Results for High and Low Treatment Groups: ***Parenting***

Variable	N (n_{HIGH}/ n_{LOW})	M_{HIGH} (*SD*)	M_{LOW} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Parental Locus of Control (PLOC)						
*Parental Control of Child's Behaviour *(negative outcome)*	173 (83/90)	6.92 (2.82)	7.22 (2.64)	ns	ns	0.11
*Child Control of Parent's Life *(negative outcome)*	173 (83/90)	8.43 (3.36)	8.74 (3.11)	ns	ns	0.10
*Parental Responsibility *(negative outcome)*	173 (83/90)	12.57 (3.18)	12.86 (3.02)	ns	ns	0.09
*Parental Belief in Fate *(negative outcome)*	173 (83/90)	9.70 (3.65)	9.97 (3.32)	ns	ns	0.08
*Parental Efficacy *(negative outcome)*	173 (83/90)	6.65 (2.43)	6.76 (2.43)	ns	ns	0.04
Maternal Attachment (CMAS)						
Quality of Attachment	173 (83/90)	4.69 (0.30)	4.68 (0.37)	ns	ns	0.03
Pleasure in Interaction	173 (83/90)	4.33 (0.38)	4.34 (0.43)	ns	ns	0.02
Absence of Hostility	173 (83/90)	4.39 (0.53)	4.41 (0.53)	ns	ns	0.04
Parental Stress Inventory (PSI)						
*Parent-Child Dysfunctional Interactions *(negative outcome)*	173 (83/90)	16.94 (4.81)	18.40 (5.71)	p<.05	p<.10	0.28
*Difficult Child *(negative outcome)*	173 (83/90)	19.45 (5.00)	20.19 (5.50)	ns	ns	0.14
*Parental Distress *(negative outcome)*	173 (83/90)	26.02 (7.98)	25.71 (7.47)	ns	ns	0.04
Parental Cognition and Conduct Toward the Infant Scale (PACTOIS)						
Baby Comparison Score	173 (83/90)	7.52 (1.92)	7.04 (1.90)	p<.05	ns	0.26
*Parental Hostile-Reactive Behaviour *(negative outcome)*	173 (83/90)	0.80 (1.13)	1.04 (1.21)	p<.10	ns	0.20
Parental Self-Efficacy	173 (83/90)	8.80 (1.11)	8.67 (1.24)	ns	ns	0.10
Parental Impact	173 (83/90)	7.25 (2.00)	7.07 (2.23)	ns	ns	0.08
*Parental Over-Protection *(negative outcome)*	173 (83/90)	6.18 (2.19)	6.14 (1.99)	ns	ns	0.02
Parental Warmth	173	9.18	9.24	ns	ns	0.06

	(83/90)	(1.17)	(1.27)			
All Parenting Measures						
Interaction With Baby	173 (83/90)	2.79 (0.61)	2.66 (0.53)	p<.10	ns	0.22
*Overall Parental Locus of Control *(negative outcome)*	173 (83/90)	44.27 (8.28)	45.54 (7.44)	ns	ns	0.16
*Total Parental Stress Score *(negative outcome)*	173 (83/90)	62.41 (14.25)	64.30 (16.18)	ns	ns	0.12
Condon Maternal Score	173 (83/90)	85.86 (5.24)	85.92 (5.73)	ns	ns	0.01
Non Step Down Measures						
*PSI Stress cut-off (90) *(negative outcome)*	173 (83/90)	0.01 (0.11)	0.06 (0.23)	p<.10	~	0.24

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

4.5 Home Environment and Safety

The home environment refers to a variety of factors that can affect family functioning, including parent-child interactions, parental responsiveness to the child (Illig, 2008), and cleanliness and safety within the home (Parcel & Dufur, 2001). These factors have a strong impact on the social, emotional and cognitive developmental aspects of school readiness such as academic and behavioural outcomes, learning problems, sustained attention, stress-related disease and the ability to deal with complex situations (Caughy, 1996; Hammen, Adrian, Gordon et al, 1987; Bradley & Caldwell, 1976).

The complexity of the relationship between the home environment and child development is demonstrated by findings which suggest that specific aspects of the early home environment vary in importance at different developmental stages. For example, stimulation in the early environment is strongly related to IQ at age four; however this aspect of the environment is not significantly correlated in later stages of development (Bradley & Caldwell, 1976; 1984; Sloan, Stewart & Dunne, 2010). While socio-economic status can play a large role in material resources available to the child, the relationship between the environment and a child's development is multifarious and optimal development is not simply explained by financial advantage (Farah, Betancourt, Shera et al, 2008). This section will examine how the home environment can play a role in children's development by focusing on the social, cognitive and physical aspects of the home environment and infant safety.

Quality of the Home Environment

Studies of the infant environment indicate that the home environment is more strongly associated with developmental outcomes, when compared to socioeconomic status or other social measures (Elardo, Bradley & Caldwell, 1976). According to Casey and Bradley (1982) developmental

researchers typically place aspects of the home environment processes into three main categories: social factors, cognitive factors and physical factors.

Social home environment factors include parental responsiveness, warmth and nurturance, the level of encouragement towards independence and the extent of restriction provided by the parent (Casey & Bradley, 1982). These factors are associated with social, emotional, cognitive and communicative competences which are important for adaptation to the school environment. They can impact the child's ability to form secure emotional attachments, which is associated with the child's motivation to interact with their learning environment (Edwards, Sheridan & Knoche, 2010). Exposure to an early responsive environment is related to classroom behaviour in later childhood and is linked to considerateness (Bradley, Caldwell, & Rock, 1988). There is also an association between parental nurturance in early childhood and memory development, with more nurturance being associated with better memory (Farah et al, 2008). Other skills such as the development of positive coping strategies for emotional expression and the development of intrinsic motivation can be enhanced by fostering independence and the use of socially appropriate reactions (Edwards et al, 2010).

Cognitive home environment factors include both the quality and quantity of language used in the home, modelling of intellectual behaviours, and variety and stimulation of activities (Casey & Bradley, 1982). Exposure to environments with low levels of stimulation is associated with cognitive, social and behavioural delays (WHO, 2009). On the other hand, variety and regular change in stimulating toys combined with novel perceptual, cognitive, motor and social interactions by caregivers stimulates positive brain changes. Being exposed to variety during early childhood is associated with cognitive development and classroom behaviour at school (Bradley et al, 1988). Stimulation is also linked to cognitive development, as more stimulating early environments help children to develop and learn. Environmental stimulation is associated with intrinsic motivation, later language development, and mathematics and reading ability (Gottfried, Fleming & Gottfried, 1998; Farah et al, 2008; Bradley & Caldwell, 1976).

Physical home environment factors include the level of organisation, structure and regularity within the home (Casey & Bradley, 1982). The physical environment of the child can influence development both directly and indirectly. Noise levels and exposure to lead and other toxins can have a direct effect on child development, impacting IQ and long-term memory. Overcrowding, chaos, and confusion are associated with psychological distress and behavioural adjustment problems at school, but these factors can also indirectly influence development as they are associated with low levels of parental responsiveness (Evans, 2006). Another aspect of the physical environment which may impact child development is exposure to second hand smoke. Infant exposure to second hand smoke is associated with increased blood lead levels, respiratory illness and middle ear disease and these health difficulties can impact school attendance (Culp, Culp, Anderson & Carter, 2007; Mannino, Albalak, Grosse & Repace, 2003; Cook & Strachan, 1999). While it is difficult to eliminate maternal smoking, increasing maternal knowledge of the effect of second hand smoke on child development has been associated with change in maternal smoking patterns (Culp et al, 2007).

Evidence suggests home visiting programmes can have a positive impact on the quality of the home environment. Home visiting programmes encourage the parent to use developmentally

stimulating toys and to engage with the child with warmth and nurturance through non-physical disciplining strategies, thus encouraging the development of skills that are useful for successful adaptation to the school environment (Gomby, 2003). Moreover, the combination of access to cognitive stimulation, good health and a clean, safe environment helps to promote lower levels of child problem behaviours at school entry level (Bakermans-Kranenburg, Van Ijzendoorn, & Bradley, 2005; Kendrick, Elkan, Hewitt et al, 2000; Parcel & Dufur, 2001).

Infant Safety

The physical safety of the home environment is important for optimal development and helps foster psychological security in the child (Rushton & Larkin, 2001). Caregivers play a primary role in maintaining a safe infant environment through supervision, modification of the environment and teaching safety rules (Morrongiello, Ondejko & Littlejohn, 2004). Caregivers frequently influence the safety of home play by restricting play areas or adapting play space dependant on developmental age (Pierce, 2000). The creation of a safe environment within the home benefits the child's learning potential as children develop and learn best when they feel safe and valued. A safe environment also helps minimise health problems through the reduction of accidental injury. Subsequently, these two factors influence school readiness as they impact the child's psychological and physiological development (Rushton & Larkin, 2001). Home based intervention programmes help educate parents on household safety and increased awareness of preventable accidents (Culp et al., 2007; Roberts, Kramer & Suissa, 1996). Findings suggest that home based intervention programmes are associated with reduced incidences of injury, abuse and neglect, all of which have an impact on school readiness later in childhood (Gomby, 2003; King, Klassen, LeBlanc et al, 2001).

4.5.1 Home Environment and Safety Instruments

Quality of the Home Environment

The Infant-Toddler version of the Home *Observation for Measurement of the Environment* (HOME; Caldwell & Bradley, 2003) is a 45-item instrument completed by a trained interviewer. It measures the stimulation potential of the child's home environment, and may be used as a substitute for reliance on social class as an indicator of quality of the child's home environment. The HOME Inventory comprises six domains. *Responsivity* (11 items, $\alpha = .71$) illustrates the degree to which a parent is responsive to the child's behaviour. *Acceptance* (8 items, $\alpha = .51$) represents parental acceptance of negative behaviour from the child and avoidance of unnecessary punishment. *Organisation* (6 items, $\alpha = .21$) pertains to the degree of routine in a family's schedule, safety of the environment, and community supports utilised. The *learning materials* domain (9 items, $\alpha = .61$) assesses the appropriateness of play materials for the child. *Involvement* (6 items, $\alpha = .36$) illustrates the degree to which the parent is involved in the child's learning and promotes child development. Finally, the *variety* domain (5 items, $\alpha = .32$) assesses visitation of people and attendance of activities that introduce variety into the child's life. Each item was scored by a trained interviewer as true or not. Items were scored based on observations while in the home. For items where this was not possible, the mother is directly asked the question in an interview format. If the item was *true* it is scored as a 1, if it is *not true* it is scored as 0. Scores for each domain on the HOME Inventory were obtained by averaging the responses to each question in that domain resulting in a score ranging from 0 to 1 with higher scores indicating a more nurturing home environment.

The *Supplement to the HOME Scale for Children Living in Impoverished Urban Environments* (SHIF; Ertem, Avni-Singer, & Forsyth, 1996) consists of 20 items that were combined with the HOME Infant/Toddler Inventory and administered by a trained interviewer along with the HOME Inventory. The SHIF was developed to be used in conjunction with the HOME Infant/Toddler Inventory to provide a more suitable and accurate assessment of the home environment of young children living in low socioeconomic urban areas. Additionally, four items assessing child interaction with adult figures (not father figures) and the level of noise generated inside and outside the house were added to this measure as they were thought to be particularly relevant to low income populations. SHIF items, as well as these additional four items, are scored in the same way as items on the HOME Inventory, with a score of one representing that the statement is *true* and a zero representing that it is *not true.* In addition to the individual HOME Inventory domains described above, a combined score using information from all questions related to the home environment (e.g., HOME + SHIF) was used to form a composite measure of stimulation in the home environment. The combined measure consists of 69 items, 45 from the HOME Inventory, 20 from the SHIF, and the four additional questions described above which form eight subscales. *Daily Routines* (10 items, $\alpha = .36$) contains items pertaining to the child's eating and sleeping patterns and the availability of food and safe sleeping facilities. *Child Care* (5 items, $\alpha = .44$) provides details about the range, adequacy and appropriateness of childcare used by parents. *Outings* (5 items, $\alpha = .20$) measures the variety of stimulation the child receives in the form of trips made outside the home environment. *Toys and Books* (10 items, $\alpha = .61$) measures the variety of appropriate play and learning materials available to the child in the home environment. *Play* (10 items, $\alpha = .39$) contains items relating to stimulating interactions between the parent and the child, and the parent's conscious encouragement of the child's development. *Physical Environment* (10 items, $\alpha = .38$) is an observational subscale which contains items relating to cleanliness and safety in the home, as well as the presence of literacy materials. *Interaction* (13 items, $\alpha = .77$) measures the parent's warmth and responsiveness in interacting with the child. Finally, *restriction* (6 items, $\alpha = .45$) measures the level of restraint the parent places on the child during the visit, in the form of physical punishment and scolding, as well as inappropriate handling by older children. Scores for each domain were obtained by averaging the responses to each question in that domain. In addition, an overall home environment score ($\alpha = .74$) was obtained by calculating the average of all responses. All calculated scores range from 0 to 1 with higher scores indicating a more stimulating home environment.

Infant Safety

The *PFL* evaluation combined multiple measures to assess the safety of the physical environment. Specifically, 15 of the 23 items on the birth to 12 month version of the *Framingham Safety Survey* (FSS; American Academy of Pediatrics, 1991) were combined with questions assessing the presence of five common safety items (e.g., safety gate) in the house. Two scores related to safety of the physical environment were derived from these questions. First, a summed score was created indicating the presence of five common household safety items (*safety gate/barrier, fire guard, smoke alarm, electric socket covers, child car seat*). This score ranges from 0 to 5 and represents the total number of safety items present in the house ($\alpha = .31$). Second, mothers were asked questions relating to the safety of the home from a list of high-risk behaviours, such as the absence of child-locks on windows. These items were rated on a scale from 0 to 10. An average score was calculated for all safety items ($\alpha = .24$), resulting in an

overall safety score, whereby higher scores represent a safer environment for the child. Additionally, participants were asked whether or not the baby's father or another person in the house smoked.

4.5.2 Home Environment & Safety Results

Home Observation for Measurement of the Environment

Of the fourteen subscales on the Home Observation for Measurement of the Environment (HOME) and the Supplement to the HOME Scale for Impoverished Families (SHIF) measure, eleven were of the expected direction and five of these effects were statistically significant for the Variety, Childcare, Toys and Books, Physical Environment, and Learning Materials subscales. The high treatment group scored significantly higher (M=3.54) than the low treatment group (M=3.1) on the Variety subscale ($p<.01$, d=.42), which assesses visitation of people and attendance of activities that introduce variety into the child's life. The high treatment group also scored significantly higher (M=4.19) than the low treatment group (M=3.93) on the Childcare subscale ($p<.01$, d=.36), which provides details about the range, adequacy and appropriateness of childcare used by parents. The high treatment group scored significantly higher (M=7.75) than the low treatment group (M=7.28) on the Toys and Books subscale ($p<.05$, d=.27), which measures the variety of appropriate play and learning materials available to the child in the home environment; and the high treatment group scored significantly higher (M=6.49) than the low treatment group (M=6.21) on the Physical Environment subscale ($p<.10$, d=.23), an observational subscale which is designed to assess through observation factors related to cleanliness and safety in the home as well as the presence of literacy material. Finally, the high treatment group scored significantly higher (M=6.80) than the low treatment group (M=6.42) on the Learning Materials subscale ($p<.10$, d=.23), which assesses the appropriateness of play materials for the child. In addition, the step down test showed that the joint effect of the fourteen HOME subscales was statistically significant ($p<.10$), indicating that there was a significant difference in the overall HOME scores between the low and high treatment groups. These joint findings were driven by the statistical significance of the Variety subscale. It is worth noting that the measures which included a lot of original missing data and were subsequently imputed, particularly Responsivity and Interaction, were not among the statistically significant measures discussed above.

Safety

Five out of seven measures in the Safety category were in the hypothesised direction, and two of these effects were statistically significant - the Framingham Safety Survey and use of electrical socket covers. The high treatment group scored an average of 7.50 on the Framingham Safety Survey, compared to 7.33 for the low treatment group ($p<.10$, d=23). In addition, 43% of mothers in the high treatment group reported that they used electrical socket covers compared with 33% of low treatment mothers ($p<.10$, d =.20). The step down test showed that the joint effect of the seven measures in the Safety category was not statistically significant.

Non Step Down Measures

The total HOME SHIF score, based on all fourteen subscales, was in the hypothesized direction and statistically significant, indicating that the high treatment group scored significantly higher (M=17.04) than the low treatment group (M=16.74) regarding the overall quality of the home environment.

Table 4.4

Results for High and Low Treatment Groups: ***Home Environment & Safety***

Variable	N (n_{HIGH}/ n_{LOW})	M_{HIGH} (*SD*)	M_{LOW} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Home Observation for Measurement of the Environment (HOME)						
Variety	170 (81/89)	3.54 (1.12)	3.10 (1.01)	p<.01	p<.10	0.42
Childcare	170 (81/89)	4.19 (0.59)	3.93 (0.83)	p<.01	ns	0.36
Toys and Books	170 (81/89)	7.75 (1.75)	7.28 (1.80)	p<.05	ns	0.27
Physical Environment	169 (80/89)	6.49 (1.17)	6.21 (1.20)	p<.10	ns	0.23
Learning Materials	168 (81/87)	6.80 (1.66)	6.42 (1.63)	p<.10	ns	0.23
Daily Routines	170 (81/89)	7.36 (1.40)	7.14 (1.22)	ns	ns	0.17
Play	170 (81/89)	7.32 (1.61)	7.05 (1.44)	ns	ns	0.18
Responsivity	165 (80/85)	9.09 (1.73)	8.83 (1.95)	ns	ns	0.14
Interaction	165 (80/85)	11.62 (2.03)	11.33 (2.48)	ns	ns	0.13
Acceptance	168 (80/88)	6.39 (0.60)	6.34 (0.60)	ns	ns	0.09
Involvement	168 (81/87)	4.36 (1.30)	4.35 (1.22)	ns	ns	0.01
Organisation	169 (80/89)	5.57 (0.65)	5.59 (0.68)	ns	ns	0.04
Outings	170 (81/89)	4.77 (0.45)	4.80 (0.43)	ns	ns	0.07
Restrictions/Not Items	169 (81/88)	5.96 (0.16)	5.98 (0.11)	ns	ns	0.17
Safety						
Framingham Safety Survey	173 (83/90)	7.50 (0.73)	7.33 (0.69)	p<.10	ns	0.23
Electrical socket covers	168 (81/87)	0.43 (0.50)	0.33 (0.47)	p<.10	ns	0.20
Safety gate	151 (75/76)	0.19 (0.39)	0.13 (0.34)	ns	ns	0.15
No. of safety items	171 (81/90)	2.69 (0.93)	2.56 (0.82)	ns	ns	0.16
*Baby exposed to cigarette smoke *(negative outcome)*	172 (82/90)	0.29 (0.46)	0.30 (0.46)	ns	ns	0.02
Smoke alarm	171 (81/90)	0.98 (0.16)	0.96 (0.21)	ns	ns	0.11
Child car seat	162 (77/85)	0.97 (0.16)	1.00 (0.00)	ns	ns	0.24
Non Step Down Measures						
Total HOME SHIF	167 (80/87)	17.04 (1.27)	16.74 (1.19)	p<.10	~	0.24

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the

test is statistically significant at the 1%, 5%, and 10% level respectively. '˜'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

4.6 Maternal Health and Pregnancy

Maternal health and well-being during pregnancy are influenced by multiple factors, many of which are interrelated. Past and current health, nutrition, exercise, antenatal care, levels of stress, social support, mental health and the use of alcohol, cigarettes and drugs are all recognised as factors associated with foetal development and birth which can have significant long-term consequences for child health and development. This section presents information relating to maternal health during and after pregnancy including health complications during pregnancy, Body Mass Index (BMI), nutrition, smoking, substance use, post-natal depression and mental health. The effects of each factor will be considered in light of the available research, with regards to the developmental outcomes for children and the effectiveness of interventions on these areas.

Health Complications During Pregnancy

Pregnancy is a transitory time in a woman's life which can have significant physical and psychological effects. While most pregnancies proceed without major problems, complications may arise which have negative consequences for the mother and infant. Pregnancy complications have been linked with obesity (Ryan, 2007), avoidance of antenatal care (Raatikainen et al., 2007) and substance use (Kothari, Wendt, Liggins, Overton, & del Carmen Sweezy, 2011; Okah, Cai & Hoff, 2005). Miscarriage, still birth and infant mortality are the most serious complications, yet gestational diabetes, pre-eclampsia and placental abruptions can also have consequences for the foetus (Enkin et al., 2000; Kothari et al., 2011). Silver et al. (2007) identified maternal obesity, advanced maternal age and maternal stress as the 'primary maternal risk factors' for stillbirth (as cited in Kothari et al., 2011, p.68). Gestational diabetes can increase the risk of macrosomia (excessive birth weight of the newborn), congenital abnormalities, birth injury and perinatal mortality (Ryan, 2007). There are also health risks for the mother due to birthing complications (Enkin et al., 2000).

Pre-eclampsia has been associated with prenatal maternal stress (Mulder et al. as cited in Kropp, Winhusen, Lewis, Hague & Somoza, 2010), hypertension (high blood pressure), diabetes (Nelson-Piercy, 2007) and obesity (Ryan, 2007). Pre-eclampsia is a serious condition for both the mother and the foetus, and is one of the leading causes of maternal and foetal death (Lyall & Belfort, 2007; Romero-Gutierrez, Espitia-Vera, Ponce-Ponce de Leon, & Huerta-Vargas, 2007). However, physical activity during pregnancy has been demonstrated to reduce high blood pressure (Martin & Brunner Huber, 2010), which is a risk factor for pre-eclampsia (Enkin et al., 2000).

Interventions for pregnancy complications usually target risk factors such as nutrition, exercise, depression and smoking. Furthermore, Robbins and colleagues (2005) reported that women who were most influenced by interventions were those who were from lower SES backgrounds and who had not planned their pregnancies. An information leaflet based intervention (Gaston &

Prapavessis, 2009) increased pregnant women's motivation to exercise after they were provided with information about the benefits of exercise for preventing maternal-foetal disease. Joseph et al. (2009) highlighted the need for more research to determine whether risk reduction has a positive impact on birth outcomes, yet reiterated that risk reduction itself is a worthwhile goal. An early intervention programme for adolescent mothers reported a reduction in the number of premature births and infant hospitalizations through a combination of educational classes and home visiting (Koniak-Griffin, Mathenge, Anderson & Verzemnicks, 1999). Ickovis et al. (2007) describe a group-based assessment, education and support programme for pregnant women, that was found to reduce the amount of pre-term births, however this same programme did not have a significant impact on low birth weight. Cigarette smoking is associated with low birth weight and interventions which reduce smoking increase birth weight (Frohna, Lantz & Pollack, 1999). Yet the reported effects of the Nurse-Family-Partnership (NFP) programme are mixed, with fewer preterm babies born amongst women who smoked more than five cigarettes a day, yet more low birth weight babies born to older women who did not smoke (Olds, Henderson, Tatelbaum & Chamberlin, 1986).

Postnatal Depression

Although poor maternal health during pregnancy may place a child at developmental risk, parental mental health throughout the child's life may also influence child development. Postnatal depression is the most common complication of childbearing, with an estimated 10% of women experiencing depression after giving birth (www.pnd.ie, as accessed, 11th July, 2011). Specifically, postnatal depression is associated with a number of negative child outcomes including poor cognitive and emotional development (Beck, 1998), insecure attachment (Murray, 1991; Teti, Gelfand, Messinger, & Isabella, 1995), and behavioural problems (Murray, 1991). Mothers who suffer from postnatal depression may engage in less responsive parenting, which is commonly associated with negative developmental outcomes in children (Coolahan, 1997; Cunningham & Boyle, 2002; Snyder, Reid, & Patterson, 2003; Steinberg, Lamborn, Darling, Mounts & Dornbusch, 1994).

Home visiting interventions have been found to significantly reduce postnatal depression scores for at-risk mothers (Armstrong, Fraser, Dadd & Morris, 1999; Dennis & Creedy, 2004), however they do not significantly reduce the overall incidence of postnatal depression (Dennis & Creedy, 2004).

Mental Health

Maternal mental health, both prenatal and postnatal, is an important determinant of child developmental outcomes as it not only influences a child's development after birth, but may influence the in-utero development of the foetus. For example, maternal depression during pregnancy has been associated with excessive crying and irritability and depressive-like symptoms in infants (Lundy et al., 1990 as cited in Spietz & Kelly, 2002; Zuckerman, Bauchner, Parker & Cabral, 1990). Studies have also shown that stress during pregnancy can increase the production of hormones such as corticotrophin-releasing hormone (CHR) and cortisol which, in excess, can predispose the child to attention deficits and depressive symptoms (Weinstock, 2005) as well as interfere with foetal brain development (Wadhwa, Sandman, Proto, Dukel-Schetter & Garite, 1993 as cited in Spietz & Kelly, 2002). Furthermore, exposure to elevated levels of cortisol and higher levels of pregnancy-specific anxiety early in pregnancy are both associated

with a slower rate of development over the child's first year of life and with lower developmental scores at 12 months of age (Davis & Sandman, 2010). Specifically, Lung, Shu, Chiang and Lin, (2010) report that child fine motor development was affected by maternal mental health at the age of 6 months, yet this effect was not apparent at 18 months. Low mood, anxiety and stress are known to reduce positive health behaviours (Fowles & Fowles, 2008, Reading, 1983), cigarette, drug and alcohol cessation (Bloch et al., 2009, Cinciripini et al., 2010), and increase pregnancy complications (Mulder et al., 2002 as cited in Kropp et al., 2010, p.74; Teixeira, Fisk & Glober, 1999 as cited in Spietz & Kelly, 2002).

Maternal mental health interventions often do not directly affect levels of depression and low self-esteem, yet they are successful in improving parent-child attachment and maternal sensitivity, as well as reducing levels of parental stress which are often hindered by poor parental mental health (Marcenko, Spence & Samost, 1996; Pinquart & Teubert, 2010; Van Doesum et al., 2008). Integration with other appropriate services has been found to improve outcomes for the family as a whole (Campbell, 1994, Niccols et al., 2010) and home visiting parenting interventions which are provided alongside outpatient treatment for depression can further enhance the mother's relationship with her infant.

Smoking, Drinking, Drug taking During Pregnancy

The use of cigarettes, alcohol and drugs are detrimental to health in general, but are particularly damaging during pregnancy. Substance use during pregnancy can lead to foetal mortality, birth defects, developmental delays (Kothari et al., 2011; Okah et al., 2005), intrauterine growth restrictions resulting in low birth weight (Ventura, Hamilton, Mathews, & Chandra, 2003), and a higher incidence of behavioural problems, such as increased hyperactivity and chronic aggression (Tremblay et al., 2004). The first trimester is particularly important as infectious diseases, neurotoxins and nutrient deficiencies may have a detrimental effect on future brain development (Shonkoff & Phillips, 2000). It is vital for pregnant mothers to cease substance use as early as possible in order to decrease the risk of these defects and delays.

While drug use by itself has an adverse effect on birth outcome as indicated above, there are indications that the lifestyle associated with drug addiction may also be damaging. Das Eiden, Peterson and Coleman, (1999) linked cocaine use in mothers with more violent environments, while Broekhuizen and colleagues (1992) found that drug use combined with more than five prenatal care visits had only a minimal effect on birth outcome (as cited in Kropp, p.74, 2010). Interventions therefore may be targeted at improving other positive behaviours as well reducing drug use.

Foetal Alcohol Syndrome is associated with impairment in short term memory and information processing (Burden et al., 2011,) as well as growth delays and general cognitive dysfunction (Chan, 1999, Thackray & Tifft, 2001). This condition is caused by alcohol consumption during pregnancy and there is evidence to suggest that even moderate alcohol consumption or one binge drinking session can negatively impact foetal development (Thackray & Tifft, 2001; Frohna et al, 1999). The Cochrane review (Doggett, Burrett, & Osborn, 2005) report that there is insufficient evidence linking home visiting programmes to reduction of drug and alcohol use for new mothers with addiction issues. Similarly, an evaluation of NFP did not report a significant impact of their home visiting programme on substance use (Olds, Robinson et al., 2004).

Maternal smoking during pregnancy has been associated with cognitive deficits (Campbell, 1994), asthma (Levitt, Shaw, Wong, & Kaczorowski, 2007,) and obesity (Toschke, Beyerlein, & von Kries, 2005) in the child. Maternal smoking is also associated with poor mental health and low SES (Cinciripini et al., 2010) and may be indicative of a lifestyle which contains other risky pregnancy behaviours. While effective smoking cessation interventions are available, there is little evidence to suggest that these programmes are effective for pregnant women, especially as chemical interventions (i.e., nicotine replacement therapy and antidepressant medication) have not been proven safe for use during pregnancy (Levitt et al., 2007). There are mixed reports of the success of other interventions. Programmes which include such initiatives as self-help (Hartmann, Thorp, Pahel-Short, & Koch, 1996), incentives, nicotine replacement therapy and home visits (Lumley et al., 2009) have reportedly been successful, whereas those that provide informational materials and counselling interventions were found to have little effect on postpartum smoking cessation and reduction. However, there were some positive changes regarding attitudes and knowledge about smoking for woman in these programmes (Levitt et al., 2007). Furthermore, smoking interventions during pregnancy appear to have a high rate of relapse and approximately 70% of women return to smoking within a year after their pregnancy ends (Levitt, et al., 2007). There may be some benefit to the child even if mothers reduce or stop smoking exclusively for the duration of the pregnancy. For example, Campbell (1994) found that pregnant smokers who received home visitations were 75% less likely to give birth prematurely than those in the control group, and while overall the children of smokers scored lower on cognitive assessments, this deficit was greatly reduced for those receiving home visits.

4.6.1 Maternal Health & Pregnancy Instruments

Health Complications During Pregnancy

During the six month interview, mothers were asked questions relating to their health and health behaviour during pregnancy. They were asked whether or not they were diagnosed with high blood pressure, preeclampsia, diabetes, abruptio placenta or any other pregnancy complications. This information was used to generate a binary variable indicating whether or not the mother had been diagnosed with at least one pregnancy complication. Mothers were also asked whether or not they were hospitalised for any special medical care immediately following the birth of their baby.

General Health

The mother's current health status was assessed using a self-rated report of general health measured on a five point scale ranging from *excellent* to *poor*. This measure was dichotomised to create a binary indicator of ill health if the mother reported *fair* or *poor* health. The mother was not considered to have ill health if she indicated her current health was *good, very good*, or *excellent*. Mothers were also asked if they had any problem breathing in the past 30 days. There were four responses options to this question including *none, mild, moderate, severe*, or *extreme.* A binary variable denoting whether or not the mother had any breathing problem was created (*none* versus *mild/moderate/severe/extreme).* Mothers were asked how many times they visited the GP in the last 6 months (not including visits for baby).

Post-Natal Depression

The *Edinburgh Postnatal Depression Scale* (EPDS; Cox, Holden, & Sagovsky, 1987) is a 10-item (α = .93) measure completed by the mother when the *PFL* child is six months old. The

EPDS is designed to identify women who are at risk of depression. Mothers were asked to tick the option that best represents how she had been feeling over the previous seven days. The four responses to each question were rated on a zero to 3 point scale with higher scores indicating a greater likelihood of depression. The total score obtained represents the sum of all responses and has a range of zero to 30. Additionally, a binary variable indicating risk of depression was created and represents participants who scored 10 or higher on this measure. In addition to an EPDS score representing well-being in the past seven days, the same questions were asked in relation to the previous six months to assess postnatal depression in the six months following the birth of the *PFL* child. Therefore, there are two sets of scores related to this measure: two (raw score, cut-off score) representing current well-being (in the past 7 days) and two representing well –being in the six month period after the child's birth.

Mental Health

Maternal well-being was assessed using the five item (α = .88) WHO-5 (World Health Organisation, 1998) instrument completed by the mother when the *PFL* child is six months old. The WHO-5 is a measure of positive mental health. Mothers were presented with five statements related to how they have been feeling over the past two weeks and asked to rate how often they have felt that way on a six point scale ranging from zero meaning *at no time* to five meaning *all of the time*. A raw score was obtained by summing all of the responses, giving a range of 0 to 25 with lower scores, particularly those below 13, indicative of poor well-being. It is recommended that anybody who falls in this range is tested for depression.

Smoking, Drinking, Drug Taking During Pregnancy

Three *yes/no* questions were used to assess whether mothers smoked, drank alcohol or took drugs, while they were pregnant. Participants were also asked if after joining the programme they changed their smoking, drinking and use of drugs behaviour during their pregnancy. Possible response options included *yes – reduced, yes – increased, yes – stopped,* or *no*. A binary variable was created indicating whether the participant *reduced/stopped* the behaviour versus *increased/no change.*

4.6.2 Maternal Health & Pregnancy Results

Maternal Physical Health

Among the five measures included in the Maternal Physical Health category, two were in the hypothesized direction and the high and low treatment groups differed significantly on one of the pregnancy outcomes: whether the mother was hospitalised immediately following the birth of the baby. 10% of mothers in the high treatment group were hospitalised immediately following the birth of their baby for special medical care, compared with 27% of mothers in the low treatment group ($p<.01$, $d=.45$). The step down test showed that the joint effect of the five measures included in this category was statistically significant ($p<.05$), indicating that there is a significant difference in regards Maternal Physical Health between the low and high treatment groups. The joint effect results were driven by the significant hospitalization measure finding.

Maternal Mental Health

All four of the Maternal Mental Health measures were in the hypothesized direction, however there were no significant differences between the high and low treatment groups on any of the

mental health outcomes. In addition, the step down test showed that the joint effect of the four measures in this category was not statistically significant.

Substance Use During Pregnancy

Two of the three measures within the Substance Use During Pregnancy category were in the hypothesized direction, however there were no significant differences between the high and low treatment groups on any of the substance use during pregnancy outcomes. In addition, the step down test showed that the joint effect of the three measures in this category was not statistically significant.

Current Substance Use

Three of the four measures in the Current Substance Use category were in the hypothesized direction, however there were no significant differences between the high and low treatment groups on any of the current substance use outcomes. In addition, the step down test showed that the joint effect of the four measures in this category was not statistically significant.

Non Step Down Measures

Two of the four measures not included in the Step Down categories were in the hypothesized direction, however there were no significant differences between the high and low treatment groups on any of these outcomes.

Table 4.5

Results for High and Low Treatment Groups: ***Maternal Health & Pregnancy***

Variable	N (n_{HIGH}/ n_{LOW})	M_{HIGH} (*SD*)	M_{LOW} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Maternal Physical Health & Health Behaviours						
*Mother hospitalised immediately after birth for special medical care *(negative outcome)*	172 (82/90)	0.10 (0.30)	0.27 (0.44)	p<.01	P<.05	0.45
*Complication during pregnancy *(negative outcome)*	172 (82/90)	0.39 (0.49)	0.43 (0.50)	ns	ns	0.09
*Breathing problem *(negative outcome)*	172 (82/90)	0.15 (0.36)	0.13 (0.34)	ns	ns	0.04
*No. of GP visits in past 6 months *(negative outcome)*	171 (82/89)	2.51 (4.13)	1.94 (3.04)	ns	ns	0.16
Health since baby was born	172 (82/90)	0.82 (0.39)	0.88 (0.33)	ns	ns	0.17
Maternal Mental Health						
*Edinburgh Postnatal Depression Score for past 7 days *(negative outcome)*	173 (83/90)	5.87 (5.58)	6.36 (5.19)	ns	ns	0.09
*Diagnosed with postnatal depression in past 6 months *(negative outcome)*	172 (82/90)	0.10 (0.30)	0.11 (0.32)	ns	ns	0.04
*Edinburgh Postnatal Depression Score for past 6 months *(negative outcome)*	173 (83/90)	6.53 (6.03)	6.63 (5.97)	ns	ns	0.02
WHO5 Percentage Score	173	64.34	64.53	ns	ns	0.01

	(83/90)	(21.10)	(21.56)			
Substance Use During Pregnancy						
*Illegal drugs during pregnancy	172	0.00	0.02	ns	ns	0.21
(negative outcome)	(82/90)	(0.00)	(0.15)			
*Smoked during pregnancy	172	0.49	0.51	ns	ns	0.05
(negative outcome)	(82/90)	(0.50)	(0.50)			
*Drank alcohol during pregnancy	172	0.34	0.28	ns	ns	0.14
(negative outcome)	(82/90)	(0.48)	(0.45)			
Current Substance Use						
*Drug use in past 6 months	172	0.02	0.07	ns	ns	0.20
(negative outcome)	(82/90)	(0.16)	(0.25)			
*Drank alcohol in past 6 months	172	0.87	0.88	ns	ns	0.04
(negative outcome)	(82/90)	(0.34)	(0.33)			
*Currently a smoker	172	0.54	0.56	ns	ns	0.04
(negative outcome)	(82/90)	(0.50)	(0.50)			
*Consumed alcohol above recommended level	168	0.13	0.09	ns	ns	0.13
(negative outcome)	(78/90)	(0.34)	(0.29)			
Non Step Down Measures						
*Edinburgh Postnatal Depression Cut-off (10)	173	0.23	0.17	ns	~	0.16
(negative outcome)	(83/90)	(0.42)	(0.37)			
*Below WHO5 Score of 13	173	0.23	0.26	ns	~	0.06
(negative outcome)	(83/90)	(0.42)	(0.44)			
Changed smoking during pregnancy	86	0.65	0.52	ns	~	0.26
	(40/46)	(0.48)	(0.51)			
Changed drinking during pregnancy	53	0.24	0.38	ns	~	0.29
	(29/24)	(0.44)	(0.49)			

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

4.7 Maternal Social Support

Although social support has been defined in many ways in the research literature (Lin, Simeone, Ensel, & Kuo, 1979), some frequently used concepts include structural aspects of support, such as the size of a person's social network; enacted support, or the provision of specific supportive behaviours such as reassurance or advice; instrumental support defined as the provision of material goods, and subjective or perceived support which is support as experienced by the recipient (Hogan, Linden, & Najarian, 2002). However, regardless of such varying definitions, research consistently demonstrates a strong association between an individual's level of social support and his or her physical and mental well-being (e.g., Cobb, 1976). Social support may have a moderating or buffering effect, whereby it protects an individual against the detrimental effects of stressors or trauma (Cohen & Wills, 1985; Dalgard, Bjork, & Tambs, 1995). Maternal social support is associated with many positive outcomes for children, including cognitive benefits (Slykerman et al., 2005), socio-emotional skills (Izzo, Weiss, Shanahan, & Rodríguez-Brown, 2000), and a more stimulating home environment (Adamakos et al., 1986). While early research focused exclusively on structural aspects of social support, such as number of friends

and contacts (e.g., Berkman & Syme, 1979), more recent research shows that measurements such as number of individuals in one's acquaintance do not necessarily translate into supportive relationships (Berkman & Glass, 2000). Therefore, it is imperative that other aspects of social support, such as perceived support, are assessed.

Social support may be an important protective factor for individuals residing in disadvantaged communities, many of whom are at greater risk of poor mental and physical health (e.g., Bradley & Corwyn, 2002). Of relevance to the *PFL* programme, social support has been shown to be particularly beneficial to women during pregnancy. For example, Harley and Eskenazi (2006) found that maternal social support was associated with a healthy diet, increased vitamin intake, and less smoking during pregnancy; all factors that can have profound effects on foetal development. Other studies have associated maternal support with earlier initiation of prenatal care (Zambrana, Scrimshaw, Collins, & Dunkel-Schetter, 1997), reduced drug and alcohol usage (Stephens, 1985), and a reduction in pregnancy complications (Norbeck & Anderson, 1989). Social support during pregnancy is also associated with increased child birth weight (Feldman, Dunkel-Schetter, Sandman, & Wadhwa, 2000), reduced child accident and injury rates (Leininger, Ryan, & Kalil, 2009; Ramsey et al., 2003), and improved general child health status (Kana'iaupuni, Donato, Thompson-Colon, & Steinback, 2005). Furthermore, social support is associated with a reduced likelihood of postnatal depression (Xie, He, Koszycki, Walker, & Wen, 2009), which is a primary risk factor for multiple negative child outcomes, including behaviour problems (Fihrer, McMahon, & Taylor, 2009; Phillips, Charles, Sharpe, & Mathey, 2009), impaired cognitive functioning and delays in motor development (Cornish et al., 2005).

As noted above, maternal social support is in important predictor of child outcomes and while promoting social support is not the primary aim of many home visiting interventions, it is often cited as a secondary or mediating outcome (Hodnett & Roberts, 2007; Kearney & Deatrick, 2000). McCurdy (2001) investigated the impact of a home visitation program on the social support systems of disadvantaged mothers and found that mothers in the programme were less likely to report dissatisfaction with those in their support network when compared to those in the control group. However, that same study failed to find significant changes in social support over time. Conversely, de la Rosa, Perry, Dalton, and Johnson (2005) found that participants in a home visiting programme demonstrated improved emotional and material support, greater connection to community, as well as gains in family resilience. Moreover, Barlow, Coren, & Stewart-Brown's (2005) found that parenting intervention programmes had a positive effect on social support.

Satisfaction with Father's Involvement

Traditionally, research on child development focused on the mother's role and did not explicitly address father involvement (Easterbrooks & Goldberg, 1984). However, there is now a well-established research base which identifies the relationships between child well-being and father involvement. Allen and Daly (2007) conducted a review of the literature in this area and found that father involvement is associated with a number of child domains including cognitive development, emotional well-being and social abilities. This review also suggested that father involvement can impact mothers, as father support is associated with mother well-being, good post-partum health and fewer complications during pregnancy and delivery (Allen & Daly, 2007).

The relationship between father involvement and child development is complicated as father presence does not guarantee quality of interaction. In some cases father involvement is associated with negative child outcomes; for example Jaffee, Moffitt, Caspi and Taylor (2003) found that paternal antisocial behaviour was associated with child conduct problems. Moreover there are factors that serve as barriers to father involvement such as the extent to which the mother allows the father to be involved in the child's life (McBride et al., 2005) and workplace barriers (Robinson & Godbey, 1997). Mothers' perceptions also play a vital role in father involvement and are often associated with both quantity and quality of father-child interactions (McBride et al., 2005). As an example, fathers who are perceived as more competent by the mothers are a more likely to gain shared custody of children following parental separation (Juby, Le Bourdais & Mercil-Gratton, 2005).

Literature which documents the effects of home visiting programs on father involvement is scarce, however Duggan et al. (2004) examined the impact of a home visiting program on fathers' involvement in parenting. Overall, they found that the program had no significant impact on the amount of time fathers' spent with their child, paternal engagement in parenting activities, or shared parenting responsibilities.

4.7.1 Maternal Social Support Instruments

Social Support

Mothers were asked to rate on a four point scale the amount of support they felt they received from their partner, parents, close relatives, friends, neighbours, and people at work (if applicable). Responses were dichotomised into *no/little/some support,* or *a lot of support.* Mothers were also asked questions about structural aspects of social support including how often they meet with friends or relatives not living in their household and how often their baby sees his/her grandparent. Response options to these questions were dichotomised into *regularly,* or *irregularly.* Additionally, mothers reported how many neighbours they knew with a child the same age as their baby with possible response options of *zero, 1-3, 4-6, 7-10,* or *10+*. This question was used to create a *yes/no* binary variable indicating whether the mother knew at least one neighbour with a baby the same age as her own. Mothers were asked whether they discussed the programme with other people including *partner, friend/neighbour, sibling, cousin, parent, other family member, do not discuss the programme with anyone,* or *other.* The responses were used to generate five *yes/no* binary variables indicating whether or not the participant discussed the programme with her partner; her family; her friends; another person; or if she discussed the programme with anyone. Finally participants were asked who helps most with making decisions about caring for their baby. There were 8 possible response options including *partner, friends, parents, siblings, other family members, programme, none of the above,* or *other*. A binary variable was created denoting whether the *baby's father/mother's partner* helped the most or alternatively if *friends/family/others* helped the most.

Satisfaction with Father's Involvement

Mothers were asked questions relating to how involved the baby's father is in her child's life and how satisfied she is with his level of involvement. A binary variable was used to assess whether or not the father of the baby was involved in the baby's life. Mothers were asked to rate their level of satisfaction with the support the baby's father provides based on 14 questions ($\alpha = .91$)

assessing satisfaction in relation to helping with household chores, playing with the baby, helping with transportation, helping with childcare, etc. Participants could answer *very dissatisfied, somewhat dissatisfied, neither/neutral, somewhat satisfied, very satisfied,* or *he does not help in this way.* The responses to these questions were then summed to create a scale representing mother's satisfaction with the father's involvement. This scale ranges from a minimum of 14 to a maximum of 90, with higher scores illustrating greater satisfaction.

4.7.2 Maternal Social Support Results

Social Support

Among the eleven measures included in the Social Support category, 10 of the effects were in the hypothesized direction and the high and low treatment groups differed significantly on 5 of these 11 outcomes related to the frequency of seeing grandparents, discussing the programme with their partner, knowing children the same age as their child and discussing the programme with others and meeting friends frequently. Approximately 90% of children in the high treatment group saw their grandparents regularly compared to 80% of children in the low treatment group ($p<.05$, $d=.29$). 76% of mothers in the high treatment group discussed the programme with their partner compared with 61% of mothers in the low treatment group ($p<.05$, $d=.31$). 66% of mothers in the high treatment group reported knowing a neighbour with a baby of similar age to their child, compared to 56% of mothers in the low treatment group ($p<.10$, $d=.21$). Approximately 4% of mothers in the high treatment group discussed the programme with someone other than her partner, family or friend, whereas no mothers in the low treatment group discussed the programme with someone other than her partner, family or friend ($p<.10$, $d=.28$). Finally, 59% of mothers in the high treatment group met with friends regularly compared to 48% of mothers in the low treatment group ($p<.10$, $d=.22$). The step down test showed that the joint effect of the eleven measures in the Social Support category was not statistically significant.

Satisfaction with Father Involvement

Neither of the two measures within the Satisfaction with Father Involvement were in the hypothesized direction or statistically significant. There was, however, one statistically significant difference between the high and low treatment groups in a non-hypothesized direction regarding satisfaction with father's involvement in the baby's life. Mothers in the high treatment group scored on average 62.26 for satisfaction with father's involvement, compared with an average score of 64.40 for mothers in the low treatment group ($p<.05$, $d=.25$). This implies that mothers in the low treatment group are on average more satisfied with the level of the father's involvement in their child's life compared to the high treatment group. The step down test showed that the joint effect of the two measures in this category was not statistically significant.

Table 4.6
Results for High and Low Treatment Groups: ***Social Support***

Variable	N (n_{HIGH}/ n_{LOW})	M_{HIGH} (*SD*)	M_{LOW} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Social Support						
Frequently sees grandparent	172 (82/90)	0.90 (0.30)	0.80 (0.40)	p<.05	ns	0.29
Discuss programme with partner	172 (82/90)	0.76 (0.43)	0.61 (0.49)	p<.05	ns	0.31
Knows children same age as baby	170	0.66	0.56	p<.10	ns	0.21

	(82/88)	(0.48)	(0.50)			
Discuss programme with others	172	0.04	0.00	p<.10	ns	0.28
	(82/90)	(0.19)	(0.00)			
Meet friends frequently	172	0.59	0.48	p<.10	ns	0.22
	(82/90)	(0.50)	(0.50)			
Discuss programme with family	172	0.84	0.78	ns	ns	0.16
	(82/90)	(0.37)	(0.42)			
Support from friends	168	0.35	0.30	ns	ns	0.11
	(82/86)	(0.48)	(0.46)			
Support from parents	161	0.77	0.69	ns	ns	0.17
	(77/84)	(0.43)	(0.47)			
Discuss programme with friends	172	0.67	0.61	ns	ns	0.12
	(82/90)	(0.47)	(0.49)			
Support from relatives	169	0.42	0.35	ns	ns	0.14
	(81/88)	(0.50)	(0.48)			
Support from baby's father	169	0.68	0.75	ns	ns	0.16
	(81/88)	(0.47)	(0.44)			
Satisfaction with Father Involvement						
Father part of baby's life	172	0.90	0.91	ns	ns	0.03
	(82/90)	(0.30)	(0.29)			
Satisfied with father's involvement	173	62.26	64.40	ns~	ns	0.25
	(83/90)	(10.84)	(6.25)			

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

4.8 Childcare and Service Use

Childcare

For low SES children, there is evidence to suggest that non-parental care may compensate for deficits in the home environment (Scaramella, Neppl, Ontai, & Conger, 2008). Yet, while most children receive some form of non-parental care in their early years, children from low SES backgrounds are less likely to experience extensive care outside the home mothers from low SES backgrounds are less likely to work (Mistry, Vandewater, Huston, & McLoyd, 2002; Pleck, 1997). Children from low SES families have higher rates of exposure to domestic risk and less access to child development materials. Consequently, low SES children may be more likely to experience cognitive deficits and socio-emotional difficulties due to time spent in high risk home environments. However there is a complex interaction between the type, timing and quality of childcare (NICHD, 2004; Sylva, Stein, Leach, Barnes & Malmberg, 2011). Good quality non maternal care can be a predictor of healthy cognitive development (Sylva et al., 2011). Moreover, an investigation by NICHD (2002) found that low-income mothers using high-quality child care have more positive interactions with their children at age six months than do those who do not use care or those who use lower quality care. However, more hours in centre-based care are also linked to higher externalising behaviours (NICHD, 2004), and the behavioural effects are more pronounced for those who enter child care at less than one year of age (Loeb, Bridges, Bassok, Fuller, & Rumberger, 2007).

Several home visiting programmes, such as Early Head Start and Even Start, either provide or actively encourage the use of childcare or early childhood education as a component of the programme (Paulsell, Kisker & Love, 2000; Tao, Gamse & Tarr, 1998). An investigation of the Early Head Start programme found that childcare provided directly by the programme was generally of a higher quality than other childcare options. Although there are multiple sources that report the benefits of quality childcare on cognitive development and school readiness, particularly for children from low socio economic status (Barnett, 1995; Sylva et al., 2011; NICHD, 2002), there is limited research which assesses the impact of home visiting programmes on childcare for children aged 6 months or younger.

Service Use

Traditionally it was assumed that high rates of health service utilisation were related to high rates of illness (Goldfeld, Wright & Oberklaid, 2003), however more recent research suggests that illness is not the sole purpose of health service utilisation. Engaging with health services, particularly preventative services, can reduce the instances of illness and emergency room visits and hospitalisations (Leventhal et al., 2000). Research suggests that low socioeconomic status is associated with lower rates of preventative care use and higher rates of emergency service use (Hubert, 2010). Home visiting programmes often seek to promote children's health by encouraging the use of preventative health service, such as prenatal care, check-ups and immunisations (Gomby et al., 1999). Home visiting programmes can link families to services to promote children's health and development and have also been shown to impact positive changes in parents' own development and use of community services in the short term. This may have long term benefits on parenting and child development (Weiss, 1993), as parents' use of preventative services for themselves is associated with the use of services for their children (VanLandeghem et al., 2002).While some home visiting programmes have reported a decrease in the use of response services, such as acute care visits or hospitalisation (Braveman et al., 1996), and non-significant trends indicate that children participating in home visiting programmes are more likely to have health problems detected (Barlow et al., 2007), there is little evidence from major evaluations to suggest that home visiting produces increased benefit of preventive health services (Gomby et al., 1999).

4.8.1 Childcare and Service Use Instruments

Childcare

Participants were asked if they have used any type of childcare for the *PFL* child, that is, if anyone besides themselves looked after the baby for more than 10 hours per week. Those who indicated that they used childcare in the last six months were then asked to choose what type of childcare they mainly used from of a list including *baby's grandparent, parent/friends/other relatives, nanny/child minder,* or *nursery/crèche.* A binary variable was created indicating whether the participant used formal childcare (*nursery/crèche)* or not. Additionally, participants were asked how many hours per week they put their baby in childcare, and what age their baby was when he/she first started childcare.

Service Use

Participants in the *PFL* cohort were asked if they had ever used any of the 63 services listed. Services were grouped into the following domains: emergency services, health services, child/family services, employment services, community services, residents associations, adult education services, and other useful services. Scores for each domain represent the number of services ever used by participants in that domain. In addition, a variable representing the total number of services mothers indicated using was created. Note that these questions were not asked of the comparison community. Additionally all participants were asked whether or not they had voted in the last general election.

4.8.2 Childcare & Service Usage Results

Childcare

Three of the four measures in the Childcare category were in the hypothesized direction, however none of these effects indicated statistically significant differences between the high and low treatment groups. In addition, the step down test showed that the joint effect of the four measures in the Childcare category was not statistically significant.

Service Use

Seven of the nine measures in the Service Use category were in the hypothesized direction, however none of these effects indicated statistically significant differences between the high and low treatment groups. In addition, the step down test showed that the joint effect of the eleven measures in the Service Use category was not statistically significant.

Non Step Down Measures

The one measure not included in the Step Down categories – whether the mother voted in the last general election – was in the hypothesized direction and statistically significant. 60% of mothers in the high treatment group voted in the last general election, compared with 43% of mothers in the low treatment group ($p<.05$, $d=.35$).

Table 4.7

Results for High and Low Treatment Groups: ***Childcare & Service Use***

Variable	N (n_{HIGH}/ n_{LOW})	M_{HIGH} (*SD*)	M_{LOW} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Childcare						
*Use childcare before 6 months *(negative outcome)*	172 (82/90)	0.18 (0.39)	0.24 (0.43)	ns	ns	0.15
*Uses formal childcare (nursery/crèche) *(negative outcome)*	172 (82/90)	0.05 (0.22)	0.07 (0.25)	ns	ns	0.08
*Hours per week in childcare *(negative outcome)*	172 (82/90)	4.20 (10.03)	4.26 (9.22)	ns	ns	0.01
Age started childcare	172 (82/90)	0.70 (1.67)	0.97 (2.10)	ns	ns	0.14
Service Use						
Adult Education Services	172 (82/90)	0.16 (0.53)	0.09 (0.32)	ns	ns	0.16
Employment Services	172 (82/90)	0.44 (0.80)	0.34 (0.80)	ns	ns	0.12
Other Services	172 (82/90)	0.66 (0.48)	0.62 (0.49)	ns	ns	0.08

Residents Associations' Services	172 (82/90)	0.13 (0.49)	0.10 (0.43)	ns	ns	0.08
Total no. of services	172 (82/90)	6.11 (3.75)	5.90 (3.90)	ns	ns	0.06
Health Services	172 (82/90)	1.52 (1.11)	1.49 (1.15)	ns	ns	0.03
Community Information Services	172 (82/90)	1.07 (1.26)	1.06 (1.38)	ns	ns	0.01
Emergency Services	172 (82/90)	0.66 (0.77)	0.67 (0.70)	ns	ns	0.01
Children/Family Services	172 (82/90)	1.46 (0.95)	1.53 (1.05)	ns	ns	0.07
Non Step Down Measures						
Voted in last General Election	167 (80/87)	0.60 (0.49)	0.43 (0.50)	p<.05	~	0.35

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

4.9 Household Factors & SES

Household Composition

Research on the impact of living in multigenerational households is mixed. Some research suggests that living in a three generation household (i.e. living with a parent or parents as well as a grandparent or grandparents) has little effect on child development. Kalil, DeLeire, Jayakody, & Chin (2001) found that children living with their mother and grandmother had similar outcomes as children living with married parents. Furthermore, Foster and Kalil (2007) found few significant associations between living arrangements and child development. Other research suggests that co-residence does affect developmental outcomes. Black and Nitz (1996) found that children of adolescent mothers who co-resided with maternal grandparents had better motor development; however children who were categorized as "failure to thrive" had poorer outcomes when co-residing with a grandmother. Mollburn, Fomby, & Dennis (2010) found that living with a grandparent was associated with higher cognitive scores and fewer behaviour problems when compared to living with a mother or grandmother only; however, living with both parents was associated with the best child outcomes (Mollburn et al., 2010). Conversely, Black et al. (2002) found that children living in three generation households had more behaviour problems than children living in two generation households and children of depressed mothers living in a three generation household were just as likely as those in two generation households to exhibit behavioural problems associated with mother's mental health.

Lone Parent Status & Siblings

The rate of non-marital childbearing has increased dramatically over the past three decades (Kiernan & Pickett, 2006). Research consistently demonstrates a relationship between single-parenthood and negative consequences for children. Children of single parents are at greater risk for low educational attainment (Biblarz & Raftery, 1999), externalising behaviours (Mott,

Koweleski-Jones, & Meneghan, 1997), and poor well-being (Ribar, 2004). Children of married mothers, compared to those of both single and cohabiting parents, tend to have higher cognitive resources (Bacharach & Baumeister, 1998), healthier birth weights (Bennett, 1992), exhibit less behaviour problems (Brown, 2004), and engage more in schooling (Amato, 2005). Furthermore, unmarried mothers are more likely to smoke during pregnancy, suffer from depression, and are less likely to engage in breastfeeding (Kiernan & Pickett, 2006). Research also suggests that unmarried cohabiting parents have fewer years of education, earn less income, have lower levels of psychological well-being, and report higher levels of parenting stress than married parents (Amato, 2005).

The number of siblings a child has can also impact developmental outcomes and several studies demonstrate an inverse relationship between the number of children in a family and educational attainment (see Steelman, Powell, Werum, & Carter, 2002 for review). The most frequently posed explanation for this effect is resource dilution, whereby parental resources are distributed equally among all children, and therefore a greater number of children results in less resources per child (e.g., Sun & Li, 2009).

Parental Education

There is much evidence to suggest a link between parental education and child well-being, specifically in the areas of children's physical health, development and education (e.g. Bradley and Corwyn, 2002, Zadeh Farnia and Ungerleider, 2010, Boyle et al, 2006). Research has indicated that low levels of parental education are associated with lower school achievement and reduced cognition later in childhood (see Bradley & Corwyn, 2002 for review). Maternal education, in particular, can have a substantial effect on child physical health (Boyle et al., 2006). This connection may be due to a "nurturing effect". Mothers who achieve a higher level of education tend to have an increased understanding of health and nutrition, and in turn create a sanitary and safe environment, which leads to better health outcomes for children (Chen & Li, 2009).

Additionally, parental academic achievement is associated with parental beliefs about their children's education. In their study of a sample of low-income parents, Halle, Kurtz-Costes, & Mahoney (1997) found that parents with a higher level of education had greater expectations for their children's academic achievement, and that these expectations were positively related to their children's success in subjects such as mathematics and reading.

Similarly, parental literacy and numeracy difficulties can have a negative impact on children's educational achievement. There is evidence to suggest that children whose parents have a history of reading difficulties are more likely to experience such difficulties themselves (Gilger, Pennington, & DeFries, 1991). There are a number of possible explanations for this finding. Genetic factors may play a role in the incidence of reading and/or mathematical difficulties among children (Plomin & Kovas 2005). Alternatively, parents who have difficulty reading may spend less time engaging in shared reading experiences with their children, or there may simply be less reading material available to the child in the family home (Bus et al., 1995). However, recent research suggests that parents who have had mathematical difficulties tend to take steps to insure that their children will learn mathematics. This finding indicates that increased effort on the part of the parent can counter negative effects of parental educational difficulties (Silinskas, Leppanen, Aunola, Parrila, & Nurmi, 2010).

Parental Employment

Parental unemployment can have a significant impact on children's social, cognitive, and health outcomes, although the strength of the effect varies depending on the social group under observation, the duration of unemployment, and whether it is the mother or father who is unemployed. Research suggests that children of mothers who work during their first year of life are more likely to experience behavioural problems and achieve lower scores on cognitive developmental assessments than children of mothers who do not work during this period (Berger, Brooks-Gunn, Paxson, & Waldfogel, 2008). However, this effect is less pronounced for children of parents in low SES communities (Hill, Waldfogel, Brooks-Gunn, & Han, 2005). There is also evidence to suggest that maternal unemployment can have a negative impact on the general health status of children in low SES groups, with boys exhibiting more problems than girls. This effect is mediated by the reduction of economic resources which generally accompanies unemployment (Gennetian, Hill, London, & Lopoo, 2010). Parental employment status can also affect children's academic and behavioural outcomes. In certain cases such as medical difficulties which render the retention of a full-time job impossible, paternal involuntary unemployment is associated with a greater likelihood of children repeating a grade or being suspended from school. However it should be noted that this effect was found solely in families where mothers were the principal earners, suggesting that this finding could be linked to family dynamics rather than income differences (Kalil & Ziol-Guest, 2008).

Employment status and number of hours spent at work may also impact child development. A recent study reported an association between parental job quality and emotional and behavioural difficulties in children (Strazdins, Shipley, Clements, O'Brien, & Broom, 2010). Similarly, Parcel and Menaghan (1990) found that an increase in maternal working hours was associated with lower verbal skills among three to six year old children; although the authors indicate that home environment may have a mediating effect on these results.

Maternity Leave

There is evidence to suggest that infants whose mothers take paid maternity leave experience better health outcomes than those whose mothers take unpaid leave (Rossin, 2011; Ruhm, 2000). Paid maternity leave is associated with a reduction in infant mortality (Winegarden & Bracy, 1995), possibly through increased rates of immunisation (Berger et al., 2005 as cited in Rossin, 2011) and increased parental time with the infant (Tanaka, 2005). Hawkins and colleagues have suggested that infants whose mothers are in a financial position to take leave have better health outcomes than the infants of women who take shorter unpaid maternity leave and who are therefore less likely to breastfeed (Hawkins, Griffiths, Dezateux, Law & the Millennium Cohort Study Child Health Group, 2007; Rossin, 2011).

The impact of maternity leave duration on infant health has been examined through a number of key studies. The World Health Organisation currently recommends exclusive breastfeeding for 6 months (WHO, 2006). In keeping with this recommendation, women who work in the U.K. are generally given the opportunity of 6 months' paid maternity leave, followed by another 6 months of unpaid leave, and research indicates that breastfeeding duration is not affected by maternal return to work at the end of the maternity leave entitlement period (Hawkins et al., 2007). Increasing maternity leave to a minimum of 14 weeks (approximately 3 months) is associated with a reduction in maternal depressive symptoms, along with increased maternal vitality, increased breastfeeding duration and improved mother-infant interactions (Staehelin, Bertea, &

Stutz, 2007). Similarly, shorter leave (6 weeks) is associated with more negative interactions between mother and infant than longer leave (12 weeks) (Clark, Shibley-Hyde, Essex, & Klein, 1997). Hair, McPhee, Milot, Halle and Moore (2006) report that mothers who return to work between birth and when the baby is 6 months old are less likely to stimulate their babies cognitively and physically than mothers who return after 6 months. Similarly, an early return to work can lead to stress and depression, which can influence the quality of care mothers provide to their babies (Rossin, 2011; Schirtzinger, Lutz & Hock, 1993 as cited in Clark et al., 1997).

Little work has been carried out on the impact of maternity leave on infant psychological and behavioural outcomes. Infants whose mothers returned to work before the infant is 6 months old are more likely to display signs of insecure attachment than those whose mothers stayed at home (Clark et al., 1997). Duration of maternity leave is not associated with increased infant behavioural difficulties (Clark et al., 1997), although there is a link between maternal return to work in the first 12 weeks and increased behavioural problems in later childhood (Berger et al., 2005 as cited in Rossin, 2011).

To date, there is no published research on the potential influence of home visiting interventions on maternity leave uptake or duration. Maternity leave policy of the State influences the length of maternity leave, in particular whether it is paid or unpaid leave. In Ireland, women are entitled to 26 weeks' paid maternity leave, and a further 16 weeks' unpaid leave. This exceeds the 14 week threshold suggested by Staehelin and colleagues (2007) and the 12 weeks associated with breastfeeding rates and child behavioural outcomes. Ruhm (2000) reports that there are no benefits of maternity leave beyond a 40 week threshold (approximately 10 months) for mother or infant. It is assumed that those *PFL* mothers who are working will take their entire paid leave entitlement, and thus it is expected that there will be little variation in maternity leave duration and effects within the sample.

Family Finances

Increased levels of household income are associated with a plethora of positive outcomes for children, including health outcomes (Case, Lubotsky, & Paxon, 2002; Currie & Stabile, 2003), cognitive outcomes (Yeung, Linver, & Brooks-Gunn, 2002), school achievement (Haveman & Wolfe, 1995), and behaviours (Duncan, Brooks-Gunn, & Klebanov, 1994). However, it is difficult to isolate the exact causality of this association, as there are a number of mediating factors involved. For example, income, as an individual component of SES, has been positively associated with children's cognitive test scores (Yeung et al., 2002), school achievement (Haveman & Wolfe, 1995), and externalising and internalising behaviours (Duncan et al., 1994), yet there are a number of different pathways through which these effects operate, including health and nutrition, the home environment, parental-child interactions, parental mental health, and neighbourhood conditions (see Brooks-Gunn & Duncan, 2002 for review). To estimate a true causal effect of income on child outcomes, researchers must control for any exogenous variables, or factors that both affect parental income and are correlated with child outcomes. However, it is extremely difficult to control for all exogenous variables, as many of these variables are unknown (e.g., Mayer, 2002). Studies that use techniques to control for unobserved exogenous variables typically, but not always, find smaller effects than less rigorous analyses. The largest effects are found for cognitive test scores and educational attainment. For example, Mayer (1997) and Blau (1999) use fixed-effects models to control for unobserved heterogeneity, finding a modest association between parental income and children's cognitive test scores.

Similarly, Duncan, Yeung, Brooks-Gunn & Smith (1998) find that an increase of 10% in parental income is associated with an increase of approximately half a year of schooling. High quality research, which utilises techniques to control for all observed and unobserved family background characteristics, finds a small-to-modest effect of income on child outcomes. The size of the effect depends partly on factors including the outcome under study and the length of time over which parental income is measured (Mayer, 2002).

Research in this field indicates that there is substantial variation in individuals' interpretations of expenditure and income-related survey questions, with many individuals reporting their individual income instead of the household income (e.g., Comerford & Delaney, 2010). Therefore, it is important that proxy indicators for low SES be incorporated, such as medical card status, possession of private health insurance, and social welfare status. Although living in social housing is often used as an indicator of low SES, several studies have reported that living in social housing is associated with positive developmental outcomes for children, compared to families with similar low incomes who do not reside in social housing. These outcomes include grade retention (Currie & Yelowitz, 2000), educational attainment (Newman & Harkness, 2002), and greater parent-reported health (Fertig & Reingold, 2007). However it should be noted that these relationships may be due to the increased resources available to parents who receive subsidies for housing (Leventhal & Newman, 2010).

Material deprivation is another indicator of low SES. The inclusion of material deprivation, or enforced deprivation measures can help to identify the extent of a respondent's poverty status. Enforced deprivation is defined as *the inability to afford basic specific goods or services...reported at the household and not the individual level* (EU-SILC, 2008). Deprivation indicators contribute towards a multi-dimensional conceptualisation of poverty (Guio, 2005), and form a complement to monetary measures, which can be unreliable (Comerford & Delaney, 2010). Such indicators largely relate to an enforced lack of items that depict material living conditions, such as the possession of consumer durables and the household's condition (Nolan & Whelan, 2010). As these deprivation indicators are a relatively new addition to the poverty literature, research into their effects is limited and mixed. For example, enforced deprivation is associated with negative outcomes such as poor health (Torsheim et al., 2004), but also with positive outcomes such as increased breastfeeding duration (Brown, Raynor, Benton, & Lee, 2010). It should be noted, however, that a family experiencing enforced deprivation may choose to breastfeed their baby in response to lack of resources. Lastly, deprivation indicators are associated with increased psychological distress and depression among unemployed individuals (Bjarnason & Sigurdardottir, 2003). These difficulties are important to identify as, when present in parents, they can affect child developmental outcomes (e.g. Feldman et al, 2009). Inclusion of enforced deprivation indicators in the *PFL* survey adds a reliable measure of poverty, helps pinpoint those families who are particularly at-risk, and may underline whether the intervention has a protective effect against adverse outcomes of poverty.

This report also uses two additional indicators of low SES: medical card status and social welfare payments. Both of these variables serve as proxies for low income as both medical card status and social welfare payments in Ireland are means tested, and to qualify for either, family income must be below a certain threshold.

4.9.1 Household Factors & SES Instruments

Household Composition, Lone Parent Status, and Siblings

Participants were asked several questions related to their household composition, including, how many people live in the household, how many biological children the mother has, and whether or not the baby's grandparent lives in the household. Additionally, the mother reported her current relationship status from a list of seven options. This information was used to generate two separate binary indicators denoting 1) whether the mother was currently in a relationship (married, cohabitating, or boyfriend) or 2) married. Those participants who reported that they were in a relationship were asked whether or not their partner was the child's biological father. In addition, they were asked how many years they have been with their partner. This question could be answered in *weeks*, *months* or *years*. All responses were converted into years.

Parental Education

Mothers were asked their highest level of education obtained as well as the highest level of education obtained by the baby's father. Responses to this question were dichotomised to indicate the number of parents who had completed a Junior Certificate qualification or below. This information was also used to generate a binary indicator representing the proportion of parents in the *PFL* Evaluation who hold a primary degree. Mothers were also asked the age at which they and their baby's father left full-time education.

Parental Employment and Maternity Leave

Several questions assessed the current work status of both the mother and the father. Participants were asked to select their current work status from a list of options including *currently in paid work, in work but on leave, unemployed, student, looking after home/family, retired, not able to work due to disability/sickness, paid FÁS training,* or *unpaid FÁS training*. Responses to this question were dichotomised to represent the proportion of mothers and fathers in paid work versus not in paid work, and the proportion of mothers and fathers currently unemployed. Unemployed individuals were asked for how many months they have been without paid work. A binary variable denoting long term unemployment (greater than 12 months) was created. Mothers also reported on whether the mother and father worked in full or part time employment and the approximate annual income of both parents. In addition, mothers were asked whether or not they were currently on/had taken maternity leave.

Family Finances

Participants' perception of financial difficulty also was assessed by asking them to consider the total income of their household, and to rate on a seven point scale, ranging from w*ith great difficulty* to v*ery easily*, how difficult it was for the household to make ends meet. Responses to this variable were used to generate a binary variable indicating whether the mothers make ends meet with difficulty or not. Mothers also stated whether or not they saved money on a regular basis. Participants also stated the household's weekly income from all sources, selecting from a scale where the lowest range was *less than €50*, and the highest was *€1500 or more*. As households differ in number of people and composition, it would be misleading to compare household income across participants as some households may have many people and others only a few, or some may have many adults and others many children. To overcome this issue a variable representing the *household equivalised weekly income* was created. This is calculated by assigning a weight to each household member. A weight of '1' is assigned to the first adult in the

household, 0.66 to each subsequent adult (aged 14+ years) and 0.33 to each child (aged less than 14 years). The sum of the weights in each household gives the household's *equivalised size* – the size of the household in adult equivalents. The *household equivalised weekly income* is the reported household weekly income divided by the equivalised size of the household.

Several questions assessed the socioeconomic status of the household. Specifically, mothers were asked which of the following best described her home: *owned with mortgage, owned outright, rented from local authority, buying from local authority, rented privately, shared ownership* or *other*. A binary variable indicating whether the mother was currently living in social housing (*renting/buying from local authority*) was created. Furthermore, mothers were asked who owns or pays the rent on the house. The responses were dichotomised to indicate whether the *mother/father paid the rent/owned the house* or whether some other person did. A series of binary socioeconomic status indicators assessed whether the mother was currently living in social housing, and whether she was currently in receipt of any social welfare payments.

4.9.2 Household Factors & SES Results

Household Factors

Two of the four measures in the Household factors category were in the hypothesized direction, however, none of the effects indicated a statistically significant difference between the high and low treatment groups. There was, however, one statistically significant difference between the high and low treatment groups in a non-hypothesized direction regarding whether the mother resides with the child's grandparent. 32% of mothers in the low treatment group lived with the baby's grandparent compared with 44% of mothers in the low treatment group ($p<.10$, $d=.25$). In addition, the step down test showed that the joint effect of the four measures in the Household Factors category was not statistically significant.

Parental Education

Four of the five measures in the Parental Education category were in the hypothesized direction, however, none of the effects indicated a statistically significant difference between the high and low treatment groups. In addition, the step down test showed that the joint effect of the five measures in the Parental Education category was not statistically significant.

Maternal Employment

One of the three measures in the Maternal Employment category was in the hypothesized direction, however, the effect did not indicate a statistically significant difference between the high and low treatment groups. In addition, the step down test showed that the joint effect of the three measures in the Maternal Employment category was not statistically significant.

Paternal Employment

One of the two measures in the Paternal Employment category was in the hypothesized direction, however, the effect did not indicate a statistically significant difference between the high and low treatment groups. In addition, the step down test showed that the joint effect of the two measures in the Paternal Employment category was not statistically significant.

Family Finances

Two of the six measures in the Family Finances category were in the hypothesized direction, however, none of the effects indicated a statistically significant difference between the high and low treatment groups. In addition, the step down test showed that the joint effect of the six measures in the Family Finances category was not statistically significant.

Non Step Down Measures

Only one of the six measures which were not included in the above Step Down categories was in the hypothesized direction, however, it did not indicate a statistically significant differences between the high and low treatment groups.

Table 4.8

Results for High and Low Treatment Groups: ***Household factors & SES***

Variable	N (n_{HIGH}/ n_{LOW})	M_{HIGH} (*SD*)	M_{LOW} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Household factors						
Household size	172 (82/90)	4.96 (1.64)	5.04 (1.73)	ns	ns	0.05
Married	172 (82/90)	0.17 (0.38)	0.16 (0.36)	ns	ns	0.04
Has a Partner	172 (82/90)	0.77 (0.42)	0.78 (0.42)	ns	ns	0.02
*Resides with grandparent *(negative outcome)*	168 (80/88)	0.44 (0.50)	0.32 (0.47)	ns~	ns	0.25
Education						
Mother degree	172 (82/90)	0.07 (0.26)	0.04 (0.21)	ns	ns	0.12
*Mother low education *(negative outcome)*	172 (82/90)	0.30 (0.46)	0.34 (0.48)	ns	ns	0.08
*Father low education *(negative outcome)*	160 (73/87)	0.41 (0.50)	0.49 (0.50)	ns	ns	0.17
Father degree	160 (73/87)	0.04 (0.20)	0.03 (0.18)	ns	ns	0.03
Mother improvement in educational status	174 (81/93)	0.12 (0.33)	0.16 (0.37)	ns	ns	0.11
Maternal Employment						
Mother in paid employment	171 (82/89)	0.37 (0.48)	0.35 (0.48)	ns	ns	0.04
*Mother long-term unemployed *(negative outcome)*	169 (82/87)	0.18 (0.39)	0.16 (0.37)	ns	ns	0.06
Mother took or is currently on maternity leave	171 (82/89)	0.28 (0.45)	0.33 (0.47)	ns	ns	0.10
Paternal Employment						
*Father long-term unemployed *(negative outcome)*	149 (72/77)	0.21 (0.41)	0.22 (0.42)	ns	ns	0.03
Father in paid employment	161 (77/84)	0.43 (0.50)	0.52 (0.50)	ns	ns	0.19
Finance						
*Difficulty making ends meet *(negative outcome)*	170 (82/88)	0.26 (0.44)	0.28 (0.45)	ns	ns	0.06
Equivalized weekly household income	150 (74/76)	240.65 (137.29)	239.11 (110.42)	ns	ns	0.01
*Social housing *(negative outcome)*	170 (81/89)	0.48 (0.50)	0.48 (0.50)	ns	ns	0.00
Save regularly	171	0.48	0.55	ns	ns	0.15

	(82/89)	(0.50)	(0.50)			
Owns/rents own accommodation	170	0.65	0.74	ns	ns	0.19
	(81/89)	(0.48)	(0.44)			
*Receives social welfare payments *(negative outcome)*	169	0.81	0.74	ns	ns	0.18
	(81/88)	(0.39)	(0.44)			
Non Step Down Measures						
No. of years with partner	131	7.14	8.16	ns	~	0.19
	(61/70)	(5.21)	(5.62)			
Partner is the baby's father	131	0.98	0.97	ns	~	0.08
	(61/70)	(0.13)	(0.17)			
Mother in part-time employment	59	0.64	0.68	ns	~	0.07
	(28/31)	(0.49)	(0.48)			
Mother improvement in work status	126	0.04	0.06	ns	~	0.11
	(57/69)	(0.19)	(0.24)			
Mother annual wage	54	16,084	17,661	ns	~	0.19
	(26/28)	(9,899)	(6859)			
Father's annual wage	58	25,045	25,283	ns	~	0.02
	(23/35)	(9,114)	(11,824)			

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

4.10 Main Results Summary: High and Low Treatment Groups

Consistent with the programme evaluation literature; limited significant findings were expected to be observed between the high and low treatment groups at 6 months. At this early stage of programme implementation, there has been an average of 14 visits by programme staff to each *PFL* family. Furthermore, many of the factors associated with the expected impact of the *PFL* programme would be difficult to detect in an infant of this age. While there were very few statistically significant differences between the groups, many of the outcomes were in the hypothesized direction with the high treatment group reporting somewhat better outcomes than the low treatment group. Despite these limitations, there were some significant findings.

Child Development

Children in the high treatment group and children in the low treatment group did not differ significantly across any of the child developmental domains, including temperament, communication and socio-emotional well-being. Furthermore, there were no significant differences found between treatment groups on indicators of developmental delays.

Child Health

Children in the high treatment group and children in the low treatment group did not differ significantly across many child health domains, including birth weight, current weight, child health since birth, breast feeding and sleep routines, amongst others. However, the following significant differences were identified:

- Children in the high treatment group were more likely than children in the low treatment group to eat age-appropriate foods and to eat more often.
- Children in the high treatment group were significantly more likely to have received the recommended immunisations at 4 months of age.
- More mothers in the high treatment group reported that their children had experienced breathing difficulties compared to those in the low treatment group.
- Children in the low treatment group were more likely to sleep in their own bed rather than with a parent or sibling.

Parenting

Mothers in the high treatment group and mothers in the low treatment group did not differ significantly across many of the parenting domains including healthy attachment, parental efficacy and general parental distress. However, the following significant differences were identified:

- Mothers in the high treatment group reported more interactions with their child and those interactions were rated as higher quality than those in the low treatment group.
- Mothers in the high treatment group were more likely than those in the low treatment group to have higher regard for their infants when compared to other children of the same age.
- Mothers in the high treatment group were more likely to be patient with their children and react with less hostility than mothers in the low treatment group.
- Significantly fewer mothers in the high treatment group reported severe levels of parenting stress.

Home Environment and Safety

Family home environments in the high treatment group and the low treatment group did not differ significantly across many of the measured domains including child eating and sleeping patterns, encouragement between mother and child, and general learning promotion, amongst others. However, a number of significant differences were identified:

- Children in the high treatment group were more likely to have a variety of people and activities available to them in their home environment than children in the low treatment group.
- Children in the high treatment group were more likely than those in the low treatment group to be cared for in an adequate and appropriate manner.
- Children in the high treatment group were more likely than children in the low treatment group to have a variety of appropriate toys and learning materials available to them in their home.
- Families in the high treatment group were more likely to have a clean and child-safe home environment than families in the low treatment group.
- Families in the high treatment group were more likely to have electrical socket covers in their homes than those in the low treatment group.

Maternal Health and Pregnancy

Mothers in the high treatment group did not differ significantly from mothers in the low treatment group across health domains such as, complications during pregnancy, general health,

reported levels of depression, substance use and changes in health behaviours. However, one significant difference between the two groups was identified:

- Significantly fewer mothers in the high treatment group were hospitalised for special medical care immediately after having given birth.

Maternal Social Support

Mothers in the high treatment group did not differ significantly from mothers in the low treatment group in terms of social support across such domains as discussing the programme with friends and family and level of support from friends, relatives and their child's father. However, a number of significant differences were identified:

- Mothers in the high treatment group were less likely to be satisfied with the father's level of involvement in their child's life.
- Mothers in the high treatment group were more likely than those in the low treatment group to know other parents with children the same age as their child.
- Mothers in the high treatment group were more likely than those in the low treatment group to regularly meet with friends.
- Children in the high treatment group were more likely to have visits with their grandparents.
- Mothers in the high treatment group were more likely than mothers in the low treatment group to discuss the programme with their partner and other non-family individuals.

Childcare and Service Use

Families in the high treatment group did not differ significantly from families in the low treatment group in terms of the number of hours per week the child was enrolled in childcare, and age in which child was placed in childcare. Also, there were no significant differences between the high and low treatment groups in utilization of education, employment, health and other available community services. There was one significant difference between the high and low treatment group in this domain:

- Significantly more mothers in the high treatment group reported having voted in the last general election than mothers in the low treatment group.

Household Factors and SES

As expected, families in the high treatment group did not differ significantly from families in the low treatment group in terms of household size, marital status of mother, parental education levels, parental employment or financial situation. There was one significant difference between the high and low treatment group in this domain:

- Mothers in the high treatment group were significantly more likely than those in the low treatment group to reside with their parents.

4.11 Differential Subgroup Results

Introduction

There is some evidence to suggest that certain groups of participants may benefit more from home visiting programmes than others (e.g. Heckman, Malofeeva, Pinto, & Savelyev, 2010). It is possible that the main results reported above, which include all participants, may mask treatment

effects for particular kinds of individuals. In order to investigate differential effects of the *PFL* Programme on specific types of participants, subgroup analyses were conducted for categories commonly found to be of relevance to early child and family interventions - child gender, primiparous status, marital status, cognitive resources and domestic risk.

Methods

First, in order to test whether the impact of the programme had a differing effect for different groups of participants, tests for interaction effects were conducted using OLS (Overall Least Squares) modelling and using the Permutation Testing framework described in Chapter 3. This involved including an interaction term in the model which represented the treatment condition (e.g. High v Low treatment) and the sub-group condition (e.g. Male versus Female). Interaction effects were found on 5% or more of the variables for each of the subgroups. The number of interaction effects varied by sub-groups. This analysis suggested that the programme had different effects depending on the characteristics of the participants[2]. To investigate this further, subgroup analyses were conducted utilizing Permutation Testing methods, which are outlined in detail in Chapter 3. This analysis tested the treatment effects (high vs. low) for both categories of participants in each subgroup. For example, separate tests were run for mothers of girls in the high and low treatment groups and for mothers of boys in the high and low treatment groups to ascertain whether there were treatment effects specifically for girls and boys. The percentage of significant results found for each category within each subgroup was then compared to the overall percentage of significant findings from the main results - 14% of all measured variables for the entire sample. Particular note was taken of those subgroups where a higher percentage of significant findings were found for those in the high treatment group in one category than those in the high treatment group in the other. Sub-group analyses were conducted for all variables used in the main results, rather than only those on which an interaction effect was identified.

The sections below examine each of the five subgroup categories separately by first providing a brief literature review on why differential programme effects may be expected within this subgroup and second, a presentation of the results of the subgroup analysis. Note that unlike the previous analysis, due to space constraints, only significant findings are reported in the tables. In addition, only positive treatment effects are reported.

4.11.1 Gender

Gender differences fluctuate with age (Hyde, 2005) and these differences are amplified as children grow (Campbell & Eaton, 1999). There are some biological gender differences which are apparent in infancy (Cho, Holditch-Davis & Miles, 2010; Elsmén, Steen and Hellström-Westas, 2004; Hintz, Kendrick, Vohr, Poole & Higgins & The NICHD Neonatal Research Network, 2006; Stevenson et al, 2000), yet there is debate about gender difference as infants develop. Studies report that parental and social expectations affect the developmental outcomes for boys and girls through gender socialisation, that is, the traits and skills which are reinforced in each gender (Field et al, 1980, Halpern, 1997, Ma, 2007). Parents may rely on gender stereotypes to inform their expectations of developmental outcomes. For example, mothers are reported to underestimate the motor skills of 6 month old girls and overestimate those of boys (Mondschein, Adolph & Tamis-LeMonda, 2000). Boys and girls may be rewarded when they display gender expected skills, i.e. boys may be rewarded for performing visio-spatial tasks and

[2] The interaction analyses are available upon request.

expected to be more independent whereas girls are expected to be more verbal and are thus praised for language skills (Clearfield & Nelson, 2006; Reinisch & Sanders, 1992 as cited in Cho et al., 2010). Moreover, findings indicate that mothers interact differently with boys and girls with regards to verbal behaviour and level of engagement (Clearfield & Nelson, 2006). Children's interaction with their environment is also moderated by gender. Gender may play a role in how the child 'receives' parenting and how parental stress affects their development. Girls appear to be more sensitive to parental stress than boys even when the stress does not affect the observable parent-child interaction, whereas boys appear to be more vulnerable to the quality of the parent-child interaction, regardless of the parental levels of stress (Vallotton et al., in press). Home visiting interventions may have an impact on parental stress levels and parental expectations of their children, and thereby lead to different outcomes for boys and girls.

While child gender is often controlled for in the analysis of home visiting interventions (Ramey & Ramey, 1994; Wagner & Clayton, 1999), few studies specifically examine whether there are gender effects of such programmes. Although, few large scale investigations find any significant differences, a meta-analysis of four experimental studies did show a larger effect of early childhood intervention (home visiting and/or pre-school programmes) on the achievement scores for lower income girls than boys (Barnett, 1995).

The Perry Preschool study examined the impact of the intervention according to gender and reported a general pattern where females displayed early positive results in the areas of education and employment, with males catching up later in life (Heckman, Moon, Pinot, Savelyev, & Yavitz, 2010). In addition, the study reported that the non-cognitive skills of both males and females were improved by the programme, yet there were positive effects for females' cognitive skills but not males. An evaluation of the Early Head Start Research and Evaluation study reported differing gender specific effects of a home visiting programme. Girls receiving the Early Head Start intervention exhibited improved vocabulary development despite high parenting stress levels. On the other hand, boys receiving the intervention were protected against the negative effects of parenting stress on vocabulary development (Vallotton et al., in press). Interventions targeting problem behaviours were more effective for boys than girls (Lindsey, Hayward & Diane DePanfilis, 2010) and teenage boys were seen to benefit more than girls after the Child Parent Centre Preschool intervention (Niles, Reynolds & Roe-Sepowitz, 2008). However, the Nurse Family Partnership programme found that gender did not interact with the treatment (Olds, 2004; Kitzman, et al, 2004).

This is a complex subject area as there is much debate surrounding the presence and emergence of gender difference. There is little research to inform whether home visiting interventions affect children differently according to their gender, or indeed how this process might occur. Moreover, effects may not be apparent at 6 months old.

Gender Subgroup Results

In order to investigate whether the *PFL* programme had an impact on girls (56% of the sample) and boys (44% of the sample), analyses were conducted comparing the outcomes for girls in the high treatment group to the outcomes for girls in the low treatment group and a separate analysis comparing boys in the high treatment group to those in the low treatment group. Table 4.9 shows that there were significant results for female children on 13% of the variables measured and there

were significant results for male children on 11% of the variables measured. The results were quite mixed. In certain domains there were treatment effects for both girls and boys, for example, in regards to home environment and safety. However, in other domains, such as parenting, there were treatment effects for girls, but not for boys. In most cases, the treatment effects found in the main results were mirrored in the subgroup results. Thus, overall, these findings suggest the *PFL* Programme benefits both girls and boys.

Table 4.9
Results for High and Low Treatment Groups by Child Gender

Variable	**Sub-Group Analysis**	
	High v Low Girls P^1	*High v Low* Boys P^2
Child Health		
Baby eats appropriate food	p<.05	ns
Baby still breastfed	p<.10	ns
Appropriate frequency of eating	p<.05	ns
Appropriate sleep preparation	ns	p<.05
Necessary immunizations at 4 months	ns	p<.05
Necessary immunizations at 6 months	ns	p<.05
Parenting		
*Parental Responsibility *(negative outcome)*	p<.05	ns
*Parent-Child Dysfunctional Interactions *(negative outcome)*	p<.10	ns
Parental Self-Efficacy	p<.10	ns
Baby Comparison Score	p<.10	ns
*Parental Over-Protection *(negative outcome)*	ns~	p<.10
*PSI Stress cut-off (90) *(negative outcome)*	p<.10	ns
Home Environment & Safety		
Variety	p<.05	p<.05
Childcare	p<.10	p<.05
Responsivity	p<.10	ns
Interaction	p<.10	ns
Physical Environment	ns	p<.05
Daily Routines	ns	p<.10
Toys and Books	ns	p<.10
Total HOME SHIF	ns	p<.01
Framingham Safety Survey	p<.10	ns
Safety Gate	ns	p<.05
No. of Safety Items	ns	p<.10
Smoke Alarm	ns	p<.10
Maternal Health & Pregnancy		
*Mother hospitalised immediately after birth for special medical care *(negative outcome)*	p<.10	p<.05
*Complication during pregnancy *(negative outcome)*	ns	p<.05
*Drug use in past 6 months	p<.10	ns

(negative outcome)		
*Illegal drugs during pregnancy *(negative outcome)*	ns	p<.10
Social Support		
Discuss programme with family	p<.05	ns
Discuss programme with partner	p<.10	p<.10
Frequently sees grandparent	p<.05	ns
Support from relatives	p<.10	ns
Childcare & Service Use		
Voted in last General Election	p<.10	p<.05
Household Factors & SES		
*Father low education *(negative outcome)*	p<.05	ns

Notes: [1] one-tailed (right-sided) p value derived from the treatment effect for girls. [2] one-tailed (right-sided) p value derived from the treatment effect for boys. All analyses based on regression based permutation tests with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '˜'indicates that the variable was significant in a left-sided test.

4.11.2 Primiparous and Multiparious Mothers

For many families the birth of a second child stimulates dramatic changes in family dynamics. It is common for both the social and physical environment of first born and later born children to differ greatly (Bornstein, 2006), and family dynamics alter with the introduction of siblings (Sulloway, 2002). There is a multitude of research which investigates differences based on birth order (Sulloway, 1996), and many differences in child outcomes have been found between children of primiparous and children of multiparous mothers. Some of these differences relate to parenting behaviours. Primiparous mothers are more likely to initiate breastfeeding than multiparous women (Ekström, Widström & Nissen, 2003), but primiparous mothers are also more likely to experience multiple difficulties when breastfeeding (Hauck, Fenwick, Dhaliwal et al., 2010). Mothers also respond, talk and express positive affection more often to first-born children (Belsky, Gilstrap & Rovine, 1984). Other differences relate the parenting experience. Multiparous mothers report higher levels of self-efficacy than primiparous mothers (Fish & Stifter, 1993) and mothers generally rate their first born child as more difficult (Bates, 1987).

The literature on home visiting programmes highlights the impact of home visiting programmes on primiparous mothers. Many home visiting programmes, such as the Nurse Family Partnership, specifically target first-time mothers as issues that programmes aim to improve are often concentrated among adolescent first-time mothers (DuMont et al., 2008; Howard & Brooks-Gunn, 2009). The implementers of these programmes hypothesise that targeting first-time mothers ensures that the programme offers primary prevention thus intervening before harmful behaviours develop (Howard & Brooks-Gunn, 2009). According to the US Advisory Board on Child Abuse and Neglect (1995) the behaviour of teenage first-time mothers may also be particularly malleable as harmful patterns have not yet become entrenched. Home visiting programmes that target primiparous mothers have shown strong favourable results (Durlack & Well, 1997), including higher household safety (Culp, Culp, Anderson & Carter, 2007), fewer childhood accidents, lower rates of welfare dependency and greater maternal employment (Olds, Henderson, Kitzman et al., 1999).

In addition, there is a substantial pool of evidence which suggests that primiparous mothers may receive more benefit from home visiting programmes than multiparous mothers (Monsen, 2006). Several studies that have found no significant differences between intervention and control groups overall, have found benefits for a subgroup of primiparous mothers across a range of outcomes. DuMont and colleagues (2010) found that first time mothers in the Healthy Families New York home-visiting programme were less likely to engage in minor physical aggression and harsh parenting than first time mothers in the control group, however a difference between intervention and control groups was not observed for multiparous mothers. Research on the Dutch SCRIPT study, which investigated the effectiveness of an early intervention home visiting programme on externalising problems, found that primiparous mothers in the intervention group displayed a significant increase in their use of positive discipline strategies compared to primiparous mothers in the control group, however this effect was not observed for multiparous mothers (Stolk et al., 2008).

Results from other studies suggest that home visiting is successful in providing early identification and prevention of poor emotional adjustment within the first six weeks particularly for primiparous mothers (Fraser, Armstrong, Morris & Dodds, 2000). Home visiting may also be effective in preventing post natal depression in primiparous mothers but not multiparous mothers (Armstrong et al., 1999; Boath, Bradley & Henshaw, 2005). Home visiting interventions also are related to higher birth weights for children of primiparous mothers but not multiparous mothers (McLaughlin, Altemeier, Christensen et al., 1992). Other results suggest that first-time mothers are less likely to drop out of home visiting interventions than other participants (DuMont et al., 2008). However Fraser and colleagues (2000) found that while primiparous mothers in the intervention group reported a greater sense of competence than primiparous mothers in the control group at six weeks, these differences were no longer significant by 12 months. Spencer, Thomas and Morris (1989) identified that a subset of young primiparous women in the intervention group of the South Manchester Family Worker Project had fewer low birth weight and preterm babies, but this difference did not reach statistical significance and El-Kamary, Higman, Fuddy, McFarlane, Sia and Duggan (2004) found that there was no significant difference over all or between primiparous and multiparous mothers in rapid repeat births.

Some researchers suggest that home visiting programmes have the greatest benefit for low-income, first-time adolescent mothers (Howard & Brooks-Gunn, 2009) and that benefits may be optimised by prioritising home visitation services for young, first-time mothers (Rodriguez, Dumont, Mitchell-Herzfeld, Walden, & Greene, 2010). However Stolk and colleagues (2008) argue that while some of the results suggest that primiparous mothers are more open to change, results indicate that multiparous mothers who experience high levels of daily hassles may also benefit.

Primiparous and Multiparious Mothers Subgroup Results

In order to investigate whether the *PFL* programme had an impact on first-time mothers (49% of the sample) and non first-time mothers (51% of the sample), analyses were conducted comparing the outcomes of the high and low treatment groups for primiparous mothers and the outcomes of the high and low treatment groups for multiparious mothers in the *PFL* Programme. Table 4.10 shows that there were significant results for primiparous mothers on 5% of the variables

measured and there were significant results for multiparious mothers on 13% of the variables measured. Again, the results are quite mixed. In certain domains there were treatment effects for both primiparous and multiparious mothers, for example, in regards to child health. However, in other domains, such as social support, there were treatment effects for multiparious mothers, but not for primiparous mothers. Overall, these findings indicate that multiparious mothers in the high treatment group may experience particular benefits from the *PFL* Programme, most notably in the realm of social support such as support from relatives and interactions with friends. Thus, overall, these findings suggest the *PFL* Programme benefits both primiparous and multiparious mothers.

Table 4.10
Results for High and Low Treatment Groups by Primiparous Status

Variable	**Sub-Group Analysis**	
	High v Low	*High v Low*
	First time mother P^1	Non first time mothers P^2
Child Development		
ASQ Gross Motor Score	ns	p<.10
Child Health		
*Age (in days) left hospital *(negative outcome)*	ns	p<.10
Necessary immunizations at 4 months	p<.10	ns
Appropriate frequency of eating	p<.01	ns
Baby eats appropriate food	ns	p<.10
Birth weight (grams)	ns~	p<.05
Parenting		
*Parental Belief in Fate *(negative outcome)*	p<.10	ns
*Child Control of Parent's Life *(negative outcome)*	ns	p<.05
*Parent-Child Dysfunctional Interactions *(negative outcome)*	ns	p<.10
Baby Comparison Score	p<.05	ns
*PSI Stress cut-off (90) *(negative outcome)*	ns	p<.05
Home Environment & Safety		
Childcare	ns	p<.05
Physical Environment	p<.05	ns
Variety	p<.05	p<.05
Toys and Books	ns	p<.10
Framingham Safety Survey	ns	p<.05
Total HOME SHIF	ns	p<.10
Maternal Health & Pregnancy		
*Mother hospitalised immediately after birth for special medical care *(negative outcome)*	p<.05	p<.01
Changed smoking during pregnancy	p<.05	ns
Social Support		

Frequently sees grandparent	ns	p<.05
Meet friends frequently	ns	p<.05
Support from relatives	ns	p<.05
Discuss programme with partner	ns	p<.05
Discuss programme with others	ns	p<.10
Childcare & Service Use		
Employment Services	ns	p<.05
Voted in last General Election	ns	p<.05

Notes: [1] one-tailed (right-sided) p value derived from the treatment effect for first time mothers. [2] one-tailed (right-sided) p value derived from the treatment effect for non-first time mothers. All analyses based on regression based permutation tests with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '˜'indicates that the variable was significant in a left-sided test.

4.11.3 Lone Parents and Partnered Parents

Children can be raised in many types of living arrangements. Different types of family structures and home environments can have effects on both child and maternal outcomes. Research examining child development outcomes for children from various family structures consistently demonstrates that children raised by two married biological parents have the best developmental outcomes compared to children in other living arrangements (Brown, 2004; Brown, 2010; Carlson & Corcoran, 2001; Kalil et al., 2001). Furthermore, single parenthood is strongly linked to a wide variety of negative developmental outcomes (Guzzo and Lee, 2008; Olds et al., 2004). However, children raised by a single mother who co-resides with maternal grandparents were found to have similar outcomes as those raised by married mothers (Kalil et al., 2001). This finding suggests that for single mothers, when immediate family is nearby, family members may provide a reliable, stable and enduring source of social and parenting support.

Social support may be a key reason why children fare better in two parent living arrangements. For instance, there appears to be an association between familial social support to mothers and child behaviour and development (Dunst, Trivette, & Cross, 1986; Kalil et al., 2001; Guzzo & Lee, 2008; Carlson & McLanahan, 2006). Social support can affect child development and behaviour by influencing maternal parenting decisions, for example the initiation and continuation of breastfeeding is strongly associated with the level of social support a mother perceives (Mitra, Khoury, Hinton, & Carothers, 2004; Kaufman & Hall, 1989; Dennis et al., 2002). Married mothers are more likely than single mothers to breastfeed (Furman, Minich, & Hack, 2002), and according to Guzzo and Lee (2008) this is due to the greater social support married mothers receive. Breastfeeding is associated with better cognitive development in children (Kramer et al., 2008; Quinn et al., 2001). Being raised in a two parent family also has implications for children as evidence suggests that there is a significant association between maternal relationship status and maternal wellbeing (Bloch et al., 2010; Brown, 2000; Carlson & McLanahan, 2006), which affects maternal care giving and positive parenting (Burchinal, Follmer, & Bryant, 1996), thus impacting child behavioural outcomes.

The few studies which directly examine differential outcomes by parental status report mixed findings. Some home visitation programmes report that unmarried mothers benefit more from treatment (Olds et al., 2004), whereas other sources have failed to find an association between

mothers' marital status and child outcomes in early intervention programmes (Lee & Kahn, 1998).

Marital Status Subgroup Results

In order to investigate whether the *PFL* programme had an impact on lone mothers during pregnancy (23% of the sample) and partnered mothers during pregnancy (77% of the sample), analyses were conducted comparing the outcomes of lone mothers in the high treatment group to the outcomes of lone mothers in the low treatment group and a separate analysis comparing partnered mothers in the high treatment group to partnered mothers in the low treatment group. Table 4.11 shows that there were significant results for lone mothers on 13% of the variables measured and there were significant results for partnered mothers on 14% of the variables measured. Some specific differences were found in both sets of results. Lone parents in the high treatment group had more significant effects in the parenting domain and maternal health domain indicating that the *PFL* Programme may benefit lone parents, particularly in terms of such factors as parent child interaction and parent efficacy. Furthermore, more significant effects in the domain of home environment and safety were found for partnered parents in the high treatment group indicating that the *PFL* Programme may benefit children of partnered parents, particularly in terms of the availability of developmentally appropriate materials and home safety. Thus, overall, these findings suggest the *PFL* Programme benefits both lone and partnered parents albeit in different ways.

Table 4.11

Results for High and Low Treatment Groups by Marital Status

Variable	**Sub-Group Analysis**	
	High v Low	*High v Low*
	Married/Partnered *P*[1]	Lone Parent *P*[2]
Child Development		
ASQ Gross Motor Score	p<.10	ns
Child Health		
Necessary immunizations at 4 months	p<.05	p<.10
Appropriate frequency of eating	p<.10	ns
Baby eats appropriate food	p<.05	ns
Age (in weeks) exclusive breastfeeding ends	ns	p<.10
*Leave baby to cry *(negative outcome)*	ns	p<.10
Appropriate sleep preparation	ns	p<.10
Parenting		
*Parent-Child Dysfunctional Interactions *(negative outcome)*	p<.05	ns
Interaction With Baby	p<.10	ns
*PSI Stress cut-off (90) *(negative outcome)*	p<.10	ns
*Parental Control of Child's Behaviour *(negative outcome)*	ns	p<.10
Pleasure in Interaction	ns	p<.10
*Difficult Child *(negative outcome)*	ns	p<.10

*Parental Hostile-Reactive Behaviour *(negative outcome)*	ns	p<.01
Baby Comparison Score	ns	p<.05
Parental Self-Efficacy	ns	p<.05
*Overall Parental Locus of Control *(negative outcome)*	ns	p<.10
Home Environment & Safety		
Variety	p<.01	ns
Toys and Books	p<.05	ns
Learning Materials	p<.05	ns
Childcare	p<.05	p<.05
Interaction	p<.10	ns
Physical Environment	p<.10	ns
Responsivity	p<.10	ns
Daily Routines	p<.10	ns
Total HOME SHIF	p<.05	ns
Maternal Health & Pregnancy		
*Mother hospitalised immediately after birth for special medical care *(negative outcome)*	p<.01	p<.05
*Complication during pregnancy *(negative outcome)*	ns	p<.05
*Drug use in past 6 months *(negative outcome)*	ns	p<.10
*Below WHO5 Score of 13 *(negative outcome)*	ns	p<.10
Social Support		
Discuss programme with partner	p<.01	ns
Frequently sees grandparent	p<.05	ns
Knows children same age as baby	p<.10	ns
Meet friends frequently	ns	p<.01
Support from friends	ns	p<.10
Childcare & Service Use		
Employment Services	p<.10	ns
Voted in last General Election	p<.05	ns
Household Factors & SES		
Equivalized weekly household income	ns~	p<.10
*Difficulty making ends meet *(negative outcome)*	ns	p<.10

Notes: [1] one-tailed (right-sided) p value derived from the treatment effect for partnered parents. [2]one-tailed (right-sided) p value derived from the treatment effect for lone parents. All analyses based on regression based permutation tests with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test.

4.11.4 Cognitive Resources

Multiple studies have reported that maternal cognitive functioning is significantly associated with child cognitive functioning (Cornelius et al., 2009; Tong, Baghurst, Vimpani, & McMichael, 2007). In particular, maternal cognition is associated with child maths achievement (Crane, 1996), reading scores (Black, Dubowitz, Krishnakumar & Starr, 2007) and linguistic

development (Sommer et al., 2000). The nature of this relationship may be due to direct or indirect effects.

Genetic research has reported that the portion of variance in cognition that can be attributable to genetic factors ranges from about 41% in childhood to about 66% in young adulthood (Haworth et al., 2010). Parental cognition may also have an indirect effect on child development. For example, parents reporting lower cognitive resources have may be less prepared to take on the role of parent (Mylod, Whitman & Borkowski, 1997), may be more likely to engage in negative and harsh parenting (Deater-Deckard, Sewell, Petrill & Thompson, 2010) and may be at greater risk for abuse (Dukewich, Borkowski & Whitman, 1999). In addition, maternal cognitive resources are significantly associated with increased rates of breastfeeding (Der, Batty & Deary, 2006), higher improved dietary intake in children (Wachs & McCabe, 2001), greater parenting satisfaction (Bornstein et al., 2003), decreased incidence of smoking during pregnancy (Kubicka, Matejcek, Dytrych, & Roth, 2001) and higher quality home environment (Burchinal, Campbell, Bryant, Wasik, & Ramey, 1997). Research has suggested that the proportion of variance in cognition attributable to environment may be moderated by family level SES. Turkheimer, Haley, Waldron, D'Onofrio, & Gottesman (2003) report that in low SES families about 60% of the variance in cognitive resources is attributable to the environment and that genetics has very little impact, while in high SES families the majority of the variance is attributable to genetics and the environment has almost no impact on cognition.

Maternal cognition can also impact on the effectiveness of early childhood interventions. A number of studies have shown that mother's with low cognitive resources who engage in home visiting programmes benefit to a greater degree than those with higher cognitive resources (Landsman & Ramey, 1989; Brooks-Gunn, Gross, Kraemer, Spiker, & Shapiro, 1992; Martin, Ramey & Ramey, 1990). The children of mothers with low cognitive resources had higher gains in language, executive functioning, and behavioural adaption compared to those in the control group (Olds, Robinson et al., 2004). In addition, these children were more responsive and communicative and had better physical health than those in the control group (Olds, 2002). This research suggests that early childhood interventions may be particularly beneficial for children whose parents have low cognitive resources.

Cognitive Resources Instruments

To gain an index of maternal cognition, the Wechsler Abbreviated Scale of Intelligence (WASI) cognitive assessment was administered to all mothers participating in the evaluation when the baby was approximately three months old. The WASI is a short, four-subset version of the Wechsler Adult Intelligence Scale (WAIS) which focuses on such domains as vocabulary, similarities of constructs, block design, and matrix reasoning. The assessment is administered by a trained assessor and takes approximately 45 minutes to complete. The WASI provides standardised measures of verbal, performance, and a full scale measure of cognitive functioning. To conduct the subgroup analysis, the full scale measure was dichotomised to create an indicator that represented mothers with relative higher cognitive resources and mothers with relatively lower cognitive resources. The dichotomisation was based on scoring above or below the median score within the sample.

Cognitive Resources Subgroup Results

In order to investigate whether the *PFL* programme had an impact on mothers with relative high cognitive resources (45% of the sample) and mothers with relatively low cognitive resources (55% of the sample), separate analyses were conducted testing the effects of the high and low treatment groups for both mothers with relatively high cognitive resources and mothers with relatively low cognitive resources. Table 4.12 shows that there were significant results for those with relatively high cognitive resources on 14% of the variables measured and there were significant results for mothers with relatively low cognitive resources on 7% of the variables measured. These findings indicate that there may be particular benefits for those mothers with relatively high cognitive resources in the high treatment group and their families, most notably in the domains of child health, such as child eating habits and appropriate child immunizations, and home environment and safety, which includes the availability of appropriate and stimulating materials for children and general infant safety. However, in other domains, such as parenting and social support, there were treatment effects for both groups of mothers. Thus, overall, these findings suggest the *PFL* Programme benefits both mothers with higher and lower cognitive resources, with mothers with higher cognitive resources having more treatment effects.

Table 4.12
Results for High and Low Treatment Groups by Maternal Cognitive Resources

Variable	**Sub-Group Analysis**	
	High v Low	*High v Low*
	Higher Cognitive Resources *P*[1]	Lower Cognitive Resources *P*[2]
Child Development		
*Difficult Temperament *(negative outcome)*	p<.05	ns
Child Health		
Necessary immunizations at 4 months	p<.05	ns
Appropriate frequency of eating	p<.01	ns
Baby eats appropriate food	p<.10	ns
Appropriate sleep preparation	p<.10	ns
Parenting		
*Parent-Child Dysfunctional Interactions *(negative outcome)*	p<.10	ns
*Parental Control of Child's Behaviour *(negative outcome)*	ns	p<.05
*Overall Parental Locus of Control *(negative outcome)*	ns	p.<.10
Baby Comparison Score	p<.05	ns
Interaction With Baby	p<.01	ns
*PSI Stress cut-off (90) (negative outcome)	ns	p<.05
Home Environment & Safety		
Variety	p<.05	p.<.10
Childcare	p<.05	ns
Toys and Books	p<.10	ns
Daily Routines	p<.10	ns
Framingham Safety Survey	p<.01	ns
Safety gate	p<.10	ns

No. of safety items	p<.10	ns
Electrical socket covers	p<.10	ns
Total HOME SHIF	p<.10	ns
Maternal Health & Pregnancy		
*Mother hospitalised immediately after birth for special medical care *(negative outcome)*	ns	p<.01
Social Support		
Father part of baby's life	p<.10	ns
Meet friends frequently	p<.10	ns
Support from parents	p<.10	ns
Frequently sees grandparent	ns	p<.05
Discuss programme with family	p<.10	ns
Discuss programme with partner	ns	p<.10
Discuss programme with friends	ns	p<.10
Discuss programme with others	ns	p<.10
Childcare & Service Use		
Employment Services	p<.10	ns
Voted in last General Election	p<.05	p<.10
Household Factors & SES		
*Father low education *(negative outcome)*	ns	p<.05

Notes: [1] one-tailed (right-sided) p value derived from the treatment effect for higher cognitive resource participants. [2] one-tailed (right-sided) p value derived from the treatment effect for lower cognitive resource participants. All analyses based on regression based permutation tests with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test.

4.11.5 Familial Risk

The childhood development literature identifies influences in a child's life which put them at-risk for poor developmental outcomes (Liaw & Brooks-Gunn, 1994). Risk is a very broad construct which includes diverse biological and environmental factors such as maternal depression, domestic violence, non-domestic violence, family size, sole parenthood, psychiatric symptomatology, substance use, poverty, financial stress, unstable housing and a lack of social support (Nair, Schuler, Black et al., 2003: Armstrong, Fraser, Dadds & Morris, 1999). These risks are often categorised into social, environmental or familial, but there is a great deal of overlap between the risk factors in each category. For the purpose of the current evaluation we will use the term familial risk as this encompasses risk factors associated with the family environment. Many studies focus solely on the impact that familial risk factors have on the incidence of child abuse (Brown, Cohen, Johnson & Salzinger, 1998). However exposure to any one or combination of these familial risk factors is associated with poor parenting and may increase the probability of poor developmental and behavioural outcomes for the child (Nair et al., 2003). Moreover, research indicates that exposure to multiple risk factors increases the chances of detrimental effects (Sameroff, 1998; Liaw & Brooks-Gunn, 1994).

The potential negative impact of domestic violence, parenting problems, separation, bereavement, addiction, maternal depression and abuse on child development is well established

in the literature. Individually these risk factors have been linked to a multitude of negative outcomes for families and children (Armstrong et al., 1999; Doggett, Burrett & Osburn, 2005). When experienced in combination these factors have deleterious effects on both parents and children across a variety of areas including parenting and employment. They are also linked to problems with the social and cognitive development of the child (CalWORKS Project, 2003). Exposure to these factors is linked to greater risk of homelessness, use of food banks, reduced ability to access needed medical care, unreliable or unsafe child care and placement in foster care (Lawrence, Chau, & Lennon, 2004).

Home visiting programmes vary greatly in their design particularly with regard to those they serve. Many home visiting programmes target families classified as at-risk. Results from a meta-analytic review indicate that programmes targeting families at-risk generate higher effect sizes than those which do not target such families (Sweet & Applebaum, 2004). However it is difficult to isolate the impact of home visiting programmes on families who are exposed specifically to familial risk factors as the definition of "at-risk" varies widely (Johnson, 2001). Many of the landmark studies that show effectiveness of home visiting programmes for "at-risk" populations exclude families where there are issues such as significant parental substance abuse (Dawe, Harnett & Frye, 2008) or they are assessed alongside other risk factors such as age of parents, planning of pregnancy and family financial situation which makes results specific to familial risk difficult to interpret (Fergusson, Grant, Horwood & Ridder, 2005).

Despite these limitations, some home visiting programmes have identified positive outcomes for risk factors of interest to the PFL evaluation. In a systematic review of randomised trials it was identified that home visiting can be effective in reducing child abuse, however the results from these trials are often conflicting (Roberts, Kramer & Suissa, 1996). Black, Nair, Kight et al. (1994) investigated the effects of a home visiting intervention in a sample of drug-abusing women and found that women in the intervention group were significantly more emotionally responsive and were more likely to provide opportunities for social interaction for the child. This same study found that those served by the programme were also marginally more likely to report being drug free than those in the control group. Armstrong et al. (1999) found that women who were receiving a home based intervention had significant reductions in postnatal depression as well as improvements in parental stress (Abidin, 1990). These mothers also showed improvement in aspects of the home environment related to optimal development in children, such as maternal-infant attachment. The impact of home visitation on domestic violence is more difficult to identify as it is often not the focus of home visiting interventions (Wolfe & Jaffe, 1999). An investigation by The Task Force on Community Preventative Services assessed the impact of home visiting programmes on violence and found insufficient evidence to determine the effectiveness of early childhood home visitation in preventing domestic violence (Bilukha et al., 2005).

The general consensus is that while home visiting interventions targeting those at severe risk can have a significant impact on early development (Lyons-Ruth, Connell, Crunebaum & Botein, 1990), further research is necessary to determine the full extent of these programmes on at-risk families (Kendrick et al., 2000).

Familial Risk Subgroup Results

Household indicators of risk were assessed at baseline by asking mothers if they or anyone in their house experienced difficulty due to a series of issues including parenting, domestic violence, addiction, separation, suicidal thoughts, mental health issues, bereavement, abuse, or any other social or emotional risk that was not listed. Mothers could tick as many issues as appropriate. A dichotomised domestic risk variable was created by categorizing participants who cited at least one risk as having high domestic risk (45%) and participants who cited no risks as having low domestic risk (55%).

In order to investigate whether the *PFL* programme had an impact on families with relatively high domestic risk and families with relative low domestic risk, separate analyses were conducted testing the effects of the high and low treatment groups for both families with high domestic risk and those with low domestic risk in the *PFL* Programme. Table 4.13 shows that there were significant results for those with high domestic risk on 15% of the variables measured and there were significant results for families with low domestic risk on 8% of the variables measured. These findings indicate that there may be particular benefits for those mothers at relatively high domestic risk in the high treatment group and their families, most notably in the realms of child health, such as child eating and sleeping habits and appropriate child immunizations, parenting, such as positive interactions with child, and home environment and safety, which includes the availability of appropriate and stimulating materials for children and general infant safety. However, in other domains, such as social support, there were treatment effects for both groups of mothers.

Table 4.13
Results for High and Low Treatment Groups by Familial Risk

Variable	**Sub-Group Analysis**	
	High v Low	*High v Low*
	High Familial Risk P^1	Low Familial Risk P^2
Child Development		
ASQ Communication Score	p<.05	ns
ASQ Gross Motor Score	ns	p<.10
*ASQ Gross Motor Cut-off *(negative outcome)*	ns	p<.10
Child Health		
Necessary immunizations at 4 months	p<.05	ns
Necessary immunizations at 6 months	p<.10	ns
Baby eats appropriate food	p<.10	ns
Appropriate frequency of eating	ns	p<.01
Mother breastfed as a baby	p<.10	ns
*Baby awakening a problem *(negative outcome)*	p<.10	ns~
*Time to sleep (>15 mins) *(negative outcome)*	p<.10	ns
Appropriate sleep preparation	ns	p<.10
Parenting		
*Difficult Child *(negative outcome)*	p<.05	ns
Baby Comparison Score	p<.05	ns
Interaction With Baby	p<.01	ns
*Parent-Child Dysfunctional	ns	p<.10

Interactions *(negative outcome)*		
Home Environment & Safety		
Variety	p<.01	ns
Childcare	p<.01	ns
Involvement	ns~	ns
Learning Materials	ns	p<.10
Toys and Books	ns	p<.10
Play	ns	p<.10
Restrictions/Not Items	ns	ns~
Total HOME SHIF	p<.10	ns
Electrical socket covers	p<.01	ns
Safety gate	p<.05	ns
No. of safety items	p<.05	ns
Framingham Safety Survey	p<.05	ns
Maternal Health & Pregnancy		
*Mother hospitalised immediately after birth for special medical care *(negative outcome)*	p<.05	p<.05
Social Support		
Discuss programme with family	p<.10	ns
Discuss programme with partner	p<.10	p<.10
Discuss programme with friends	ns	p<.10
Discuss programme with others	p<.10	ns
Frequently sees grandparent	ns	p<.05
Childcare & Service Use		
Adult Education Services	p<.10	ns
Voted in Last General Election	p<.05	ns
Household Factors & SES		
Married	p<.10	ns
*Mother low education *(negative outcome)*	ns	p<.10

Notes: [1] one-tailed (right-sided) p value derived from the treatment effect for high risk families. [2] one-tailed (right-sided) p value derived from the treatment effect for low risk families. All analyses based on regression based permutation tests with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test.

4.11.6 Differential Effects Results Summary

Overall, subgroup results echo the findings found in the main (high vs. low treatment group) results. Where differential effects were found, these generally were in the same broad categories as the significant results found in the main results – child health, parenting, home environment and social support. Therefore, it is possible that the outcomes in the main results were influenced by a particular subgroup or multiple subgroups. For example, there were more positive treatment effects among mothers with relatively higher cognitive resources than mothers with relatively lower cognitive resources, particularly in the domains of child health and home environment and safety. While this finding does not indicate that there are no programme effects for those mothers with relatively lower cognitive resources, it suggests that mothers with relatively higher

cognitive resources and their children may benefit more from the *PFL* Programme. Similarly, there were more treatment effects for mothers with multiple children than mothers with only one child, particularly on the social support domain. Again, while this finding does not suggest there that there are no treatment effects for first time mothers, it suggests that mothers with multiple children may particularly benefit from the social dimension of the *PFL* Programme. In addition, the results also showed that the programme had effects on both lone and partnered parents, albeit in different domains. For example, lone parents particularly benefited regarding the home environment and safety outcomes, while partnered parents particularly benefitted regarding the parenting outcomes. Similarly, high domestic risk families also benefitted regarding the child health and home environment and safety outcomes. Finally, the programme also had effects for girls and boys, yet the outcomes varied by gender. For example, there were positive treatment effects for both girls and boys regarding child health; however the programme particularly benefits the eating patterns of girls and the immunization rates of boys.

Overall, the results of the interaction and subgroup analysis were in line with the main results concerning the areas of effectiveness at six months. Based on the number of significant treatment effects in the subgroup analysis, the results suggest that the programme may have more effects for mothers with relatively higher cognitive resources, multiparious mothers, and families with higher domestic risks. Another significant finding is that the programme may not only benefit different types of parents, but benefit different groups of parents in different ways. While the results of the subgroup analysis are fairly mixed at six months, in part due to the few main effects, stronger patterns may emerge in later reports.

CHAPTER 5: Treatment and Comparison Group Results

5.1 Introduction

Why is the Comparison Community Needed?
This chapter presents the results comparing the six month outcomes of the two treatment groups to the six month outcomes of the comparison community group. The *PFL* treatment groups were compared to this comparison group for two main reasons. First, as both the high and low *PFL* treatment groups were receiving some form of treatment, a comparison to 'services as usual' group which did not receive any treatment, may help identify what would have occurred to the *PFL* families in the absence of the programme. Second, as the potential for contamination between the two *PFL* treatment groups is high given the geographical proximity of the participants within the community, this additional comparison group allows us to evaluate the impact of the programme even if contamination was present within the high and low treatment groups. As the comparison community group is geographically separated from the *PFL* catchment area by ~10km it could not be influenced by the activities of the *PFL* programme. Thus, if there was a substantial transfer of materials and knowledge between the two *PFL* treatment groups such that the outcomes of the low treatment group were comparable to those of the high treatment group, comparing these groups to the external comparison group allows us to evaluate the impact of the overall *PFL* programme. The issue of contamination is discussed in depth in Chapter 8.

How was the Comparison Community Selected?
The comparison group was identified using quasi-experimental methods. Small area population statistics (SAPS) from the Census 2006 were used to rank all 322 communities in Dublin in terms of their closeness to the *PFL* community based on standard demographic and socio-economic characteristics. Although the selected comparison communities were similar to the *PFL* catchment areas, they were not the highest ranking communities. Several communities were more closely ranked to the *PFL* catchment area, but were already experiencing some form of early childhood intervention. Therefore, the selected communities were identified as they were the most similar socio-demographically communities not receiving an early childhood intervention. Ninety-nine pregnant women were recruited from the comparison community. Data from the participants in this group were collected at the same time points as the *PFL* treatment groups. We refer to this comparison group as *LFP*.

How did the Comparison Community Group Compare to the PFL Groups at Baseline?
A comparison of the overall *PFL* group to the comparison group across a wide range of parental and family characteristics and behaviours using baseline data found that the two groups did not statistically differ on 75% of the measures analysed. However, there were significant differences in the areas of mother's and father's age, education, social housing, attachment style, self-efficacy, considerations of future consequences, use of health services, planned pregnancy, participation in antenatal classes, smoking and drinking behaviour during pregnancy, parenting (AAPI-2), and intentions to breastfeed. There were also differences in mother's cognitive resources between the *PFL* groups and the comparison group, as measured by the Wechsler Abbreviated Scale of Intelligence when the *PFL* children were approximately three months old. These results indicate that the mothers in the comparison community are, for the most part,

faring better than mothers in the *PFL* community on domains which have been shown to have clear relationships with child developmental outcomes.

How to Control for Baseline Differences in the Six Month Comparison Group Results?
As the comparison group demonstrated some demographic and psychosocial differences compared to the *PFL* groups at baseline, it is important to control for these differences when comparing the outcomes of the *PFL* treatment groups and comparison group at six months. The majority of the baseline results indicated that the comparison group had better baseline outcomes than the *PFL* group, thus failure to account of these differences may bias the six month results by reducing the magnitude of the treatment effect. This can be explained as follows. As the comparison group had better outcomes before the programme began, one can assume that this sample would still have had better six month outcomes compared to the *PFL* sample if the *PFL* programme did not take place. Thus, if the *PFL* treatment was effective and improved the outcomes of the *PFL* sample to the same level of the comparison sample, then the analysis would conclude the *PFL* programme had no effect (as there was no statistical difference between the *PFL* sample and the comparison sample, even though the *PFL* programme had a positive effect). If the *PFL* programme improved the outcomes of the *PFL* sample such that they were below that of the comparison sample, then the analysis would conclude that the programme had a negative effect. If the *PFL* programme improved the outcomes of the *PFL* sample such that they were significantly above that of the comparison sample, then the analysis would conclude that the programme had a positive effect; however this would be an underestimation of the true programme effect. Therefore, if the assumption that the initial differences between the *PFL* groups and the comparison group lead the comparison group to have better outcomes at six months than the *PFL* groups, failing to control for these differences would lead to such inaccurate conclusions about the impact of the programme.

We use 'conditional permutation tests' to control for these baseline differences when comparing the outcomes of the two *PFL* treatment groups and the comparison community group. This method is described in detail in Chapter 3. The first step involved selecting the measures to include in the conditioning set. While there were 31 measures on which the two groups differed at baseline, it is not statistically possible to control for all 31 measures in the conditioning set as the sample size available is too small (degrees of freedom issue). To reduce the number of variables included in the conditioning set we first removed any variables that were measuring the same concept. For example, we excluded all the sub-domains on the Adult Adolescent Parenting Inventory, Pearlin Self efficacy, and Vulnerable Attachment Style Questionnaire from the analysis and included the total score for those measures only. Second, we removed father's age as it was highly correlated with mother's age. Third, we removed the quantity of cigarettes and alcohol consumed during pregnancy as the indicator of whether the respondent smoked during pregnancy was a good approximation of this measure. Forth, we removed whether the respondent lived with their partner, as this was highly negatively correlated with whether the respondent lived with a parent.

After excluding these variables, eighteen controls remained. As including such as large number of variables in the conditioning set may compromise the accuracy of the statistical analyses, we used maximum likelihood factor analysis to determine which measures best represented the underlying differences between the two groups for the remaining variables. We first estimated a

two-factor model which allowed us to dichotomise the variables into two groups based on the correlation between the variables. For each set of variables, we then estimated a one-factor model and only included the variables with the highest factor loadings in the two-factor model. Finally, the variables with the highest factor loadings (greater than 0.5) from this analysis were chosen to be included in the conditioning set. Ultimately, this analysis resulted in six measures collected at baseline that best represented the differences between the two groups. They included two binary variables indicating whether the mother was above or below the median age and whether the mother was living with her parents or not, and four continuous variables representing maternal self-efficacy (Pearlin Self Efficacy Scale), maternal attachment (Vulnerable Attachment Style Questionnaire), parenting (Adult Adolescent Parenting Inventory) and maternal cognitive resources (Wechsler Abbreviated Scale of Intelligence). In all cases, the comparison group scored more positively at baseline on each dimension e.g. older mothers, not living with a parent, higher self-efficacy, less vulnerable attachment style, better parenting attitudes, and higher cognitive resources. These six measures were included in the conditioning set of all analyses comparing the *PFL* groups and the comparison group. The binary variables were treated as non-parametric and the continuous measures were treated as parametric. The benefit of this approach is that no distributional assumptions were placed on the binary variables. Ideally, all of the conditioning variables would be treated non-parametrically. However, this was not possible with the continuous measures as there would be too few observations within each conditioning subgroup to allow for permutation testing. Similarly, if the continuous psychometric measures were dichotomised to allow them to be treated non-parametrically, we would lose a lot of important information. Therefore, this semi-parametric approach was viewed to be the most appropriate method.

Analyses and Presentation of Results

Two separate analyses were conducted. The first compared the outcomes of the high treatment group to the comparison group and the second compared the outcomes of the low treatment group to the comparison group. The analysis of the *PFL* treatment groups and the community comparison group focused on the eight main domains. The results for each domain are presented as a separate section for each analysis. As before, the statistical results are provided in both text and table format and are presenting in the same format as the main results.

5.2 Hypotheses

As the high treatment group and the low treatment group have received some level of treatment compared to the comparison community group, we hypothesize that there may be statistically significant differences between the *PFL* treatment group and the community comparison group. As the high treatment group supports were more intensive and substantial than the supports provided to the low treatment group, we hypothesize that there may be more differences between the high treatment group and the comparison group than the low treatment group and the comparison group.

Controlling for the baseline differences between the groups, a finding that the high treatment group have outperformed the comparison group at six months is suggestive that the high treatment supports were effective. Similarly, a finding that the low treatment group have outperformed the comparison group at six months is suggestive that the low treatment supports

were effective. If there are no statistical differences between high/low treatment groups and the comparison group this may suggest that the treatment was not effective.

5.3 High Treatment Group and Comparison Group

This section compares the outcomes of the high treatment group to the outcomes of the comparison group at six months, while controlling for the set of baseline measures outlined above.

5.3.1 Child Development

ASQ Scores and Difficult Temperament

Within the ASQ Scores and Difficult Temperament category, four of the seven child development measures were in the hypothesized direction. Three of the measures were statistically significant - ASQ Communication Score, ASQ Social-Emotional Score and ASQ Gross Motor Score. On the ASQ Communication Score, which measures child's babbling, vocalisation, listening and understanding, the average score for the high treatment group was 53.27, which was significantly higher than the average comparison group score of 51.51 (p=<.05, d=.36). For the ASQ Social-Emotional Score, which indicates maladaptive functioning and interaction with others, the average score for the high treatment group was 14.57, which was significantly lower than the average comparison group score of 17.85 (p=<.05, d=.33). This finding indicates that children in the high treatment group were significantly more likely to show signs of social emotional adaptation. On the ASQ Gross Motor Score which reflects age appropriate arm, body and leg movements, the average score for the high treatment group was 41.17, which was significantly higher than the average comparison group score of 39.76 (p=<.10, d=.23). In addition, the step down test showed that the joint effect of the ASQ Scores and Difficult Temperament subscales was statistically significant (p<.10), indicating that there is a significant difference in Child development between the high treatment group and the comparison group. The joint effect finding is driven by the significant results found for the ASQ Communication Score and the ASQ Social-Emotional Score.

ASQ Cut-off Scores

Within the ASQ Cut-off Scores category, which measures the proportion of children at risk of development delay in each group, two of the six measures were in the hypothesized direction and one, ASQ Gross Motor Cut-off, was significant. For the ASQ Gross Motor Cut-off which reflects possible developmental impairment in physical movement, the percentage of participants in the high treatment group who scored within the range of impairment was 1%, which was significantly lower than the percentage of 6% for comparison group (p=<.05, d=.33). The step down test showed that the joint effect of all six measures in the ASQ Cut-off Scores category was statistically significant (p=<.05). The joint effect finding is driven by the significant results found for the ASQ Gross Motor Cut-off.

Table 5.1
Results for High Treatment Group and Comparison Group (LFP): ***Child Development***

Variable	N (n_{HIGH}/ n_{LFP})	M_{HIGH} (*SD*)	M_{LFP} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
ASQ Scores & Difficult Temperament						
ASQ Communication Score	164 (81/83)	53.27 (7.46)	51.51 (7.10)	p<.05	p<.10	0.36
*ASQ Social-Emotional Score *(negative outcome)*	164 (81/83)	14.57 (10.73)	17.65 (14.53)	p<.05	p<.10	0.33
ASQ Gross Motor Score	164 (81/83)	41.17 (11.79)	39.76 (13.11)	p<.10	ns	0.23
*Difficult Temperament *(negative outcome)*	164 (81/83)	11.75 (5.76)	12.48 (5.97)	ns	ns	0.09
ASQ Fine Motor Score	164 (81/83)	50.86 (9.38)	51.14 (9.57)	ns	ns	0.08
ASQ Problem Solving Score	164 (81/83)	52.16 (9.18)	52.53 (8.46)	ns	ns	0.03
ASQ Personal Social Score	164 (81/83)	46.54 (12.16)	48.55 (11.54)	ns	ns	0.08
ASQ Cut-off scores						
*ASQ Gross Motor Cut-off *(negative outcome)*	164 (81/83)	0.01 (0.11)	0.06 (0.24)	p<.05	p<.05	0.33
*ASQ Social Emotional Cut-off *(negative outcome)*	164 (81/83)	0.01 (0.11)	0.02 (0.15)	ns	ns	0.15
*ASQ Personal Social Cut-off *(negative outcome)*	164 (81/83)	0.06 (0.24)	0.05 (0.22)	ns	ns	0.02
*ASQ Problem Cut-off *(negative outcome)*	164 (81/83)	0.07 (0.26)	0.05 (0.22)	ns	ns	0.03
*ASQ Fine Motor Cut-off *(negative outcome)*	164 (81/83)	0.01 (0.11)	0.00 (0.00)	ns	ns	0.06
*ASQ Communication Cut-off *(negative outcome)*	164 (81/83)	0.00 (0.00)	0.00 (0.00)	ns	~	~

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

5.3.2 Child Health

Child Health

Two of the six measures in the Child Health category were in the hypothesised direction, however none indicated statistically significant differences between the high treatment and comparison groups. Overall, the step down test showed that the joint effect of all six measures in the Child Health category was not statistically significant.

Mother's Health Decisions for Her Infant

Within the Mother's Health Decisions for her Infant category, five of the nine measures showed differences in the hypothesised direction and one of these measures - Necessary immunizations

at 4 months - was statistically significant. 96% of mothers in the high treatment group reported that their children had the necessary immunizations at 4 months, compared to 89% of mothers in the comparison group ($p<.05$, $d=.24$). There was also one significant difference found between the high treatment and comparison groups in a non-hypothesized direction. 41% of mothers in the high treatment group reported leaving their baby to cry in comparison to 30% of mothers in the comparison group ($p<.10$, $d=.25$). Overall, the step down test showed that the joint effect of all nine measures in the Mother's Health Decisions category was not statistically significant.

Sleep Routines

Four of the eight measures in the Sleep Routine category were in the hypothesised direction, and differences for one of these - appropriate sleep preparation - was statistically significant. 48% of mothers in the high treatment group reported putting their baby to sleep awake and letting him/her fall asleep on his/her own, which was significantly higher than the 40% of those in the comparison group who reported appropriate sleep preparations ($p<.05$, $d=.20$). There was, however, one significant difference between the high treatment and comparison groups in a non-hypothesized direction regarding the appropriateness of the infants sleeping location. 90% of children in the high treatment group slept alone in their own bedroom or in their mother's bedroom, but not in her bed, compared with 96% of children in the comparison group ($p<.05$, $d=.32$). This indicated that children in the high treatment group were more likely to have an inappropriate sleeping location such as sleeping in their mother's bed or sharing a bedroom with another sibling. The step down test showed that the joint effect of all eight measures in the Sleep Routines category was not statistically significant.

Non Step Down Measures

None of the seven measures which were not included in the above Step Down categories were in the hypothesized direction, however, one indicated a statistically significant difference between the high treatment and comparison groups in the non-hypothesized direction. 9% of mothers in the high treatment group reported that their infants were of low birth weight where as 2% of mothers in the comparison group did so ($p<.10$, $d=.17$).

Table 5.2

Results for High Treatment Group and Comparison Group (LFP): ***Child Health***

Variable	N (n_{HIGH}/ n_{LFP})	M_{HIGH} (*SD*)	M_{LFP} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Child Health						
*Stayed in hospital during first 6 months *(negative outcome)*	164 (81/83)	0.10 (0.30)	0.11 (0.31)	ns	ns	0.01
*Age (in days) left hospital *(negative outcome)*	164 (81/83)	3.25 (7.11)	2.45 (2.45)	ns	ns	0.06
Birth weight (grams)	161 (78/83)	3346 (569)	3439 (453)	ns	ns	0.07
Good health since birth	164 (81/83)	0.93 (0.26)	0.96 (0.19)	ns	ns	0.12
*No. of health problems taken to GP/health centre/casualty *(negative outcome)*	164 (81/83)	1.37 (1.64)	1.14 (1.13)	ns	ns	0.15
*Problem breathing *(negative outcome)*	163 (81/82)	0.22 (0.42)	0.12 (0.33)	ns	ns	0.22

Mothers Health Decisions						
Necessary immunizations at 4 months	162 (80/82)	0.96 (0.19)	0.89 (0.31)	p<.05	ns	0.24
Baby eats appropriate food	163 (81/82)	0.86 (0.34)	0.87 (0.34)	ns	ns	0.03
Appropriate frequency of eating	164 (81/83)	0.77 (0.43)	0.72 (0.45)	ns	ns	0.09
Necessary immunizations at 6 months	162 (80/82)	0.36 (0.48)	0.32 (0.47)	ns	ns	0.10
Mother breastfed as a baby	159 (79/80)	0.15 (0.36)	0.15 (0.36)	ns	ns	0.07
Knows baby's weight	164 (81/83)	0.40 (0.49)	0.35 (0.48)	ns	ns	0.02
*Baby's crying a problem (negative outcome)	164 (81/83)	0.12 (0.33)	0.10 (0.30)	ns	ns	0.05
Attempted breastfeeding	164 (81/83)	0.25 (0.43)	0.33 (0.47)	ns	ns	0.12
*Leave baby to cry (negative outcome)	164 (81/83)	0.41 (0.49)	0.30 (0.46)	ns~	ns	0.25
Sleep Routines						
*Time to sleep (> 30 mins) (negative outcome)	163 (80/83)	0.30 (0.46)	0.39 (0.49)	ns	ns	0.22
Appropriate sleep preparation	164 (81/83)	0.48 (0.50)	0.40 (0.49)	p<.05	ns	0.20
Sleeps undisturbed through the night	164 (81/83)	0.75 (0.43)	0.70 (0.46)	ns	ns	0.14
Sleeps undisturbed by 3 months	164 (81/83)	0.37 (0.49)	0.35 (0.48)	ns	ns	0.07
Sleeps more than 8 hrs per night	164 (81/83)	0.77 (0.43)	0.77 (0.42)	ns	ns	0.00
*Baby awakening a problem (negative outcome)	164 (81/83)	0.25 (0.43)	0.17 (0.38)	ns	ns	0.12
*Difficulty falling asleep (negative outcome)	164 (81/83)	0.44 (0.50)	0.35 (0.48)	ns	ns	0.21
Appropriateness of sleeping location	164 (81/83)	0.90 (0.30)	0.96 (0.19)	ns~	ns	0.32
Non Step Down Variables						
Current weight (grams)	61 (32/29)	7603 (1677)	7695 (1916)	ns	~	0.11
*Low birth weight (<2500 grams) *(negative outcome)*	161 (78/83)	0.09 (0.29)	0.02 (0.15)	ns~	~	0.17
*High birth weight (>4000 grams) *(negative outcome)*	161 (78/83)	0.08 (0.27)	0.08 (0.28)	ns	~	0.00
Ever vaccinated	164 (81/83)	0.99 (0.11)	0.99 (0.11)	ns	~	0.04
Baby still breastfed	47 (20/27)	0.10 (0.31)	0.11 (0.32)	ns	~	0.01
Age (in weeks) exclusive breastfeeding ends	46 (20/26)	4.04 (7.32)	6.36 (8.25)	ns	~	0.19
Age non-exclusive breastfeeding ends	42 (18/24)	4.23 (6.37)	6.15 (6.65)	ns	~	0.20

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was

significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

5.3.3 Parenting

Parental Locus of Control

Three of the five Parental Locus of Control (PLOC) subscales were in the hypothesised direction, and one – Parental Control of Child's Behaviour - was significantly different. The high treatment group scored an average of 6.96, whereas the comparison group scored an average of 7.39 ($p<.10$ $d=.23$). This indicates that parents in the high treatment group were less likely to feel they had unreasonable control over their child's behaviour then those in the comparison group. The step down test showed that the joint effect of the five PLOC subscales was not statistically significant.

Maternal Attachment

All three of the Condon Maternal Attachment Scale (CMAS) subscales were in the hypothesised direction, however, there were no significant differences between the high treatment and comparison groups on any of the three subscales. In addition, the step down test showed that the joint effect of the three CMAS subscales was not statistically significant.

Parenting Stress Inventory

Two of the three Parenting Stress Inventory (PSI) subscales were in the hypothesised direction. Both of these, the Parent-Child Dysfunctional Interaction subscale and the Difficult Child subscale, were statistically significant. The Parent-Child Dysfunctional Interaction subscale measured the mother's perception of the quality of her interactions with the child; higher scores were indicative of a more dysfunctional relationship between the mother and her child. The high treatment group scored an average of 16.89 on this subscale while the comparison group scored an average of 17.71 ($p<.01$, $d=.48$) indicating that the comparison group was more likely to engage in dysfunctional interactions with their child. On the Difficult Child subscale, the high treatment group scored an average of 19.35, whereas the comparison group scored 20.73 ($p<.05$, $d=.40$) indicating that the comparison group was more likely to cite more poor behavioural characteristics of the child than was the high treatment group. In addition, the step down test showed that the joint effect of the three PSI subscales was statistically significant ($p<.05$), indicating that there is a significant difference in parenting stress between the high treatment group and the comparison group. The joint effect finding is driven by the significant results found for the Parent-Child Dysfunctional Interaction subscale and the Difficult Child subscale.

Parental Cognition and Conduct Towards the Infant Scale

Of the six subscales within the Parental Cognition and Conduct Towards the Infant Scale (PACTOIS), 3 of the 6 subscales were in the hypothesized direction and 2 subscales, the Parental Self-efficacy and the Parental Impact subscales, were statistically significant. The high treatment group scored an average of 8.82 on the Parental Self-Efficacy subscale while the comparison group scored an average of 8.51 ($p<.05$, $d=.35$). This indicates that high treatment mothers were more likely than comparison group mothers to hold positive beliefs about their parenting competence. In addition, controlling for baseline differences, the high treatment group outperformed the comparison group on the Parental Impact subscale ($p<.05$, $d=.22$), indicating

that the high treatment group were more likely to report that they had a positive impact on their child. The step down test showed that the joint effect of the six PACTOIS subscales was statistically significant (p<.10). The joint effect finding is driven by the significant results found for the Parental Self-Efficacy subscale.

All Parenting Measures

All of the four measures in the overall Parenting category were in the hypothesized direction and two of these effects - Total Parental Stress Score and Overall Parental Locus of Control, were statistically significant. The high treatment and comparison groups differed significantly on the level of reported parental stress, with mothers in the high treatment group reporting less stress. On average, mothers in the high treatment group scored 62.09 on this scale, compared with an average score of 64.27 for mothers in the comparison group (p=<.05, d=.39). Additionally, mothers in the high treatment group scored an average of 44.46 on the Overall Parental Locus of Control, which measures sense of control as it relates to parenting, whereas the mothers in the comparison group scored an average of 45.16. This indicates that mothers in the high treatment group were significantly more likely to feel they had a sense of control regarding parenting their child (p=<.10, d=.28). The step down test showed that the joint effect of the four Parenting measures in this category was statistically significant (p=<.10). The joint effect finding is driven by the significant results found for the Total Parental Stress Score.

Non Step Down Measures

The Parenting Stress Inventory cut-off score was in the hypothesized direction and indicated a significant difference between the high treatment and comparison groups. The high treatment mothers were less likely to have clinically significant stress levels compared to comparison group mothers. 1% of mothers in the high treatment group score above the Parenting Stress Inventory cut-off point compared to 6% of mothers in the comparison group (p<.05, d=.33).

Table 5.3

Results for High Treatment Group and Comparison Group (LFP): ***Parenting***

Variable	N (n_{HIGH}/ n_{LFP})	M_{HIGH} (*SD*)	M_{LFP} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Parental Locus of Control (PLOC)						
*Parental Control of Child's Behaviour *(negative outcome)*	164 (81/83)	6.96 (2.83)	7.39 (2.78)	p<.10	ns	0.23
*Child Control of Parent's Life *(negative outcome)*	164 (81/83)	8.46 (3.40)	8.89 (2.88)	ns	ns	0.17
*Parental Responsibility *(negative outcome)*	164 (81/83)	12.51 (3.20)	13.13 (3.54)	ns	ns	0.14
*Parental Belief in Fate *(negative outcome)*	164 (81/83)	9.83 (3.60)	9.57 (3.17)	ns	ns	0.12
*Parental Efficacy *(negative outcome)*	164 (81/83)	6.70 (2.44)	6.20 (2.37)	ns	ns	0.03
Maternal Attachment (CMAS)						
Quality of Attachment	164 (81/83)	4.70 (0.30)	4.69 (0.31)	ns	ns	0.15
Pleasure in Interaction	164 (81/83)	4.34 (0.38)	4.26 (0.42)	ns	ns	0.14

Absence of Hostility	164 (81/83)	4.39 (0.53)	4.33 (0.56)	ns	ns	0.13
Parental Stress Inventory (PSI)						
*Parent-Child Dysfunctional Interactions *(negative outcome)*	164 (81/83)	16.89 (4.83)	17.71 (5.44)	p<.01	p<.05	0.46
*Difficult Child *(negative outcome)*	164 (81/83)	19.35 (5.02)	20.73 (6.20)	p<.05	p<.05	0.40
*Parental Distress *(negative outcome)*	164 (81/83)	25.85 (7.94)	25.82 (8.53)	ns	ns	0.13
Parental Cognition and Conduct Toward the Infant Scale (PACTOIS)						
Parental Self-Efficacy	164 (81/83)	8.82 (1.12)	8.51 (1.48)	p<.05	p<.10	0.35
Parental Impact	164 (81/83)	7.27 (2.00)	7.37 (2.30)	p<.05	ns	0.22
*Parental Hostile-Reactive Behaviour *(negative outcome)*	164 (81/83)	0.82 (1.13)	0.98 (1.33)	ns	ns	0.20
Parental Warmth	164 (81/83)	9.18 (1.18)	9.14 (1.41)	ns	ns	0.13
Baby Comparison Score	164 (81/83)	7.54 (1.90)	7.60 (1.83)	ns	ns	0.08
*Parental Over-Protection *(negative outcome)*	164 (81/83)	6.19 (2.18)	5.79 (1.97)	ns	ns	0.05
All Parenting Variables						
*Total Parental Stress Score *(negative outcome)*	164 (81/83)	62.09 (14.27)	64.27 (16.89)	p<.05	p<.10	0.39
*Overall Parental Locus of Control *(negative outcome)*	164 (81/83)	44.46 (8.29)	45.18 (8.01)	p<.10	ns	0.28
Interaction With Baby	164 (81/83)	2.78 (0.62)	2.68 (0.57)	ns	ns	0.22
Condon Maternal Score	164 (81/83)	85.93 (5.27)	85.20 (5.46)	ns	ns	0.20
Non Step Down Variables						
*PSI Stress cut-off (90) *(negative outcome)*	164 (81/83)	0.01 (0.11)	0.06 (0.24)	p<.05	~	0.33

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

5.3.4 Home Environment & Safety

HOMESHIF

Of the fourteen subscales on the Home Observation for Measurement of the Environment (HOME) and the Supplement to the HOME Scale for Impoverished Families (SHIF) measure,

twelve were of the expected direction and five of these effects were statistically significant for the Variety, Childcare, Toys and Books, Play, Learning Materials and Interaction subscales. The high treatment group scored significantly higher (*M*=3.57) than the comparison group (*M*=3.01) on the Variety subscale (p<.01, d=.60), which assesses visitation of people and attending activities that introduce variety into the child's life. The high treatment group also scored significantly higher (*M*=7.76) than the comparison group (*M*=7.02) on the Toys and Books subscale (p<.01, d=.50), which measures the variety of appropriate play and learning materials available to the child in the home environment. The high treatment group scored significantly higher (*M*=7.33) than the comparison group (*M*=7.00) on the Play subscale (p<.05, d=.37), which relates to stimulating interactions between the parent and the child, and the parent's conscious encouragement of the child's development; and the high treatment group scored significantly higher (*M*=6.79) than the comparison group (*M*=6.43) on the Learning Materials subscale (p<.10, d=.32), which assesses the appropriateness of play materials for the child. Finally, the high treatment group scored significantly higher (*M*=11.66) than the comparison group (*M*=11.54) on the Interaction subscale (p<.10, d=.17), which measures the parent's warmth and responsiveness in interacting with the child. In addition, the step down test showed that the joint effect of the fourteen HOME subscales was statistically significant (p<.05), indicating that there was a significant difference in the overall HOME scores between the high treatment and comparison groups. These joint findings were driven by the statistical significance of the Variety and Toys and Books subscales.

Safety

Two out of seven measures in the Safety category were in the hypothesised direction, and one of these effects - use of electrical socket covers - was statistically significant. 43% of mothers in the high treatment group reported that they used electrical socket covers compared with 19% of comparison group mothers (p<.01, d =.47). Additionally, there was a significant finding in the non-hypothesized direction. 100% of mothers in the comparison group reported having a smoke alarm in their home, whereas 98% of the high treatment mothers reported having a smoke alarm (p<.05, d =.26) The step down test showed that the joint effect of the seven measures in the Safety category was statistically significant (p<.01). These joint findings were driven by the statistical significance of the electrical socket covers finding.

Non Step Down Measures

The total HOME SHIF score, based on all fourteen subscales, was in the hypothesized direction and statistically significant, indicating that the high treatment group scored significantly higher (*M*=17.05) than the comparison group (*M*=16.91) regarding the overall quality of the home environment (p<.05, d =.24).

Table 5.4

Results for High Treatment Group and Comparison Group (LFP): ***Home Environment & Safety***

Variable	N (n_{HIGH} / n_{LFP})	M_{HIGH} (*SD*)	M_{LFP} (*SD*)	Individual Test	Step Down Test	Effect Size *d*

				p^1	p^2	
Home Observation for Measurement of the Environment (HOME)						
Variety	162 (79/83)	3.57 (1.12)	3.01 (1.15)	p<.01	p<.05	0.60
Toys and Books	162 (79/83)	7.76 (1.77)	7.02 (2.03)	p<.01	p<.10	0.50
Play	162 (79/83)	7.33 (1.63)	7.00 (1.53)	p<.05	ns	0.37
Learning Materials	162 (79/83)	6.79 (1.68)	6.43 (1.82)	p<.10	ns	0.32
Involve	162 (79/83)	4.38 (1.31)	4.31 (1.22)	ns	ns	0.23
Childcare	162 (79/83)	4.19 (0.60)	4.11 (0.54)	ns	ns	0.18
Physical Environment	161 (78/83)	6.49 (1.17)	6.35 (1.18)	ns	ns	0.20
Interaction	159 (78/81)	11.66 (2.01)	11.54 (2.30)	p<.10	ns	0.17
Responsivity	159 (78/81)	9.12 (1.68)	9.11 (1.81)	ns	ns	0.11
Restrictions/Not Items	162 (79/83)	5.96 (0.16)	5.93 (0.27)	ns	ns	0.10
Outings	162 (79/83)	4.78 (0.44)	4.73 (0.54)	ns	ns	0.14
Organisation	161 (78/83)	5.58 (0.65)	5.55 (0.72)	ns	ns	0.08
Routine	162 (79/83)	7.35 (1.40)	7.47 (1.32)	ns	ns	0.00
Acceptance	161 (78/83)	6.38 (0.60)	6.42 (0.78)	ns	ns	0.03
Safety						
Electrical socket covers	163 (80/83)	0.43 (0.50	0.19 (0.40)	p<.01	p<.01	0.47
No. of safety items	163 (80/83)	2.69 (0.94)	2.58 (0.75)	ns	ns	0.08
*Baby exposed to cigarette smoke *(negative outcome)*	164 (81/83)	0.28 (0.45)	0.27 (0.44)	ns	ns	0.02
Framingham Safety Survey	164 (81/83)	7.51 (0.73)	7.53 (0.68)	ns	ns	0.02
Safety gate	150 (74/76)	0.19 (0.39)	0.25 (0.44)	ns	ns	0.18
Child car seat	157 (76/81)	0.97 (0.16)	1.00 (0.00)	ns	ns	0.21
Smoke alarm	163 (80/83)	0.98 (0.16)	1.00 (0.00)	ns~	ns	0.26
Non Step Down Variables						
Total HOME SHIF	161 (78/83)	17.05 (1.28)	16.91 (1.46)	p<.05	~	0.24

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. . '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables

included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

5.3.5 Maternal Health & Pregnancy

Maternal Physical Health

Among the five measures included in the Maternal Physical Health category, three were in the hypothesized direction and the high treatment and comparison groups differed significantly on one of these outcomes: whether the mother was hospitalised immediately following the birth of the baby. 10% of mothers in the high treatment group were hospitalised immediately following the birth of their baby for special medical care, compared with 17% of mothers in the comparison group ($p<.05$, $d=.24$). Additionally, there was one significant finding in the non-hypothesized direction. 92% of mothers in the comparison group rated their own health as good or very good, whereas 81% of mothers in the high treatment group did so ($p<.10$, $d=.23$). The step down test showed that the joint effect of the five measures included in this category was not statistically significant.

Maternal Mental Health

Two of the four Maternal Mental Health measures were in the hypothesized direction, however, there were no significant differences between the high treatment and comparison groups on any of these outcomes. In addition, the step down test showed that the joint effect of the four measures in this category was not statistically significant.

Substance Use During Pregnancy

Neither of the two measures within the Substance Use During Pregnancy category were in the hypothesized direction and there was one significant difference between the high treatment and comparison groups in a non-hypothesized direction regarding whether the mothers reported smoking during pregnancy. 48% of mothers in the high treatment group reported having smoked during pregnancy, whereas 30% of mothers in the comparison group reported smoking during pregnancy ($p<.05$, $d=.25$). The step down test showed that the joint effect of the three measures in this category was not statistically significant.

Current Substance Use

Two of the four measures in the Current Substance Use category were in the hypothesized direction and one - drug use in the past 6 months - was significant. 2 % of mothers in the high treatment group reported using drugs in the previous 6 months, whereas 6% of comparison group mothers reported doing so ($p<.05$, $d=.23$). The step down test revealed that the joint effect of the four measures in this category was not statistically significant.

Non Step Down Measures

Four of the five measures not included in the Step Down categories were in the hypothesized direction and one of these – below WHO5 cutoff score of 13 – was significant. 22% of mothers in the high treatment group scored below 13 on the WHO5 which is an indication of poor well-being, compared to 33% of those in the comparison group ($p<.05$, $d=.33$).

Table 5.5

Results for High Treatment Group and Comparison Group (LFP): ***Maternal Health & Pregnancy***

Variable	N (n_{HIGH}/ n_{LFP})	M_{HIGH} (*SD*)	M_{LFP} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Maternal Physical Health						
*Mother hospitalised immediately after birth for special medical care *(negative outcome)*	164 (81/83)	0.10 (0.30)	0.17 (0.38)	p<.05	ns	0.24
*Complication during pregnancy *(negative outcome)*	164 (81/83)	0.40 (0.49)	0.43 (0.50)	ns	ns	0.03
*Breathing problem *(negative outcome)*	164 (81/83)	0.15 (0.36)	0.11 (0.31)	ns	ns	0.10
*No. of GP visits in past 6 months *(negative outcome)*	164 (81/83)	2.54 (4.15)	1.78 (1.91)	ns	ns	0.22
Health since baby was born	164 (81/83)	0.81 (0.39)	0.92 (0.28)	ns~	ns	0.23
Maternal Mental Health						
WHO5 Percentage Score	164 (81/83)	64.89 (20.37)	61.45 (21.15)	ns	ns	0.21
*Edinburgh Postnatal Depression Score for past 7 days *(negative outcome)*	164 (81/83)	5.65 (5.38)	5.86 (4.88)	ns	ns	0.19
*Diagnosed with postnatal depression in past 6 months *(negative outcome)*	164 (81/83)	0.10 (0.30)	0.10 (0.30)	ns	ns	0.03
*Edinburgh Postnatal Depression Score for past 6 months *(negative outcome)*	164 (81/83)	6.40 (5.99)	6.28 (5.28)	ns	ns	0.03
Substance Use During Pregnancy						
*Drank alcohol during pregnancy *(negative outcome)*	164 (81/83)	0.35 (0.48)	0.30 (0.46)	ns	ns	0.03
*Smoked during pregnancy *(negative outcome)*	164 (81/83)	0.48 (0.50)	0.30 (0.46)	ns~	ns	0.25
Current Substance Use						
*Drug use in past 6 months *(negative outcome)*	164 (81/83)	0.02 (0.16)	0.06 (0.24)	p<.05	ns	0.23
*Drank alcohol in past 6 months *(negative outcome)*	164 (81/83)	0.86 (0.34)	0.89 (0.31)	ns	ns	0.01
*Currently a smoker *(negative outcome)*	164 (81/83)	0.53 (0.50)	0.45 (0.50)	ns	ns	0.08
*Consumed alcohol above recommended level *(negative outcome)*	160 (77/83)	0.12 (0.32)	0.07 (0.26)	ns	ns	0.13
Non Step Down Variables						
*Edinburgh Postnatal Depression Cut-off (10) *(negative outcome)*	164 (81/83)	0.22 (0.42)	0.24 (0.43)	ns	~	0.13
*Below WHO5 Score of 13 *(negative outcome)*	164 (81/83)	0.22 (0.42)	0.33 (0.47)	p<.05	~	0.33
*Illegal drugs during pregnancy *(negative outcome)*	164 (81/83)	0.00 (0.00)	0.00 (0.00)	~	~	~

Changed smoking during pregnancy	64 (39/25)	0.64 (0.49)	0.60 (0.50)	ns	~	0.13
Changed drinking during pregnancy	53 (29/24)	0.24 (0.44)	0.21 (0.41)	ns	~	0.07

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

5.3.6 Maternal Social Support

Social Support

Among the eleven measures included in the Social Support category, nine of the effects were in the hypothesized direction and the high treatment group and comparison group differed significantly on five of these eleven outcomes related to discussing the programme with friends, family, and partner, child's frequency of seeing grandparent, and knowing children the same age as their child in the community. Approximately 67% of mothers in the high treatment group discussed the programme with friends, whereas 21% of mothers in the comparison group discussed the programme with friends (p<.01, d=1.00). 85%of mothers in the high treatment group discussed the programme with family, compared to 51% of mothers in the comparison group (p<.01, d=.82). 77% of mothers in the high treatment group discussed the programme with their partner compared with 64% of mothers in the comparison group (p<.01, d=.35). Approximately 90% of children in the high treatment group saw their grandparents regularly compared to 80% of children in the comparison group (p<.10, d=.37). Finally, 65% of mothers in the high treatment group reported knowing a neighbour with a baby of similar age to their child, compared to 54% of mothers in the comparison group (p<.05, d=.26). The step down test showed that the joint effect of the eleven measures in the Social Support category was statistically significant (p<.01). These joint findings were driven by the statistical significance of the findings regarding discussing the programme with friends, family and partners.

Satisfaction with Father Involvement

Neither of the two measures within the Satisfaction with Father Involvement were in the hypothesized direction or statistically significant. There was, however, one significant difference between the high treatment and comparison groups in a non-hypothesized direction regarding the father being a part of the baby's life. 90% of mothers in the high treatment group reported that the father was part of their child's life compared with 98% of mothers in the comparison group (p<.10, d=.25). The step down test showed that the joint effect of the two measures in this category was not statistically significant.

Table 5.6

Results for High Treatment Group and Comparison Group (LFP): ***Social Support***

Variable	N (n_{HIGH}/	M_{HIGH} (*SD*)	M_{LFP} (*SD*)	Individual Test	Step Down Test	Effect Size

	$n_{LFP)}$			p^1	p^2	d
Social Support						
Discuss programme with friends	156 (81/75)	0.67 (0.47)	0.21 (0.41)	p<.01	p<.01	1.00
Discuss programme with family	156 (81/75)	0.85 (0.36)	0.51 (0.50)	p<.01	p<.01	0.82
Discuss programme with partner	156 (81/75)	0.77 (0.43)	0.64 (0.48)	p<.01	p<.10	0.35
Frequently sees grandparent	164 (81/83)	0.90 (0.30)	0.80 (0.41)	p<.10	ns	0.37
Knows children same age as baby	163 (81/82)	0.65 (0.48)	0.54 (0.50)	p<.05	ns	0.26
Support from friends	164 (81/83)	0.35 (0.48)	0.28 (0.45)	ns	ns	0.16
Support from parents	152 (76/76)	0.76 (0.43)	0.66 (0.48)	ns	ns	0.25
Support from relatives	163 (80/83)	0.43 (0.50)	0.35 (0.48)	ns	ns	0.19
Meet friends frequently	164 (81/83)	0.59 (0.49)	0.53 (0.50)	ns	ns	0.17
Discuss programme with others	156 (81/75)	0.04 (0.19)	0.04 (0.20)	ns	ns	0.00
Support from baby's father	163 (80/83)	0.69 (0.47)	0.77 (0.42)	ns	ns	0.13
Satisfaction with Father Involvement						
Satisfied with father's involvement	164 (81/83)	62.29 (10.91)	63.69 (7.88)	ns	ns	0.20
Father part of baby's life	164 (81/83)	0.90 (0.30)	0.98 (0.15)	ns~	ns	0.25

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

5.3.7 Childcare & Service Use

Childcare

All four measures in the Childcare category were in the hypothesized direction, however none of these effects indicated statistically significant differences between the high treatment and comparison groups. In addition, the step down test showed that the joint effect of the four measures in the Childcare category was not statistically significant.

Non Step Down Measures

The one measure not included in the Step Down categories – whether the mother voted in the last general election – was in the hypothesized direction and statistically significant. 59% of mothers in the high treatment group voted in the last general election, compared with 49% of mothers in the comparison group (p<.05, d=.31).

Table 5.7

Results for High Treatment Group and Comparison Group (LFP): ***Childcare & Service Use***

Variable	N (n_{HIGH}/ n_{LFP})	M_{HIGH} (*SD*)	M_{LFP} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Childcare						
*Hours per week in childcare *(negative outcome)*	164 (81/83)	4.25 (10.08)	5.16 (10.84)	ns	ns	0.02
*Uses formal childcare (nursery/crèche) *(negative outcome)*	164 (81/83)	0.05 (0.22)	0.06 (0.24)	ns	ns	0.02
*Use childcare before 6 months *(negative outcome)*	164 (81/83)	0.19 (0.39)	0.20 (0.41)	ns	ns	0.03
Age started childcare	164 (81/83)	0.70 (1.68)	0.96 (2.10)	ns	ns	0.05
Non Step Down Variables						
Voted in last General Election	157 (79/78)	0.59 (0.49)	0.49 (0.50)	p<.05	~	0.31

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

5.3.8 Household Factors & SES

Household Factors

Two of the four measures in the Household factors category were in the hypothesized direction. One of these – marital status - was significant. Controlling for baseline differences, a greater proportion of mothers in the high treatment group reported being married compared to the comparison group (p<.10, d=.03). The step down test showed that the joint effect of the four measures in the Household Factors category was not statistically significant.

Parental Education

One of the five measures in the Parental Education category was in the hypothesized direction, however this effect was not statistically significant. In addition, the step down test showed that the joint effect of the five measures in the Parental Education category was not statistically significant.

Maternal Employment

One of the three measures in the Maternal Employment category was in the hypothesized direction, and this – whether mothers had been unemployed long-term – was significant. 19% of mothers in the high treatment group reported having been unemployed long term, whereas 24% of mothers in the comparison group reported long-term unemployment (p<.10, d=.21). The step down test showed that the joint effect of the three measures in the Maternal Employment category was not statistically significant.

Paternal Employment

Neither of the two measures in the Paternal Employment category were in the hypothesized direction. There was, however, a significant finding in a non-hypothesized direction for father in paid employment. 43% of mothers in the high treatment group reported that fathers were in paid employment, whereas 60% of mothers in the comparison group reported fathers in paid employment ($p<.05$, $d=.26$). The step down test showed that the joint effect of the two measures in the Paternal Employment category was not statistically significant.

Family Finances

None of the six measures in the Family Finances category were in the hypothesized direction, and none of the effects indicated a statistically significant difference between the high treatment and comparison groups. In addition, the step down test showed that the joint effect of the six measures in the Family Finances category was not statistically significant.

Non Step Down Measures

Two of the six measures which were not included in the above Step Down categories were in the hypothesized direction, however, they did not indicate a statistically significant differences between the high treatment and comparison groups.

Table 5.8

Results for High Treatment Group and Comparison Group (LFP): ***Household factors & SES***

Variable	N (n_{HIGH}/ n_{LFP})	M_{HIGH} (*SD*)	M_{LFP} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Household factors						
Married	164 (81/83)	0.17 (0.38)	0.20 (0.41)	p<.10	ns	0.03
Household size	164 (81/83)	4.96 (1.65)	4.46 (1.57)	ns	ns	0.24
Has a Partner	164 (81/83)	0.78 (0.42)	0.92 (0.28)	ns	ns	0.29
*Resides with grandparent *(negative outcome)*	160 (79/81)	0.43 (0.50)	0.23 (0.43)	ns	ns	0.40
Education						
Mother improvement in educational status	141 (71/70)	0.14 (0.35)	0.10 (0.30)	ns	ns	0.07
*Mother low education *(negative outcome)*	164 (81/83)	0.31 (0.46)	0.27 (0.44)	ns	ns	0.09
*Father low education *(negative outcome)*	150 (72/78)	0.40 (0.49)	0.38 (0.49)	ns	ns	0.08
Mother degree	164 (81/83)	0.07 (0.26)	0.08 (0.28)	ns	ns	0.04
Father degree	150 (72/78)	0.04 (0.20)	0.09 (0.29)	ns	ns	0.16
Maternal Employment						
*Mother long-term unemployed *(negative outcome)*	161 (81/80)	0.19 (0.39)	0.24 (0.43)	p<.10	ns	0.21
Mother in paid employment	163 (81/82)	0.36 (0.48)	0.40 (0.49)	ns	ns	0.00
Mother took or is currently on maternity leave	163 (81/82)	0.28 (0.45)	0.39 (0.49)	ns	ns	0.11
Paternal Employment						
*Father long-term unemployed	151	0.21	0.21	ns	ns	0.04

(negative outcome)	(71/80)	(0.41)	(0.41)			
Father in paid employment	157 (76/81)	0.43 (0.50)	0.60 (0.49)	ns~	ns	0.26
Finance						
*Difficulty making ends meet *(negative outcome)*	164 (81/83)	0.26 (0.44)	0.23 (0.42)	ns	ns	0.03
*Social housing *(negative outcome)*	162 (80/82)	0.47 (0.50)	0.35 (0.48)	ns	ns	0.17
Save regularly	164 (81/83)	0.48 (0.50)	0.55 (0.50)	ns	ns	0.09
Equivalized weekly household income	148 (73/75)	240.01 (138.13)	279.93 (141.49)	ns	ns	0.15
*Receives social welfare payments *(negative outcome)*	162 (80/82)	0.81 (0.39)	0.70 (0.46)	ns	ns	0.20
Owns/rents own accommodation	163 (81/82)	0.65 (0.48)	0.83 (0.38)	ns	ns	0.37
Non Step Down Variables						
No. of years with partner	137 (61/76)	7.14 (5.21)	7.24 (5.06)	ns	~	0.06
Partner is the baby's father	137 (61/76)	0.98 (0.13)	1.00 (0.00)	ns	~	0.20
Mother in part-time employment	60 (27/33)	0.63 (0.49)	0.42 (0.50)	ns	~	0.32
Mother improvement in work status	99 (47/52)	0.04 (0.20)	0.02 (0.14)	ns	~	0.06
Mother annual wage	58 (25/33)	16,301 (10,039)	23,118 (12,703)	ns	~	0.55
Father's annual wage	64 (23/41)	25,045 (9114)	26,696 (8349)	ns	~	0.13

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

5.3.9 Key Findings: High Treatment Group and Comparison Group

This section summarises the findings comparing the outcomes of the high treatment group to the outcomes of the comparison group. Overall, the results are similar to the main results comparing the two *PFL* treatment groups. Specifically, of the 151 individual outcomes analysed, there were positive significant differences between the high treatment group and the comparison group on 32 measures (21%), with most effects in the domains of social support, parenting and the home environment. One key difference from the main results is that some significant treatment effects were identified on the child development domain. A number of these effects remained significant in the multiple hypothesis analysis regarding ASQ scores, Parental Stress Inventory, PACTOIS, HOME, Safety, and Social Support. In addition, there were eight incidences where the comparison group outperformed the high treatment group (5%). The results are detailed below.

Child Development

Children in the high treatment group and children in the comparison group did not differ significantly across many child developmental domains, including temperament and risk for developmental delays in such areas as communication and fine-motor skills. However, the following significant differences were identified:

- Children in the high treatment group had significantly better communication and interpersonal skills, in terms of vocalisation, listening and general interaction with others than did children in the comparison group.
- Children in the high treatment group were significantly more likely to demonstrate age appropriate arm, body and leg movements than those in the comparison group.
- Children in the high treatment group were significantly less likely to be at risk for gross motor developmental delays.

Child Health

Children in the high treatment group and children in the comparison group did not differ significantly across many child health domains, including current weight, child health since birth, eating habits, crying, breastfeeding and difficulty sleeping. However, the following significant differences were identified:

- Children in the high treatment group were significantly more likely than those in the comparison group to have received the recommended immunisations at 4 months of age.
- Mothers in the high treatment group were significantly more likely to put their child to sleep awake and let them fall asleep on their own.
- Mothers in the high treatment group were significantly more likely to let their child cry out.
- Children in the comparison group were more likely to sleep in their own bed rather than with a parent or sibling.
- Significantly more children in the high treatment group had low birth weight compared to those in the comparison group.

Parenting

Mothers in the high treatment group and the comparison group did not differ significantly across many of the parenting domains including healthy attachment, parental efficacy, regard for the child and parental distress. However, the following significant differences were identified:

- Mothers in the high treatment group were less likely to believe that they had unreasonable influence over their child's behaviour compared to mothers in the comparison group.
- Mothers in the high treatment group were more likely to rate their interactions with their child as more positive than those in the comparison group.
- Mothers in the high treatment group were less likely to perceive negative characteristics of their child.
- Mothers in the high treatment group were more likely to report parenting competence and positive impact on their child.
- Significantly fewer mothers in the high treatment group reported severe levels of parenting stress.
- Mothers in the high treatment group were more likely to hold the belief that they are primarily responsible for the outcomes in their lives.

Home Environment and Safety

Family home environments in the high treatment group and the comparison group did not differ significantly across many of the measured domains including encouragement between mother and child, general learning promotion, and child care, amongst others. However, a number of significant differences were identified:

- Children in the high treatment group were more likely than children in the comparison group to have a variety of people and activities available to them in their home environment.
- Children in the high treatment group were more likely than children in the comparison group to have a variety of appropriate toys and learning materials available to them in their home.
- Mothers in the high treatment group were more likely to be warm and responsive when interacting with their children than those in the comparison group.
- More families in the high treatment reported having electrical socket covers in their homes than those in the comparison group.
- Families in the comparison group were more likely to have smoke alarms in their homes than those in the high treatment group.

Maternal Health and Pregnancy

Mothers in the high treatment group did not differ significantly from mothers in the comparison group across health domains such as complications during pregnancy, reported levels of depression and changes in health behaviours. However, several significant differences between the two groups were identified:

- Significantly fewer mothers in the high treatment group were hospitalised for special medical care immediately after having given birth.
- Significantly fewer mothers in the high treatment group used drugs during the 6 months prior to the interview.
- Mothers in the high treatment group reported significantly higher levels of well-being than those in the comparison group.
- Significantly more mothers in the high treatment group reported smoking during pregnancy.
- Mothers in the high treatment group were significantly more likely to experience ill health since the birth of their child.

Maternal Social Support

Mothers in the high treatment group did not differ significantly from mothers in the comparison group in terms of social support across such domains as the level of support from friends, relatives and their child's father and frequency of meeting friends. However, a number of significant differences were identified:

- Mothers in the high treatment group were more likely than mothers in the comparison group to discuss the programme with their family, partner and friends.
- Children in the high treatment group were more likely to have visits with their grandparents.
- Mothers in the high treatment group were more likely than those in the comparison group to know other parents with children the same age as their child.
- More fathers in the comparison group were a part of the child's life.

Childcare and Service Use
Families in the high treatment group did not differ significantly from families in the comparison group in terms of the number of hours per week the child was enrolled in childcare and age in which child was placed in childcare. Also, there were no significant differences between the high treatment and comparison groups in utilization of education, employment, health and other available community services. There was one significant difference between the high treatment and comparison groups in this domain:

- Significantly more mothers in the high treatment group reported having voted in the last general election than mothers in the comparison group.

Household Factors and SES
Families in the high treatment group did not differ significantly from families in the comparison group in terms of household size, parental education levels, social housing or financial situation. However, there were some significant differences between the high and comparison group in the following domains:

- Mothers in the high treatment group were more likely to be married than those in the comparison group.
- More mothers in the comparison group had been unemployed long-term compared to mothers in the high treatment group.
- More fathers in the comparison group were in paid employment compared to fathers in the high treatment group.

5.4 Low Treatment Group and Comparison Group

This section compares the outcomes of the low treatment group to the outcomes of the comparison group at six months, while controlling for the set of baseline measures outlined above.

5.4.1 Child Development

ASQ Scores and Difficult Temperament
Within the ASQ Scores and Difficult Temperament category, four of the seven child development measures were in the hypothesized direction. One of the subscales was statistically significant - the ASQ Social-Emotional Score. For the ASQ Social-Emotional Score, which indicates maladaptive functioning and interaction with others, the average score for the low treatment group was 15.00, which was significantly lower than the average score of 17.65 for the comparison group ($p=<.05$, $d=.22$). This finding indicates that children in the low treatment group were significantly more likely to show signs of social emotional adaptation. The step down test showed that the joint effect of the ASQ Scores and Difficult Temperament subscales was not statistically significant.

ASQ Cut-off Scores
Within the ASQ Cut-off Scores category, which measures the proportion of children at risk of development delay in each group, one of the six measures was in the hypothesized direction, however it was not significantly different. The step down test showed that the joint effect of all six measures in the ASQ Cut-off Scores category was not statistically significant.

Table 5.9
Results for Low Treatment Group and Comparison Group (LFP): ***Child Development***

Variable	N (n_{LOW}/ n_{LFP})	M_{LOW} (*SD*)	M_{LFP} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
ASQ Scores & Difficult Temperament						
*ASQ Social-Emotional Score *(negative outcome)*	171 (88/83)	15.00 (13.85)	17.65 (14.53)	p<.05	ns	0.22
ASQ Fine Motor Score	171 (88/83)	51.42 (10.17)	51.14 (9.57)	ns	ns	0.13
ASQ Communication Score	171 (88/83)	51.82 (8.55	51.51 (7.10)	ns	ns	0.11
ASQ Problem Solving Score	171 (88/83)	52.50 (10.00)	52.53 (8.46)	ns	ns	0.06
ASQ Gross Motor Score	171 (88/83)	38.30 (13.06)	39.76 (13.11)	ns	ns	0.02
*Difficult Temperament *(negative outcome)*	171 (88/83)	12.35 (5.47)	12.48 (5.97)	ns	ns	0.05
ASQ Personal Social Score	171 (88/83)	45.91 (13.72)	48.55 (11.54)	ns	ns	0.12
ASQ Cut-off scores						
*ASQ Gross Motor Cut-off *(negative outcome)*	171 (88/83)	0.05 (0.21)	0.06 (0.24)	ns	ns	0.14
*ASQ Fine Motor Cut-off *(negative outcome)*	171 (88/83)	0.01 (0.11)	0.00 (0.00)	ns	ns	0.04
*ASQ Problem Cut-off *(negative outcome)*	171 (88/83)	0.08 (0.27)	0.05 (0.22)	ns	ns	0.06
ASQ Social Emotional Cut-off *(negative outcome)*	171 (88/83)	0.05 (0.21)	0.02 (0.15)	ns	ns	0.10
*ASQ Communication Cut-off *(negative outcome)*	171 (88/83)	0.01 (0.11)	0.00 (0.00)	ns	ns	0.12
*ASQ Personal Social Cut-off *(negative outcome)*	171 (88/83)	0.10 (0.30)	0.05 (0.22)	ns	ns	0.16

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

5.4.2 Child Health

Child Health

One of the six measures in the Child Health category was in the hypothesised direction, however there was no significant difference between the low treatment and comparison groups. Overall, the step down test showed that the joint effect of all six measures in the Child Health category was not statistically significant.

Mother's Health Decisions for Her Infant

Within the Mother's Health Decisions for her Infant category, one of the nine measures – mother knows baby's weight – showed differences in the hypothesised direction and was statistically significant. 49% of mothers in the low treatment group knew their child's weight compared to 35% in the comparison group (p<.10, d=.17). There were three significant differences between the low treatment and comparison groups in a non-hypothesized direction. 63% of mothers in the low treatment group reported appropriate frequency of eating, compared to 72% of mothers in the comparison group (p<.10, d=.22). 76% of mothers in the low treatment group reported that their child ate appropriate food in comparison to 87% of mothers in the comparison group (p<.10, d=.24). 47% of mothers in the low treatment group reported leaving their baby to cry in comparison to 30% of mothers in the comparison group (p<.01, d=.41). Overall, the step down test showed that the joint effect of all nine measures in the Mother's Health Decisions category was not statistically significant.

Sleep Routines

Five of the eight measures in the Sleep Routine category were in the hypothesised direction, and differences for two of these – sleep undisturbed by 3 months and sleeps undisturbed through the night - were statistically significant. 45% of mothers in the low treatment group reported that their child was able to sleep through the night at or before 3 months of age, which was significantly higher than the 35% of those in the comparison group (p<.05, d=.23). Additionally, 77% of mothers in the low treatment group reported that their child was able to sleep through the night at the time of the interview, compared to 70% of those in the comparison group (p<.10, d=.17). The step down test showed that the joint effect of all eight measures in the Sleep Routines category was not statistically significant.

Non Step Down Measures

One of the seven measures which were not included in the above Step Down categories was in the hypothesized direction and statistically significant. Controlling for baseline difference, a greater proportion of mothers in the low treatment group reported that their infants had been vaccinated compared to those in the comparison group (p<.01, d=.23).

Table 5.10

Results for Low Treatment Group and Comparison Group (LFP): ***Child Health***

Variable	N (n_{LOW}/ n_{LFP})	M_{LOW} (*SD*)	M_{LFP} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Child Health						
*Stayed in hospital during first 6 months *(negative outcome)*	171 (88/83)	0.09 (0.29)	0.11 (0.31)	ns	ns	0.03
*Age (in days) left hospital *(negative outcome)*	171 (88/83)	3.10 (3.74)	2.45 (2.45)	ns	ns	0.00
*Problem breathing *(negative outcome)*	170 (88/82)	0.15 (0.36)	0.12 (0.33)	ns	ns	0.02
Birth weight (grams)	171 (88/83)	3333 (615)	3439 (453)	ns	ns	0.02
Good health since birth	171	0.93	0.96	ns	ns	0.09

	(88/83)	(0.25)	(0.19)			
*No. of health problems taken to GP/health centre/casualty *(negative outcome)*	171 (88/83)	1.30 (1.10)	1.14 (1.13)	ns	ns	0.10
Mothers Health Decisions						
Knows baby's weight	171 (88/83)	0.49 (0.50)	0.35 (0.48)	p<.10	ns	0.17
Mother breastfed as a baby	168 (88/80)	0.13 (0.33)	0.15 (0.36)	ns	ns	0.00
Necessary immunizations at 6 months	170 (88/82)	0.32 (0.47)	0.32 (0.47)	ns	ns	0.01
Necessary immunizations at 4 months	170 (88/82)	0.88 (0.33)	0.89 (0.31)	ns	ns	0.07
*Baby's crying a problem *(negative outcome)*	171 (88/83)	0.11 (0.32)	0.10 (0.30)	ns	ns	0.07
Attempted breastfeeding	171 (88/83)	0.23 (0.42)	0.33 (0.47)	ns	ns	0.12
Appropriate frequency of eating	171 (88/83)	0.63 (0.49)	0.72 (0.45)	ns~	ns	0.22
Baby eats appropriate food	170 (88/82)	0.76 (0.43)	0.87 (0.34)	ns~	ns	0.24
*Leave baby to cry *(negative outcome)*	171 (88/83)	0.47 (0.50)	0.30 (0.46)	ns~	ns	0.41
Sleep Routines						
Sleeps undisturbed by 3 months	171 (88/83)	0.45 (0.50)	0.35 (0.48)	p<.05	ns	0.23
Sleeps undisturbed through the night	171 (88/83)	0.77 (0.42)	0.70 (0.46)	p<.10	ns	0.17
*Time to sleep (>15 mins) *(negative outcome)*	171 (88/83)	0.34 (0.48)	0.39 (0.49)	ns	ns	0.13
Appropriateness of sleeping location	171 (88/83)	0.99 (0.11)	0.96 (0.19)	ns	ns	0.02
Sleeps more than 8 hrs per night	169 (86/83)	0.79 (0.41)	0.77 (0.42)	ns	ns	0.05
Appropriate sleep preparation	171 (88/83)	0.40 (0.49)	0.40 (0.49)	ns	ns	0.03
*Difficulty falling asleep *(negative outcome)*	171 (88/83)	0.38 (0.49)	0.35 (0.48)	ns	ns	0.10
*Baby awakening a problem *(negative outcome)*	171 (88/83)	0.23 (0.42)	0.17 (0.38)	ns	ns	0.09
Non Step Down Measures						
Current weight (grams)	72 (43/29)	7529 (1819)	7695 (1916)	ns	~	0.03
*Low birth weight (<2500 grams) *(negative outcome)*	171 (88/83)	0.07 (0.25)	0.02 (0.15)	ns	~	0.02
*High birth weight (>4000 grams) *(negative outcome)*	171 (88/83)	0.11 (0.32)	0.08 (0.28)	ns	~	0.12
Ever vaccinated	171 (88/83)	1.00 (0.00)	0.99 (0.11)	p<.01	~	0.23
Baby still breastfed	47 (20/27)	0.00 (0.00)	0.11 (0.32)	ns	~	0.26
Age (in weeks) exclusive breastfeeding ends	46 (20/26)	3.34 (5.28)	6.36 (8.25)	ns	~	0.26
Age non-exclusive breastfeeding ends	44 (20/24)	4.22 (5.77)	6.15 (6.65)	ns	~	0.20

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

5.4.3 Parenting

Parental Locus of Control

Three of the five Parental Locus of Control (PLOC) subscales were in the hypothesised direction, but none were significantly different. The step down test showed that the joint effect of the five PLOC subscales was not statistically significant.

Maternal Attachment

Two of the three Condon Maternal Attachment Scale (CMAS) subscales were in the hypothesised direction, however, there were no significant differences between the low treatment and comparison groups on any of these subscales. In addition, the step down test showed that the joint effect of the three CMAS subscales was not statistically significant.

Parenting Stress Inventory

Two of the three Parenting Stress Inventory (PSI) subscales were in the hypothesised direction, however, none were statistically significant. In addition, the step down test showed that the joint effect of the three PSI subscales was not statistically significant.

Parental Cognition and Conduct Towards the Infant Scale

Of the six subscales within the Parental Cognition and Conduct Towards the Infant Scale (PACTOIS), two were in the hypothesized direction but neither were statistically significant. There was one significant finding in a non-hypothesized direction. The low treatment group scored an average of 7.03 on the Baby Comparison Score while the comparison group scored an average of 7.60 (p<.10, d=.20). This indicates that low treatment mothers were less likely than comparison group mothers to rate their child more positively when compared to other children. The step down test showed that the joint effect of the six PACTOIS subscales was not statistically significant.

All Parenting Measures

One of the four measures in the overall Parenting category was in the hypothesized direction, however it was not statistically significant. The step down test showed that the joint effect of the four Parenting measures in this category was not statistically significant.

Non Step Down Measures

The Parenting Stress Inventory cut-off score was not in the hypothesized direction and did not indicate a significant difference between the low treatment and comparison groups.

Table 5.11

Results for Low Treatment Group and Comparison Group (LFP): ***Parenting***

Variable	N (n_{LOW}/ n_{LFP})	M_{LOW} (*SD*)	M_{LFP} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Parental Locus of Control (PLOC)						
*Parental Responsibility *(negative outcome)*	171 (88/83)	12.74 (2.93)	13.13 (3.54)	ns	ns	0.09
*Parental Control of Child's Behaviour *(negative outcome)*	171 (88/83)	7.20 (2.67)	7.39 (2.78)	ns	ns	0.08
*Parental Belief in Fate *(negative outcome)*	171 (88/83)	10.00 (3.28)	9.57 (3.17)	ns	ns	0.06
*Child Control of Parent's Life *(negative outcome)*	171 (88/83)	8.74 (3.14)	8.89 (2.88)	ns	ns	0.02
*Parental Efficacy *(negative outcome)*	171 (88/83)	6.81 (2.43)	6.20 (2.37)	ns	ns	0.02
Maternal Attachment (CMAS)						
Absence of Hostility	171 (88/83)	4.41 (0.53)	4.33 (0.56)	ns	ns	0.10
Pleasure in Interaction	171 (88/83)	4.33 (0.42)	4.26 (0.42)	ns	ns	0.09
Quality of Attachment	171 (88/83)	4.68 (0.38)	4.69 (0.31)	ns	ns	0.03
Parental Stress Inventory (PSI)						
*Difficult Child *(negative outcome)*	171 (88/83)	20.30 (5.50)	20.73 (6.20)	ns	ns	0.13
*Parental Distress *(negative outcome)*	171 (88/83)	25.66 (7.53)	25.82 (8.53)	ns	ns	0.06
*Parent-Child Dysfunctional Interactions *(negative outcome)*	171 (88/83)	18.51 (5.72)	17.71 (5.44)	ns	ns	0.02
Parental Cognition and Conduct Toward the Infant Scale (PACTOIS)						
Parental Warmth	171 (88/83)	9.23 (1.28)	9.14 (1.41)	ns	ns	0.13
Parental Self-Efficacy	171 (88/83)	8.65 (1.25)	8.51 (1.48)	ns	ns	0.13
Parental Impact	171 (88/83)	7.02 (2.23)	7.37 (2.30)	ns	ns	0.11
*Parental Over-Protection *(negative outcome)*	171 (88/83)	6.10 (1.98)	5.79 (1.97)	ns	ns	0.05
*Parental Hostile-Reactive Behaviour *(negative outcome)*	171 (88/83)	1.06 (1.21)	0.98 (1.33)	ns	ns	0.07
Baby Comparison Score	171 (88/83)	7.03 (1.91)	7.60 (1.83)	ns~	ns	0.20
All Parenting Measures						
*Overall Parental Locus of Control *(negative outcome)*	171 (88/83)	45.49 (7.42)	45.18 (8.01)	ns	ns	0.10
*Total Parental Stress Score *(negative outcome)*	171 (88/83)	64.47 (16.29)	64.27 (16.89)	ns	ns	0.09
Condon Maternal Score	171 (88/83)	85.77 (5.71)	85.20 (5.46)	ns	ns	0.07
Interaction With Baby	171 (88/83)	2.67 (0.54)	2.68 (0.57)	ns	ns	0.02

Non Step Down Measures						
*PSI Stress cut-off (90)	171	0.06	0.06	ns	~	0.03
(negative outcome)	(88/83)	(0.23)	(0.24)			

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

5.4.4 Home Environment & Safety

HOMESHIF

Of the fourteen subscales on the Home Observation for Measurement of the Environment (HOME) and the Supplement to the HOME Scale for Impoverished Families (SHIF) measure, eight were in the expected direction and four of these effects were statistically significant for the Involvement, Toys and Books, Play, Restrictions/Not Items subscales. The low treatment group scored significantly higher (*M*=4.38) than the comparison group (*M*=4.31) on the Involvement subscale (p<.05, d=.26), which illustrates the degree to which the parent is involved in the child's learning and promotes child development. The low treatment group also scored significantly higher (*M*=7.30) than the comparison group (*M*=7.02) on the Toys and Books subscale (p<.10, d=.23), which measures the variety of appropriate play and learning materials available to the child in the home environment. The low treatment group scored significantly higher (*M*=7.07) than the comparison group (*M*=7.00) on the Play subscale (p<.10, d=.22), which relates to stimulating interactions between the parent and the child, and the parent's conscious encouragement of the child's development. The low treatment group scored significantly higher (*M*=5.98) than the comparison group (*M*=5.93) on the Restriction subscale (p<.10, d=.20), which measures the level of restraint the parent places on the child during the visit, in the form of physical punishment and scolding. Additionally there were significant findings on two subscales – Daily Routines and Childcare – in a non-hypothesized direction. The low treatment group scored significantly lower (*M*=7.15) than the comparison group (*M*=7.47) on the Daily Routines subscale (p<.10, d=.19), which contains items pertaining to the child's eating and sleeping patterns and the availability of food and safe sleeping facilities. The low treatment group also scored significantly lower (M=3.94) than the comparison group (M=4.11) on the Childcare subscale (p<.05, d=.23), which provides details about the range, adequacy and appropriateness of childcare used by parents. The step down test showed that the joint effect of the fourteen HOME subscales was not statistically significant

Safety

One of the seven measures in the Safety category was in the hypothesised direction, and this was statistically significant. 33% of mothers in the low treatment group reported that they used electrical socket covers compared with 19% of comparison group mothers (p<.10, d =.23). Additionally, there were three significant findings in a non-hypothesized direction on items related to having a smoke alarm, use of a baby gate and general environmental safety as reflected by the Framingham Safety Survey. 100% of mothers in the comparison group reported having a smoke alarm in their home, whereas 95% of the low treatment mothers reported having a smoke

alarm (p<.01, d =.35). 14% of those in the low treatment group reported using a baby gate, whereas 25% of mothers in the comparison group reported doing so (p<.10, d =.30). Additionally those in the low treatment group scored an average of 7.34 on the Framingham Safety Survey compared to those in the comparison group who scored an average of 7.53 (p<.05, d =.32) indicating that those in the low treatment group were significantly less likely than those in the comparison group to rate their environment as safe across a number of domains. The step down test showed that the joint effect of the seven measures in the Safety category was not statistically significant.

Non Step Down Measures

The total HOME SHIF score based on all fourteen subscales, was not in the hypothesized direction. Additionally, the item which assesses whether the family has a child car seat was not in the hypothesized direction.

Table 5.12

Results for Low Treatment Group and Comparison Group (LFP): ***Home Environment & Safety***

Variable	N (n_{LOW}/ n_{LFP})	M_{LOW} (*SD*)	M_{LFP} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Home Observation for Measurement of the Environment (HOME)						
Involvement	168 (85/83)	4.38 (1.17)	4.31 (1.22)	p<.05	ns	0.26
Toys and Books	170 (87/83)	7.30 (1.82)	7.02 (2.03)	p<.10	ns	0.23
Play	170 (87/83)	7.07 (1.41)	7.00 (1.53)	p<.10	ns	0.22
Restrictions/Not Items	169 (86/83)	5.98 (0.11)	5.93 (0.27)	p<.10	ns	0.20
Variety	170 (87/83)	3.12 (1.02)	3.01 (1.15)	ns	ns	0.13
Learning Materials	168 (85/83)	6.44 (1.64)	6.43 (1.82)	ns	ns	0.12
Outings	170 (87/83)	4.80 (0.43)	4.73 (0.54)	ns	ns	0.14
Organisation	170 (87/83)	5.61 (0.68)	5.55 (0.72)	ns	ns	0.09
Interaction	164 (83/81)	11.34 (2.51)	11.54 (2.30)	ns	ns	0.01
Physical Environment	170 (87/83)	6.24 (1.19)	6.35 (1.18)	ns	ns	0.01
Responsivity	164 (83/81)	8.87 (1.94)	9.11 (1.81)	ns	ns	0.05
Acceptance	169 (86/83)	6.33 (0.60)	6.42 (0.78)	ns	ns	0.11
Daily Routines	170 (87/83)	7.15 (1.23)	7.47 (1.32)	ns~	ns	0.19
Childcare	170 (87/83)	3.94 (0.83)	4.11 (0.54)	ns~	ns	0.23
Safety						
Electrical socket covers	168 (85/83)	0.33 (0.47)	0.19 (0.40)	p<.10	ns	0.23

*Baby exposed to cigarette smoke *(negative outcome)*	171 (88/83)	0.31 (0.46)	0.27 (0.44)	ns	ns	0.08
No. of safety items	171 (88/83)	2.53 (0.82)	2.58 (0.75)	ns	ns	0.13
Smoke alarm	171 (88/83)	0.95 (0.21)	1.00 (0.00)	ns~	ns	0.35
Safety gate	150 (74/76)	0.14 (0.34)	0.25 (0.44)	ns~	ns	0.30
Framingham Safety Survey	171 (88/83)	7.34 (0.69)	7.53 (0.68)	ns~	ns	0.32
Non Step Down Measures						
Total HOME SHIF	168 (85/83)	16.74 (1.20)	16.91 (1.46)	ns	~	0.04
Child car seat	164 (83/81)	1.00 (0.00)	1.00 (0.00)	ns	~	~

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. . '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

5.4.5 Maternal Health & Pregnancy

Maternal Physical Health

None of the five measures included in the Maternal Physical Health category were in the hypothesized direction. The step down test showed that the joint effect of the five measures included was not statistically significant.

Maternal Mental Health

None of the four Maternal Mental Health measures were in the hypothesized direction. In addition, the step down test showed that the joint effect of the four measures was not statistically significant.

Substance Use During Pregnancy

One of the three measures within the Substance Use During Pregnancy category was in the hypothesized direction, however there was no significant difference between the low treatment and comparison groups. There was a significant difference found in a non-hypothesized direction regarding whether the mothers reported smoking during pregnancy. 50% of mothers is in the low treatment group reported having smoked during pregnancy whereas 30% of mothers in the comparison group reported smoking during pregnancy ($p<.05$, $d=.27$). The step down test showed that the joint effect of the three measures in this category was not statistically significant.

Current Substance Use

One of the four measures in the Current Substance Use category was in the hypothesized direction, however was not statistically significant. The step down test revealed that the joint effect of the four measures in this category was not statistically significant.

Non Step Down Measures

Three of the four measures not included in the Step Down categories were in the hypothesized direction and one of these – an indication of changed drinking habits during pregnancy – was significant. 38% of mothers in the low treatment group reported changing their drinking behaviour during pregnancy, compared to 21% of those in the comparison group ($p<.05$, $d=.47$).

Table 5.13

Results for Low Treatment Group and Comparison Group (LFP): ***Maternal Health & Pregnancy***

Variable	N (n_{LOW}/ n_{LFP})	M_{LOW} (*SD*)	M_{LFP} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Maternal Physical Health & Health Behaviours						
*Complication during pregnancy *(negative outcome)*	171 (88/83)	0.43 (0.50)	0.43 0.50	ns	ns	0.05
*No. of GP visits in past 6 months *(negative outcome)*	170 (87/83)	1.94 (3.06)	1.78 1.91	ns	ns	0.05
Health since baby was born	171 (88/83)	0.88 (0.33)	0.92 (0.28)	ns	ns	0.08
*Breathing problem *(negative outcome)*	171 (88/83)	0.14 (0.35)	0.11 (0.31)	ns	ns	0.11
*Mother hospitalised immediately after birth for special medical care *(negative outcome)*	171 (88/83)	0.26 (0.44)	0.17 (0.38)	ns	ns	0.17
Maternal Mental Health						
WHO5 Percentage Score	171 (88/83)	65.14 (21.06)	61.45 (21.15)	ns	ns	0.12
*Diagnosed with postnatal depression *(negative outcome)*	171 (88/83)	0.11 (0.32)	0.10 (0.30)	ns	ns	0.03
*Edinburgh Postnatal Depression Score for past 7 days *(negative outcome)*	171 (88/83)	6.35 (5.25)	5.86 (4.88)	ns	ns	0.05
*Diagnosed with postnatal depression in past 6 months *(negative outcome)*	171 (88/83)	6.56 (6.01)	6.28 (5.28)	ns	ns	0.09
Substance Use During Pregnancy						
*Drank alcohol during pregnancy *(negative outcome)*	171 (88/83)	0.28 (0.45)	0.30 (0.46)	ns	ns	0.10
*Illegal drugs during pregnancy *(negative outcome)*	171 (88/83)	0.02 (0.15)	0.00 (0.00)	ns	ns	0.17
*Smoked during pregnancy *(negative outcome)*	171 (88/83)	0.50 (0.50)	0.30 (0.46)	ns~	ns	0.27
Current Substance Use						
*Drug use in past 6 months *(negative outcome)*	171 (88/83)	0.07 (0.25)	0.06 (0.24)	ns	ns	0.02
*Consumed alcohol above recommended level	171 (88/83)	0.09 (0.29)	0.07 (0.26)	ns	ns	0.04

(negative outcome						
*Drank alcohol in past 6 months	171 (88/83)	0.88 (0.33)	0.89 (0.31)	ns	ns	0.06
(negative outcome)						
*Currently a smoker	171	0.55	0.45	ns	ns	0.09
(negative outcome)	(88/83)	(0.50)	(0.50)			
Non Step Down Measures						
*Edinburgh Postnatal Depression Cut-off (10)	171 (88/83)	0.17 (0.38)	0.24 (0.43)	ns	~	0.22
(negative outcome)						
*Below WHO5 Score of 13	171	0.25	0.33	ns	~	0.20
(negative outcome)	(88/83)	(0.44)	(0.47)			
Changed smoking during pregnancy	69 (44/25)	0.52 (0.51)	0.60 (0.50)	ns	~	0.09
Changed drinking during pregnancy	48 (24/24)	0.38 (0.49)	0.21 (0.41)	p<.05	~	0.47

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

5.4.6 Maternal Social Support

Social Support

Among the eleven measures included in the Social Support category, seven of the effects were in the hypothesized direction and the low treatment group and comparison group differed significantly on two of these eleven outcomes related to the discussing programme with friends and family. Approximately 60% of mothers in the low treatment group discussed the programme with friends, whereas 21% of mothers in the comparison group discussed the programme with friends (p<.01, d=.84). 78% of mothers in the low treatment group discussed the programme with family, compared to 51% of mothers in the comparison group (p<.01, d=.62). There was also one significant finding in a non-hypothesized direction. Mothers in the comparison group were significantly more likely (4%) to discuss the programme with individuals who were not friends or family than those in the low treatment group (0%, p<.10, d=.62). The step down test showed that the joint effect of the eleven measures in the Social Support category was statistically significant (p<.01). These joint findings were driven by the statistical significance of the findings regarding discussing the programme with friends and family.

Satisfaction with Father Involvement

One of the two measures within the Satisfaction with Father Involvement category was in the hypothesized direction, however this difference was not statistically significant. The step down test showed that the joint effect of the two measures was not statistically significant.

Table 5.14

Results for Low Treatment Group and Comparison Group (LFP): ***Social Support***

Variable	N (n_{LOW}/ n_{LFP})	M_{LOW} (*SD*)	M_{LFP} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Social Support						
Discuss programme with friends	163 (88/75)	0.60 (0.49)	0.21 (0.41)	p<.01	p<.01	0.84
Discuss programme with family	163 (88/75)	0.78 (0.41)	0.51 (0.50)	p<.01	p<.01	0.62
Discuss programme with partner	163 (88/75)	0.61 (0.49)	0.64 (0.48)	ns	ns	0.02
Support from friends	167 (84/83)	0.31 (0.47)	0.28 (0.45)	ns	ns	0.05
Knows children same age as baby	168 (86/82)	0.56 (0.50)	0.54 (0.50)	ns	ns	0.05
Support from parents	158 (82/76)	0.70 (0.46)	0.66 (0.48)	ns	ns	0.07
Support from relatives	169 (86/83)	0.36 (0.48)	0.35 (0.48)	ns	ns	0.00
Frequently sees grandparent	171 (88/83)	0.81 (0.40)	0.80 (0.41)	ns	ns	0.06
Support from baby's father	169 (86/83)	0.74 (0.44)	0.77 (0.42)	ns	ns	0.03
Meet friends frequently	171 (88/83)	0.48 (0.50)	0.53 (0.50)	ns	ns	0.11
Discuss programme with others	163 (88/75)	0.00 (0.00)	0.04 (0.20)	ns~	ns	0.26
Satisfaction with Father Involvement						
Satisfied with father's involvement	171 (88/83)	64.47 (6.30)	63.69 (7.88)	ns	ns	0.01
Father part of baby's life	171 (88/83)	0.91 (0.29)	0.98 (0.15)	ns	ns	0.19

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

5.4.7 Childcare & Service Use

Childcare

Two of the four measures in the Childcare category were in the hypothesized direction, however neither of these effects indicated statistically significant differences between the low treatment and comparison groups. In addition, the step down test showed that the joint effect of the four measures in the Childcare category was not statistically significant.

Non Step Down Measures

The one measure not included in the Step Down categories – whether the mother voted in the last general election – was not in the hypothesized direction and was not statistically significant.

Table 5.15
Results for Low Treatment Group and Comparison Group (LFP): ***Childcare & Service Use***

Variable	N (n_{LOW}/ n_{LFP})	M_{LOW} (*SD*)	M_{LFP} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Childcare						
Age started childcare	171 (88/83)	0.99 (2.11)	0.96 (2.10)	ns	ns	0.06
*Hours per week in childcare *(negative outcome)*	171 (88/83)	4.35 (9.30)	5.16 (10.84)	ns	ns	0.01
*Uses formal childcare (nursery/crèche) *(negative outcome)*	171 (88/83)	0.07 (0.25)	0.06 (0.24)	ns	ns	0.05
*Use childcare before 6 months *(negative outcome)*	171 (88/83)	0.25 (0.44)	0.20 (0.41)	ns	ns	0.18
Non Step Down Measures						
Voted in last General Election	163 (85/78)	0.42 (0.50)	0.49 (0.50)	ns	~	0.05

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

5.4.8 Household Factors & SES

Household Factors

One of the four measures in the Household Factors category was in the hypothesized direction, however, it did not indicate a statistically significant difference between the low treatment and comparison groups. There was a significant difference found in a non-hypothesized direction for the item indicating whether the mother reported having a partner. 92% of mothers in the comparison group reported having a partner, whereas 77% of those in the low treatment group reported having a partner (p<.05, d=.30). The step down test showed that the joint effect of the four measures in the Household Factors category was not statistically significant.

Parental Education

One of the five measures in the Parental Education category was in the hypothesized direction, and this – mother's improvement in educational status - was statistically significant. 20% of mothers in the low treatment group reported a positive change in their educational status since their last interview, whereas 10% of those in the comparison group reported an improvement in educational status (p<.10, d=.23). In addition, the step down test showed that the joint effect of the five measures in the Parental Education category was not statistically significant.

Maternal Employment

One of the three measures in the Maternal Employment category was in the hypothesized direction, and this – whether mothers had been unemployed long-term – was significant. 16% of mothers in the low treatment group reported having been unemployed long term, whereas 24% of mothers in the comparison group reported long-term unemployment (p<.01, d=.28). The step

down test showed that the joint effect of the three measures in the Maternal Employment category was statistically significant (p<.10). These joint findings were driven by the statistical significance of the findings regarding mothers' long term unemployment.

Paternal Employment
Neither of the two measures in the Paternal Employment category was in the hypothesized direction. The step down test showed that the joint effect of the two measures in the Paternal Employment category was not statistically significant.

Family Finances
None of the six measures in the Family Finances category were in the hypothesized direction, and none of the effects indicated a statistically significant difference between the low treatment and comparison groups. In addition, the step down test showed that the joint effect of the six measures in the Family Finances category was not statistically significant.

Non Step Down Measures
Three of the six measures which were not included in the above Step Down categories were in the hypothesized direction. Two of these – number of years with partner and mother in part-time employment were significant. Mothers in the low treatment group reported being with their partner for an average of 8.15 years, whereas those in the comparison group reported being with their partner for an average of 7.24 years (p<.01, d=.28). Additionally, 68% of mothers in the low treatment group reported being in part-time employment, compared to 42% of those in the comparison group (p<.05, d=.49). There was also a significant finding between the low treatment group and comparison group in a non-hypothesized direction. Mothers in the low treatment group reported an average annual age of €17,661, whereas those in the comparison group reported an average annual wage of €23,118 (p<.10, d=.46).

Table 5.16
Results for Low Treatment Group and Comparison Group (LFP): ***Household factors & SES***

Variable	N (n_{LOW}/ n_{LFP})	M_{LOW} (*SD*)	M_{LFP} (*SD*)	Individual Test p^1	Step Down Test p^2	Effect Size *d*
Household factors						
Married	171 (88/83)	0.16 (0.37)	0.20 (0.41)	ns	ns	0.01
*Resides with grandparent *(negative outcome)*	167 (86/81)	0.31 (0.47)	0.23 (0.43)	ns	ns	0.11
Household size	171 (88/83)	5.02 (1.74)	4.46 (1.57)	ns	ns	0.22
Has a Partner	171 (88/83)	0.77 (0.42)	0.92 (0.28)	ns~	ns	0.30
Education						
Mother improvement in educational status	146 (76/70)	0.20 (0.40)	0.10 (0.30)	p<.10	ns	0.23
*Mother low education *(negative outcome)*	171 (88/83)	0.33 (0.47)	0.27 (0.44)	ns	ns	0.08
*Father low education *(negative outcome)*	163 (85/78)	0.49 (0.50)	0.38 (0.49)	ns	ns	0.11
Mother degree	171 (88/83)	0.05 (0.21)	0.08 (0.28)	ns	ns	0.06
Father degree	163	0.04	0.09	ns	ns	0.18

	(85/78)	(0.19)	(0.29)			
Maternal Employment						
*Mother long-term unemployed *(negative outcome)*	165 (85/80)	0.16 (0.37)	0.24 (0.43)	p<.01	p<.10	0.28
Mother in paid employment	169 (87/82)	0.36 (0.48)	0.40 (0.49)	ns	ns	0.00
Mother took or is currently on maternity leave	169 (87/82)	0.33 (0.47)	0.39 (0.49)	ns	ns	0.01
Paternal Employment						
*Father long-term unemployed *(negative outcome)*	155 (75/80)	0.21 (0.41)	0.21 (0.41)	ns	ns	0.04
Father in paid employment	164 (83/81)	0.53 (0.50)	0.60 (0.49)	ns	ns	0.06
Finance						
Save regularly	170 (87/83)	0.55 (0.50)	0.55 (0.50)	ns	ns	0.03
*Receives social welfare payments *(negative outcome*	168 (86/82)	0.73 (0.45)	0.70 (0.46)	ns	ns	0.01
*Social housing *(negative outcome)*	169 (87/82)	0.47 (0.50)	0.35 (0.48)	ns	ns	0.13
*Difficulty making ends meet *(negative outcome)*	170 (87/83)	0.28 (0.45)	0.23 (0.42)	ns	ns	0.06
Owns/rents own accommodation	169 (87/82)	0.74 (0.44)	0.83 (0.38)	ns	ns	0.14
Equivalized weekly household income	151 (76/75)	239.11 (110.42)	279.93 141.49)	ns	ns	0.18
Non Step Down Measures						
No. of years with partner	144 (68/76)	8.15 (5.59)	7.24 (5.06)	p<.01	~	0.16
Partner is the baby's father	144 (68/76)	0.97 (0.17)	1.00 (0.00)	ns	~	0.21
Mother in part-time employment	64 (31/33)	0.68 (0.48)	0.42 (0.50)	p<.05	~	0.49
Mother improvement in work status	105 (53/52)	0.08 (0.27)	0.02 (0.14)	ns	~	0.22
Mother annual wage	61 (28/33)	17,661 (6,859)	23,118 (12,703)	ns~	~	0.46
Father's annual wage	76 (35/41)	25,283 (11,824)	26,696 (8,349)	ns	~	0.14

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. [1] one-tailed (right-sided) p value from an individual permutation test with 1000 replications. [2] one-tailed (right-sided) p value from a Step Down permutation test with 1000 replications. * indicates the variable was reverse coded for the testing procedure. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively. '~'indicates that the variable was significant in a left-sided test. The sample size reported are those used in the individual tests and may differ from the sample size used in the Step Down analyses which are based on the number of observations present in all variables included in the Step Down category. The variables are reported in order of the largest to the smallest T statistic within each Step Down category.

5.4.9 Key Findings: Low Treatment Group and Comparison Group

This section summarizes the findings comparing the outcomes of the low treatment group to the outcomes of the comparison group. There were positive significant differences between the low treatment group and the comparison group on 17 measures (11%), with most effects in the domains of social support, the home environment, and household factors/SES. However, very

few of these effects remained significant in the multiple hypothesis analysis. In addition, there were negative significant differences i.e. the comparison group outperformed the low treatment group, on 13 measures (9%). Thus overall the results comparing the low treatment and comparison groups are quite mixed. The results are detailed below.

Child Development

Children in the low treatment group and children in the comparison group did not differ significantly across most of the child developmental domains, including temperament, communication and motor skills. Furthermore, there were no significant differences found on indicators of developmental delays. However there was one significant difference:

- Children in the low treatment group displayed better interaction skills than did children in the comparison group.

Child Health

Children in the low treatment group and children in the comparison group did not differ significantly across child health domains such as child weight, breastfeeding, sleep location and immunizations. However, the following significant differences were identified:

- Children in the low treatment group were less likely than those in the comparison group to have stayed in the hospital in the 6 months prior to the interview.
- Mothers in the low treatment group were more likely to know their child's weight.
- Children in the low treatment group were more likely to sleep undisturbed at 3 months of age and to sleep through the night.
- Children in the low treatment group were more likely to have been vaccinated.
- Mothers in the low treatment group were significantly more likely to let their child cry out.
- Children in the comparison group were more likely to eat frequently and appropriately.

Parenting

Mothers in the low treatment group and mothers in the comparison group did not differ significantly across most of the parenting domains including healthy attachment, parental efficacy, regard for the child, parent interaction with child and parental distress. However, the following significant difference was identified:

- Mothers in the comparison group were more likely than those in the low treatment group to have higher regard for their infants when compared to other children of the same age.

Home Environment and Safety

Family home environments in the low treatment group and the comparison group did not differ significantly across many of the measured domains including encouragement between mother and child, organization and responsivity, amongst others. However, a number of significant differences were identified:

- Mothers in the low treatment group were more likely to be actively involved in their child's learning and development than those in the comparison group.
- Children in the low treatment group were more likely than children in the comparison group to have a variety of appropriate toys and learning materials available to them in their home.

- Mothers in the low treatment group were less likely to restrict their children by scolding or physical punishment than those in the comparison group.
- More families in the low treatment reported having electrical socket covers in their homes than those in the comparison group.
- Children in the comparison group were more likely to have age appropriate eating and sleeping patterns than those in the low treatment group.
- Mothers in the comparison group were more likely to provide an appropriate range and adequacy of childcare to their children than those in the low treatment group.
- Families in the comparison group were more likely to have smoke alarms, safety gates and child safe homes than those in the low treatment group.

Maternal Health and Pregnancy

Mothers in the low treatment group did not differ significantly from mothers in the comparison group across health domains such as complications during pregnancy, levels of depression, substance use and general health. However, two significant differences were identified:

- Mothers in the low treatment group were significantly more likely to have changed their drinking habits during pregnancy.
- Significantly more mothers in the low treatment group reported smoking during pregnancy.

Maternal Social Support

Mothers in the low treatment group did not differ significantly from mothers in the comparison group in terms of social support across such domains as level of support from friends, relatives and their child's father and frequency of meeting friends. However, two significant differences were identified:

- Mothers in the low treatment group were more likely than mothers in the comparison group to discuss the programme with their family and friends.
- Mothers in the comparison group were more likely to discuss the programme with other individuals who are not friends or family.

Childcare and Service Use

Families in the low treatment group did not differ significantly from families in the comparison group in terms of the number of hours per week the child was enrolled in childcare and age in which child was placed in childcare. Also, there were no significant differences between the low and comparison groups in utilization of education, employment, health and other available community services.

Household Factors and SES

Families in the low treatment group did not differ significantly from families in the comparison group in terms of household size, parental education levels or social housing. However, there were some significant differences between the low treatment and comparison groups in the following domains:

- Mothers in the low treatment group were more likely to have improved their educational status than those in the comparison group.

- Mothers in the low treatment group were less likely to have experienced long-term unemployment and were more likely to be in part-time employment.
- Mothers in the low treatment group were with their partners longer than those in the comparison group.
- Mothers in the comparison group were more likely to have a partner than those in the low treatment group.
- The average wage for mothers in the comparison group was higher than the average wage of mothers in the low treatment group.

Overall, the results of the high treatment group and comparison group analysis support the main findings, such that the additional support provided to the high treatment group appeared to have some positive effects at six months, while the results of the low treatment group and comparison group analysis suggest that the low treatment is having a lesser impact on participant outcomes at six months. Further analysis in future reports will examine the impact of varying the conditioning set on the results.

CHAPTER 6: Implementation Analysis

Experimental evaluations of early childhood programmes are considered the optimal means of identifying the impact of a new policy or programme. Yet a recent review of home visiting programs evaluated by experimental design found that only half of these programmes had a positive impact on at least one child outcome (Kahn & Moore, 2010). The presence of such mixed findings in regards to the effectiveness of home visiting interventions has often been attributed to varying implementation practices (Astuto & Allen, 2009; Gomby, 2007). Implementation analyses can identify deviations from programme protocol and inform programme fidelity efforts (Cunningham, Michielutte, Dignan, Sharp, & Boxley, 2000). Additionally, programme reach and delivery of services can be tracked and thus shed light on intervention effectiveness (Windsor, Baranowski, Clark, & Cutter 1994). Implementation analyses also can determine whether the programme can be replicated and transferred to different situations (Matthews & Hudson, 2001). Therefore, investigating implementation processes in early childhood interventions is important, as any barrier to programme implementation may have significant effects on programme effectiveness.

As evaluations of early childhood interventions typically focus on outcomes alone, without considering the processes that led to these outcomes, information explaining why a programme did or did not work is often lacking. This can be problematic as there is extensive evidence to suggest that programme implementation has a major impact on effectiveness (Durlak & DuPre, 2008). Data from nearly 500 studies evaluated in five meta-analyses indicate that the magnitude of mean effect sizes are two to three times higher when programmes are carefully implemented and free from serious implementation problems (Durlak & DuPre, 2008). In addition, the majority of studies showed a significant and positive relationship between the level of implementation (e.g., fidelity, dosage, program reach, adaptation and quality). Furthermore, data from 59 youth mentoring studies illustrate that higher levels of implementation are often associated with better outcomes, particularly when programme fidelity or dosage is assessed (DuBois, Holloway, Valentine, & Cooper, 2002).

Therefore, in order to fully interpret and understand the effects of the *PFL* Programme, the evaluation has collected an extensive range of implementation data which cover multiple dimensions of the implementation process. Information related to communications between the *PFL* programme staff and the *PFL* participants is documented in the Database Management System (DBMS), which is a database specifically designed for the *PFL* Programme. This database is used by *PFL* staff to track all interactions with participant families such as home visits, phone calls, as well as the duration of the interaction and the material covered during the contact. From this information, programme attrition, dosage and fidelity can be tracked throughout implementation of the *PFL* Programme. In addition, information on participant satisfaction was recorded during the six month assessment conducted by the *PFL* Evaluation team. This chapter describes and analyses *PFL* implementation practices regarding participant attrition, engagement, and satisfaction between programme intake and when the child was six months of age.

6.1 *PFL* Attrition up to Six Months of Age

This section investigates the level and determinants of attrition in the *PFL* sample between baseline and the six month survey. It is important to investigate this issue as the sample size used in the evaluation is relatively small and the existence of systematic attrition may break the key rationale behind the method of randomized controlled trials.

Literature Review on Attrition

Attrition occurs when participants withdraw from a programme before its completion. In randomised control trials and quasi experimental studies, such as the evaluation of *Preparing for Life*, the phenomenon of attrition presents challenges to interpretation of results. A review of the literature found that once enrolled, between 20% and 80% of families leave home visiting programmes before services are scheduled to end (Gomby, 2005). Attrition is undesirable when conducting an evaluation as it reduces the potential sample size available for analysis. In addition, attrition may bias results if the characteristics of the participants who remain in the programme differ from those who left the programme before completion. Thus it is difficult to determine whether the outcomes of the programme are due to the intervention itself or the individual characteristics of the remaining participants (Lerner, Jacobs, & Wertlieb, 2005). For example, if the parents who remained in the programme had better outcomes than those who left might have if they had remained in the programme this may lead to an overestimation of the programme's impact. Within RCTs, attrition rates are often higher in the comparison group, and may vary by demographic group (Lerner et al., 2005), such that the final sample size in the intervention and control groups may differ both in size and composition (Lerner et al., 2005). For this reason it is important to analyse the intervention and comparison groups for equivalence at both the beginning and the end of the evaluation to avoid overstating or understating the impacts of the programme (Lerner et al., 2005).

Factors influencing attrition

Individual, family, psycho-social and programme factors have been found to have an impact on attrition rates in early intervention and prevention programmes (Daro, McCurdy, Falconnier, & Stojanovic, 2003; Gomby, 2005; Gross, Julion, & Fogg, 2001; McCurdy & Daro, 2001; Mendez, Carpenter, La Forett, & Cohen, 2009; Snell-Johns, Mendez, & Smith, 2004). Yet the factors influencing attrition vary from study to study and are not consistent across the literature. Below are some common findings in relation to these mediating variables.

Demographic factors influencing attrition

Parental age can influence attrition rates, with studies finding that dropout rates are significantly lower among older mothers (Birkel & Repucci, 1983; Firestone & Witt, 1982; Josten, Mullett, Savick, Campbell & Vincent, 1995; McCurdy & Jones, 2000). However, other studies have found no effect of maternal age on attrition (Ammerman et al., 2006, Duggan et al., 2000; McGuigan et al., 2003 as cited in Damashek et al, 2011). Single parent status has also been associated with an increased likelihood of premature drop-out (Kazdin & Mazurick, 1994; Taylor & Biglan, 1998). In contrast, Gross et al. (2001) found that parents who were in a partnered relationship were significantly more likely to drop out than those who were married, single or foster parents. Parental gender has also been found to influence participation in

parenting programmes as mothers are more likely to engage with programmes and less likely to drop out than fathers (Spoth & Redmond, 1995; Rogmann, Boyce, Cook & Cook,2002).

Socio-economic status has been found to influence participation and attrition rates (Spoth & Redmond, 1995). Daro et al. (2003) found that home visitation programmes were significantly more successful in retaining mothers with limited education and poor employment histories. Other studies have found that families residing in low-income neighbourhoods have a higher risk of dropout than those in less disadvantaged areas (Kazdin, 1996, McKay at al., 1999 as cited in Snell-Johns, Mendez & Smith, 2004). However, Gross et al. (2001) found that parental income and education were unrelated to attrition. Economic groups are often characterised as being homogenous, however, Mendez et al. (2009) found significant variability within a sample of low income parents regarding psychological resources and involvement behaviour. They found that these characteristics mediated parents' participation when faced with barriers such as conflicting schedules, transportion and motivation. Families of ethnic minorities have been found to be more susceptible to early drop-out than Caucasian families of similar economic status (Laveist, 1993; Corso, Fang, Begle & Dumas, 2010). Conversely, Daro et al. (2003) found that African-American and Hispanic participants had greater participation levels in home visiting programmes. Several studies suggest that treatments should be sensitive to cultural variations in coping style and problem expression in order to minimise drop out rates and maximise treatment effects (Brondino et al., 1997; Prinz & Miller, 1994).

Psycho-social factors influencing attrition

There have been mixed findings regarding maternal depression and attrition. Kazdin & Mazurick (1994) found that depression predicted early drop out from a family therapy service. However, other studies have found that maternal depression predicted greater service completion (Girvin, DePanfilis & Daining, 2007) or was not significantly related to drop out (Daro et al., 2003). Marital problems can act as a barrier to participation in family intervention programmes and therefore can put families at greater risk of drop out (Heinrichs, Bertram, Kuschel & Hahlweg, 2005). However, victims of psychological aggression have been found to have higher service completion rates (Damashek et al., 2011). Moreover, Healthy Families America programmes found that parents who had experienced domestic violence were more likely to begin services and to remain in services for longer periods of time (Amerman et al., 2006, Daro et al., 2003, Duggan et al., 2000, McGuigan et al., 2003). Parents who face multiple problems such as marital adjustment, depressive symptoms and family adversity in addition to parenting issues have been found to be at increased risk of drop out (Prinz & Miller, 1994; Webster-Stratton & Hammond, 1990). In contrast Duggan et al. (2000) found that families with parents who had a history of problem substance use and violence were more likely to stay in services longer.

Neighbourhood & programme factors influencing attrition

Neighbourhoods can also have an impact on parent behaviour in relation to the programme (McCurdy & Daro, 2001). Community factors such as level of social cohesion, sharing of common values and trust (Korbin & Coulton, 1997) all impact parental behaviours. Unsurprisingly, neighbourhoods where job prospects are limited may cause parents to leave the neighbourhood (and the programme) in search of work (McCurdy & Daro,2001).

Programme characteristics are another mediating variable in programme participation. Daro et al. (2003) found that service duration improved the earlier pregnant participants were enrolled. They also found that lower caseloads and a workforce that mirrors the racial composition and parenting status of the target population are important in gaining buy-in from parents. Lower case loads allow service providers to be responsive to the needs of their participants and foster stronger working relationships with them (McCurdy & Daro, 2001). In addition, service provider skills and competencies are central to ensuring that the intervention is personalised and relevant to each individual (McCurdy & Jones, 2000). McCurdy and Jones (2000) also found that tangible incentives such as goods and services were important in increasing participation in parenting programmes. None of these are possible without funding, which is an important factor in smooth service delivery, consistent staffing and service provision. These efforts reduce uncertainty and increase participant contact thereby increasing participant commitment (McCurdy & Jones, 2000).

Managing Attrition

Attrition is undesirable when conducting an evaluation as it reduces the potential sample size and thus the ability to identify statistically significant effects. In addition, attrition may bias the outcome results if the characteristics of the participants who remain in the programme differ from those who left the programme before completion. This makes it difficult to determine whether the outcomes of the programme are due to the intervention itself or the individual characteristics of the remaining participants. Research on individual, family and socio-environmental characteristics and their impact on programme participation has produced mixed results. This highlights the importance of further investigating the relationship between these variables and attrition.

Programmes experiencing high attrition rates are not necessarily beyond rectification. The programme characteristics described above can be monitored, shaped and improved to address attrition. Arizona's Healthy Families America programmes have increased the average length of family enrolment from 595 days to 698 days (Gomby, 2005) through monitoring and modifying the programme to meet parental needs. It is more difficult however to address psychosocial and demographic characteristics through programme interventions. Individuals who enrol in prevention programmes may differ in motivation and intention, often related to individual, family and neighbourhood factors described above. In prevention studies where attrition between control and intervention groups is non-equivalent, statistical methods such as propensity score matching can be applied (Wen et al., 2011). In cases where participants choose not to avail of services, their demographic details can be used to 'match' them to equivalent participants who had a greater degree of participation (Wen et al., 2011). Thus, these methods can reveal the true impact of interventions which might otherwise have been distorted by attrition.

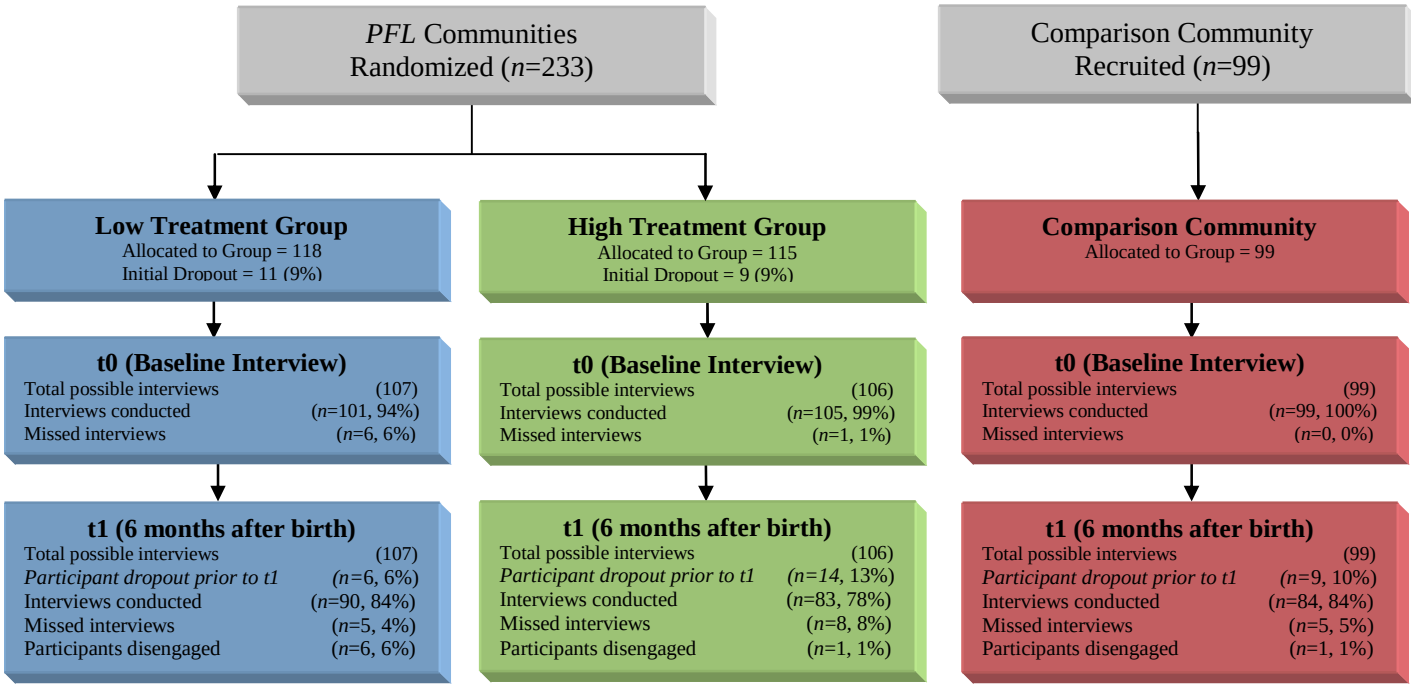
6.1.1 Attrition/Disengagement in PFL

Figure 6.1, The Consort Diagram, describes the progression of the participants between programme entry and six months. In total, 257 six month interviews (nLow = 90; nHigh = 83; nLFP = 84) were completed. On average, 82% of the sample completed a six month interview across the three groups. The high treatment group completed the least number of six month interviews (78%) and the low treatment group and comparison group completed the most (84% respectively). On average, 10% of the sample were classified as official 'dropouts' between

baseline and six months, with the highest dropout rate experienced among the high treatment group (13%) and the lowest among the low treatment group (6%). 10% of the comparison group dropped out of the evaluation after completing the baseline interview, but prior to completing a six month interview. Official dropouts as defined as participants who actively told the *PFL* programme staff or the evaluation team that they wanted to leave the programme. The most frequently cited reason given by those who left the programme prior to 6 months was time constraints. Many former participants felt that their busy schedules restricted them from participating. A number of former participants also suggested that their children did not need the programme, that the interview questions were too personal and that a five year commitment was too long.

In addition to those who dropped out, about 8% of the sample did not complete a six month interview as there was difficulty in contacting these participants. The rates are similar across the high and low treatment groups (10% and 9% respectively) and lowest among the comparison group (6%). It is possible that some of the missed interviews may represent participants who were disengaged, but did not officially dropout of the programme. Also, it is possible that some of these participants will re-engage with the programme at later data collection waves.
Figure 6.1

6 Month Consort Diagram



6.1.2 Analysis of Attrition/Disengagement before Six Months

As the number of official dropouts between baseline and six months was quite low, the analysis below compared the baseline characteristics of participants who completed a baseline interview and a six month interview to those who did not complete a six month interview. Thus the

analysis of 'attritors' includes those who have officially dropped out of the programme between baseline and six months, those who were disengaged at six months but may have re-engaged subsequently, those who were disengaged at six months and may still be disengaged, and those who did not complete a six month interview for other reasons. These characteristics were chosen based on the literature presented above and theoretical consideration. Each group were analysed separately.

Table 6.1 reports the baseline characteristics of the low treatment group by attrition status and tests for significant differences between the attrition/disengaged group (12%) and the non-attrition/engaged group (88%) based on each characteristic. It shows that of the 21 maternal characteristics examined only three were statistically significant. Specifically, low treatment group mothers who entered the programme earlier in their pregnancy ($p<.10$), those with less knowledge of infant development during pregnancy ($p<.01$) and mothers living with their parents ($p<.10$) were more likely to have not completed a six month interview due to attrition or disengagement.

Table 6.1
Comparison of Baseline Characteristics between Attrition/Disengaged and Non attrition/Engaged sample: ***Low Treatment Group***

Variables	Attrition/disengaged			Non-attrition/engaged			Individual Test
	N	Mean	SD	N	Mean	SD	p
Weeks in pregnancy at programme entry	12	22.42	4.94	89	25.69	6.04	p<.10
Mother's age	12	22.50	7.70	89	21.18	6.87	ns
Partnered	12	0.92	0.29	89	0.83	0.38	ns
Married	12	0.58	0.51	89	0.45	0.50	ns
Living with parent(s)	12	0.75	0.45	89	0.46	0.50	p<.10
First time mother	12	0.25	0.45	89	0.17	0.38	ns
Low education	12	0.67	0.49	89	0.36	0.48	ns
Mother employed	12	0.33	0.49	89	0.40	0.49	ns
Saves regularly	12	0.42	0.51	89	0.53	0.50	ns
Social housing	12	0.50	0.52	89	0.56	0.50	ns
Cognitive resources (WASI) at 3MO	12	15.17	5.44	89	14.39	5.80	ns
Vulnerable attachment (VASQ) at BL	12	17.33	3.63	89	17.89	4.04	ns
Self efficacy (Pearlin) at BL	12	2.96	0.38	89	3.03	0.53	ns
Self esteem (Rosenberg) at BL	12	13.00	2.13	89	12.75	2.95	ns
Knowledge of infant development (KIDI) at BL	12	64.64	5.21	89	70.51	8.29	p<.01
Positive parenting attitudes (AAPI) at BL	11	115.36	15.91	89	117.02	13.55	ns
Physical Health Condition at BL	12	0.50	0.52	89	0.64	0.48	ns
Mental Health Condition at BL	12	0.08	0.29	89	0.26	0.44	ns
Smoking during pregnancy at BL	12	0.33	0.49	89	0.49	0.50	ns
Drinking during pregnancy at	12	0.42	0.51	89	0.25	0.43	ns

BL							
Drug ever used at BL	12	0.08	0.29	89	0.16	0.37	ns

Note: N= sample size, M=mean, SD=standard deviation. § p <.10, * p < .05, ** p < .01. p-values were obtained from two-sided t test based on permutation testing with 1000 replications.

Table 6.2 reports the baseline characteristics of the high treatment group by attrition status and tests for significant differences between the attrition/disengaged group (21%) and the non-attrition/engaged group (79%) based on each characteristic. It shows that of the 21 maternal characteristics examined only one was statistically significant. Specifically, high treatment group mothers who were not employed during pregnancy (p<.01) were more likely to have not completed a six month interview due to attrition or disengagement.

Table 6.2
Comparison of Baseline Characteristics between Attrition/Disengaged and Non-attrition/Engaged sample: ***High Treatment Group***

Variables	Attrition/disengaged			Non-attrition/engaged			Individual Test
	N	Mean	SD	N	Mean	SD	p
Weeks in pregnancy at programme entry	22	24.68	6.23	82	25.67	5.76	ns
Mother's age	22	20.86	8.04	82	21.78	7.83	ns
Partnered	22	0.68	0.48	82	0.80	0.40	ns
Married	22	0.64	0.49	82	0.55	0.50	ns
Living with parent(s)	22	0.59	0.50	82	0.52	0.50	ns
First time mother	22	0.09	0.29	82	0.16	0.37	ns
Low education	22	0.50	0.51	82	0.29	0.46	ns
Mother employed	22	0.14	0.35	82	0.43	0.50	p<.01
Saves regularly	22	0.36	0.49	82	0.50	0.50	ns
Social housing	21	0.62	0.50	82	0.54	0.50	ns
Cognitive Resources (WASI) at 3MO	22	12.09	5.36	82	13.96	4.94	ns
Vulnerable attachment (VASQ) at BL	22	18.95	3.77	82	18.05	3.76	ns
Self efficacy (Pearlin) at BL	22	2.79	0.60	82	2.93	0.49	ns
Self esteem (Rosenberg) at BL	22	11.91	2.89	82	13.06	2.60	ns
Knowledge of infant development (KIDI) at BL	22	71.69	9.39	82	72.40	7.10	ns
Positive parenting attitudes (AAPI) at BL	22	117.91	16.82	82	120.13	12.92	ns
Physical Health Condition at BL	22	0.73	0.46	82	0.76	0.43	ns
Mental Health Condition at BL	22	0.32	0.48	82	0.27	0.45	ns
Smoking during pregnancy at BL	22	0.50	0.51	82	0.51	0.50	ns
Drinking during pregnancy at BL	22	0.18	0.39	82	0.27	0.45	ns
Drug ever used at BL	22	0.05	0.21	82	0.16	0.37	ns

Note: N= sample size, M=mean, SD=standard deviation. § p <.10, * p < .05, ** p < .01. p-values were obtained from two-sided t test based on permutation testing with 1000 replications.

Table 6.3 reports the baseline characteristics of the comparison group by attrition status and tests for significant differences between the attrition/disengaged group (15%) and the non-attrition/engaged group (85%) based on each characteristic. It shows that of the 21 maternal characteristics examined only one was statistically significant. Specifically, comparison group mothers who did not have a previous mental health condition (p<.01) were more likely to have not completed a six month interview due to attrition or disengagement.

Table 6.3
Comparison of Baseline Characteristics between Attrition/Disengaged and Non-attrition/Engaged sample: ***Comparison Group***

Variables	Attrition/disengaged			Non-attrition/engaged			Individual Test
	N	Mean	SD	N	Mean	SD	p
Weeks in pregnancy at programme entry	15	27.60	5.44	84	27.23	6.36	ns
Mother's age	15	26.47	6.28	84	24.93	6.35	ns
Partnered	15	0.73	0.46	84	0.89	0.31	ns
Married	15	0.40	0.51	84	0.31	0.47	ns
Living with parent(s)	15	0.33	0.49	84	0.43	0.50	ns
First time mother	15	0.20	0.41	84	0.18	0.39	ns
Low education	15	0.27	0.46	84	0.25	0.44	ns
Mother employed	14	0.50	0.52	83	0.42	0.50	ns
Saves regularly	14	0.57	0.51	82	0.56	0.50	ns
Social housing	15	0.47	0.52	83	0.42	0.50	ns
Cognitive resources (WASI) at 3MO	15	16.47	6.00	84	14.93	4.85	ns
Vulnerable attachment (VASQ) at BL	15	16.67	3.90	84	16.95	3.56	ns
Self efficacy (Pearlin) at BL	15	3.03	0.55	84	3.06	0.52	ns
Self esteem (Rosenberg) at BL	15	13.73	3.01	84	12.92	3.11	ns
Knowledge of infant development (KIDI) at BL	15	70.57	8.74	84	73.33	8.68	ns
Positive parenting attitudes (AAPI) at BL	15	115.60	14.12	83	120.64	12.10	ns
Physical Health Condition at BL	15	0.60	0.51	84	0.68	0.47	ns
Mental Health Condition at BL	14	0.07	0.27	84	0.42	0.50	p<.01
Smoking during pregnancy at BL	15	0.33	0.49	84	0.35	0.48	ns
Drinking during pregnancy at BL	15	0.40	0.51	84	0.29	0.45	ns
Drug ever used at BL	15	0.07	0.26	84	0.17	0.37	ns

Note: N= sample size, M=mean, SD=standard deviation. § p <.10, * p < .05, ** p < .01. p-values were obtained from two-sided t test based on permutation testing with 1000 replications.

6.1.3 Key Findings

Overall, the level of official attrition between baseline and six months is quite low at less than 10% across the whole sample. Although it is interesting that the attrition rate was higher among

the high treatment group (13%) than among the low treatment group (6%) who were less intensively engaged in the *PFL* programme. This may be due to the fact that those in the high treatment group were more regularly in contact with the *PFL* programme staff therefore they had more opportunities to officially inform the staff that they are leaving the programme. Indeed, a greater proportion of the low treatment group (6%) were categorised as being disengaged compared to the high treatment group (1%). Thus it is possible that many of those categorized as disengaged in the low treatment group may represent participants who will ultimately be defined as dropouts.

For the purposes of analysis we compared the baseline characteristics of participants who were still participating in the programme and engaged at six months to those who did not complete the six month interview as they were either official dropouts, disengaged, or did not complete the interview for another reason (~16% of the sample). Overall, few baseline characteristics were associated with attrition/disengagement between the baseline survey during pregnancy and the six month interview. Although the evidence is not strong, there is some indication that more disadvantaged mothers were less likely to complete the six month survey and thus dropout or disengage from the programme. For example, mothers in the low treatment group who were living with their parents and/or had lower scores on the KIDI scale were more likely to be in the attrition/disengaged sample, while mothers in the high treatment group who were employed were more likely to have completed the six month survey. For the comparison group the impact differed, as mothers with a previous diagnosed mental health condition were more likely to remain in the sample at six months.

Given that the difference across the three groups was not profound at six months, we did not conduct any further analysis of attrition. However, it is possible that a more obvious pattern will emerge as the programme continues and attrition increases. Thus the issue of attrition will be analysed more in-depth using more sophisticated methods in future reports.

6.2 Participant Engagement up to Six Months of Age

Engagement refers to the amount of activities an individual participates in within the programme, such as the duration of a prescribed activity or information session, or the frequency with which a participant meets with her mentor. Participant engagement is also referred to as dosage in the literature. While some studies use a quantitative measure of dosage, capturing the percentage of prescribed home visits conducted, length of visits as a fraction of prescribed length, and whether or not a study met its total prescribed visits (Fagan, Hanson, Hawkins, & Arthur, 2008), others focus on dosage thresholds, which are defined as the lowest level of implementation at which desired results can be achieved (Felner et al., 2001).

Programme engagement differs by study, and a review by Durlak and DuPre (2008) found that implementation levels rarely exceed 80%. Furthermore, no published study has reported 100% implementation, while threshold effects as low as 60% have been found. Barriers to optimal programme dosage include participants moving frequently and changing phone lines (Brookes, Summers, Thomburg, Ispa, & Lane, 2006; Kitzman, Cole, Yoos, & Olds, 1997). Reviews of home visiting programs by Gomby et al. (1999) and Rapoport and O'Brien-Strain (2001) report that, among families who have not dropped out, approximately half of all prescribed home visits

are not received. This is a significant issue as increased frequency of home visits is associated with better child outcomes (Kahn and Moore, 2010; Lyons-Ruth & Melnick, 2004; Nievar et al.2010; Sweet & Appelbaum, 2004). In particular, Wagner and Clayton (1999) found that ten home visits were associated with a one month developmental advantage in the cognitive, social and self-help domains. Factors which have been identified as important predictors of engagement in home visiting programmes include ethnicity, maternal age, employment status, marital status, maternal socio-emotional functioning, personality, low social support, increased stress, and family risk level (Ammerman, et al., 2006; Daro et al., 2003; Duggan et al. , 1999; Duggan et al., 2000; Olds & Korfmacher, 1998; Raikes, Green et al., 2006; Roggman et al., 2002; Sharp, Ispa, Thornburg & Lane, 2003; Wagner, Spiker, Hernandez, Song, & Gerlach-Downie, 2001). Other factors such as the perceived need of the programme (McCurdy & Daro, 2001) and emotional availability and cognitive skills (Barnard, 1998) have been identified. However, some of the findings are unclear. In regards to ethnicity, Daro et al. (2003) found a higher engagement level among African-Americans compared to Whites. While Wagner et al. (2001) and Raikes, Green et al. (2006), found that White parents had a higher engagement level. For maternal age, Daro et al. (2003) and Wagner et al. (2001) identified lower engagement among teenage mothers, while Navaie-Waliser et al. (2000) found no association between age and engagement. In addition, some studies did not find any relationship between socio-demographic variables and engagement (e. g. Gross et al., 2001).

6.2.1 Instruments

Information on participant engagement within *PFL* was gathered from two sources - the *PFL* database and paper files held by the *PFL* mentors and survey responses from participants at the six month interview.

Mentor Data

Participant engagement using the mentor data was measured in three ways: a) the number of home visits a participant received from entry into the programme until their baby was 6 months old, b) the percentage of guideline home visits delivered between intake and 6 months (calculated by dividing the number of visits delivered by the number of guideline visits for this period in the programme manual), and c) the total duration in hours of all delivered home visits between intake and 6 months. For each of these measures, we examined programme engagement prenatally, within the first 3 months, between 3 and 6 months, and for the whole period. As there were participants who were randomized into a treatment condition but never engaged with the programme, we examined these measures by restricting the sample to those who have received at least one home visit, yet may have subsequently dropped out during the study period. Given that the mentors worked solely with those in the high treatment group, the analysis of engagement using this data was restricted to participants in the high treatment group.

Participant Data

The frequency of meetings that a participant has with their mentor (high treatment group) or information officer (low treatment group) was measured using a single question which asked how often the participant meets with their mentor/information officer. Possible responses were once a week, two times a month, once a month, less than once a month, or other. The responses were dichotomised to indicate whether the participant met with their mentor or information

office regularly (once a week, two times a month) or irregularly (once a month, less than once a month).

6.2.2 Participant Engagement from Mentor Records

Table 6.4 provides a summary of participant engagement in the *PFL* programme between programme entry and six months of age for the high treatment group. The *PFL* manual set guidelines of weekly home visits during the pre and postnatal period. Thus the guideline number of pre-natal home visits was dependent on when the participant joined the programme and the guideline number of post-natal home visits was 24. On average, participants in the high treatment group received 14 home visits between programme entry and 6 months. The minimum number of visits received was 2 and the maximum was 34. The average number of home visits in the pre-natal period was 6.3 visits. The average number of home visits in the post-natal period was 3.8 in the 0-3 month period and 3.9 in the 3-6 month period. Therefore there were more visits, on average, in the post-natal period than the prenatal period. Figure 6.2 also displays the variation in the number of home visits over the entire period.

These figures were then used to calculate the proportion of guideline number of home visits actually delivered. Table 6.4 shows that based on a guideline of 1 visit per week, only 31% of visits were delivered on average. The proportion was higher in the pre-natal period with 35% of home visits being delivered, compared to 29.4% in the 0-3 month period and 29.6% in the 3-6 month period. Table 6.4 also reports the average and total duration of all home visits. These times are based on the amount of time the mentor spent with the participant, in addition to the time spent writing the case notes based on each visit. On average, each visit lasted 59 minutes long, with the shortest visit lasting just over half an hour and the longest visits lasting just under two hours. The duration of home visits was slightly lower in the prenatal period (58 minutes) compared to the 0-3 month period (63 minutes) and the 3-6 month period (59 minutes). On average, the high treatment group spent 13.7 hours participating in home visits. The minimum duration spent in home visits was 2 hours and the maximum was 30 hours in total. Participants received, on average, 6 hours of home visits during the pre-natal period, 4 hours in the 0-3 month period and just under 4 hours in the 3-6 month period. Figure 2 also displays the variation in the duration of home visits over the entire period.

Table 6.4
Participant Engagement in Home Visits in PFL up to 6 Months of Age

	Prenatal	0-3	3-6	Total
Guideline no. of home visits	Weekly	12	12	~
Delivered no. of home visits	6.29 (4.2) 0-19	3.8 (2.4) 0-10	3.9 (2.1) 0-10	14.0 (6.8) 2-34
% of guideline home visits	35.4 (23.5) 0-175	29.4 (18.3) 0-77	29.6 (16.3) 0-77	31.2 (14.2) 4-70
Mean duration of home visits	58.3 (21.4) 5-179	63.3 (14.7) 20-97.5	59.0 (14.0) 27.5-110	59.3 (13.6) 34-115
Total duration of home visits (in hrs)	6.0 (4.0) 0-16	4.0 (2.6) 0-11	3.9 (2.2) 0-9	13.7 (7.0) 2-30

The table presents mean, standard deviation and the minimum-maximum values
*Ever engaged = participants received at least one home visit

Figure 6.2
Variation in Number of Home Visits from Programme Entry to Six Months

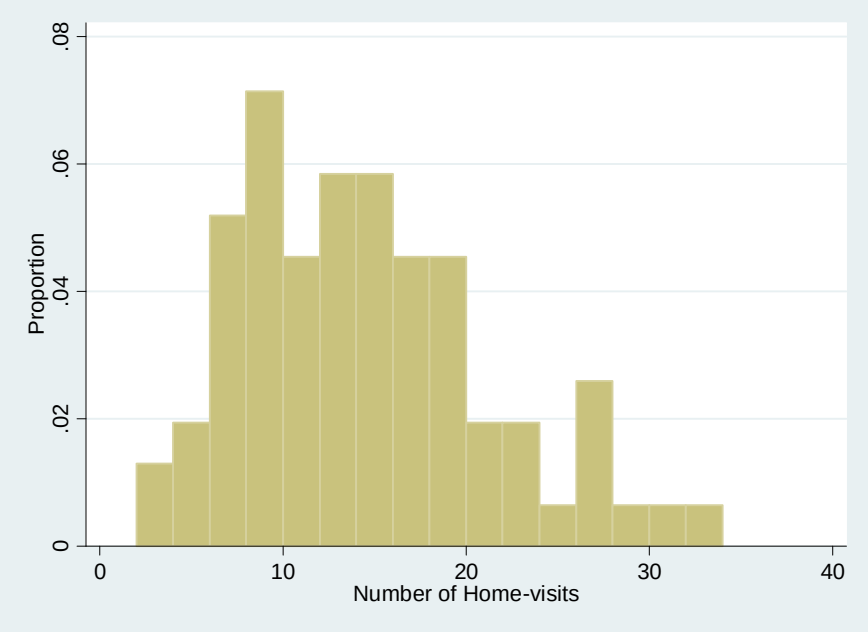
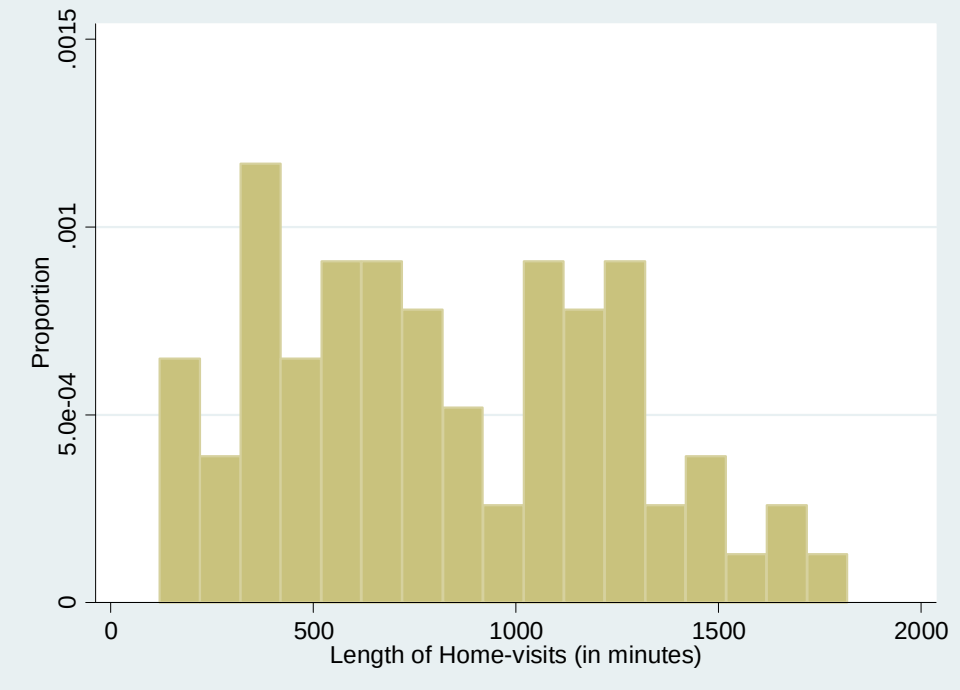


Figure 6.3
Variation in Duration of Home Visits from Programme Entry to Six Months



6.2.3 Participant engagement from participant interviews

High Treatment Group

Based on participant responses to the six month interview, 16% of participants in the high treatment group reported meeting with their mentor once a week, 68% reported meeting twice a month, 13% reported meeting once a month, and 3% reported meeting their mentor less than once a month. Thus the majority of participants reported meeting their mentor bi-monthly. While these figures are not exactly comparable, this largely corroborates the findings reported above from the *PFL* mentor database which finds that about 8 home visits were delivered to each participant over a 24 weeks period between 0 and 6 months, corresponding to approximately one visit every three weeks.

Low Treatment Group

Based on participant responses to the six month interview conducted by the Evaluation Team, 2% of participants in the low treatment group reported meeting the information officer (IO) once a week, 6% reported meeting twice a month, 7% reported once a month, and 85% reported meeting the IO less than once a month. This corresponds to the *PFL* manual which indicates that the low treatment group does not receive any scheduled meetings. Rather, participants may schedule a meeting with the Information Officer, if they require one.

6.2.4 Factors Associated with Engagement in Home Visiting

As described above, participants in the high treatment group were exposed to different degrees of treatment dosage and intensity as defined by the number of home visits they received and the length of contact time with mentors. In this section we examined the factors associated with participant engagement in the home visiting sessions between programme entry and six months. Specifically, we examined the relationships between participant engagement and a range of socio-demographic and maternal psychosocial factors collected at the baseline assessment. This allowed us to test whether the characteristics of the participants who engaged in more home visits were different from the characteristics of participants who received less home visits.

Bivariate Models

Table 6.5 compares “High Engaged” participants and “Low Engaged” participants by different maternal characteristics. High engagement was defined as having more than 13 home visits between programme entry and the six months after baby’s birth and low engagement was defined as having less than 13 home visits during this period. Thirteen home visits was the median number of home visits received by all high treatment participants. Baseline measures collected before the programme began were used in the analysis as measures collected after the intervention began may have been influenced by participation in the programme. The only exception is the Wechsler Abbreviated Scale of Intelligence (WASI) which was administered to the mother when the child was about 3 months old. As measures of cognitive resources are stable in adulthood, maternal cognitive resources should not have been influenced by programme participation during pregnancy or at 3 months. In addition, as described in Chapter 4, there were no significant differences in WASI scores between the high and low treatment groups, suggesting that the programme did not impact on maternal cognitive resources.

Total Engagement

Table 6.5 reports the characteristics of each group by engagement status and tests for significant differences between the groups based on each characteristic. These characteristics were chosen based on the literature presented above and theoretical considerations. It shows that of the 23 maternal characteristics examined, only three were statistically significant. Specifically, mothers with higher cognitive resource scores (p<.01), mothers who had experienced a previous mental health condition (p<.10), and mothers who had girls (p<.05) were associated with receiving more than 13 home visits between programme entry and six months.

Table 6.5

Testing differences between High Engaged Participants versus Low Engaged Participants from Programme Entry to Six Months

Variables	High Engaged Group			Low Engaged Group			Individual Test
	N	Mean	SD	N	Mean	SD	p
Weeks in pregnancy at programme entry	37	20.86	7.00	40	23.70	8.12	ns
Mother's age	37	26.19	6.06	40	24.48	5.36	ns
Partnered	37	0.76	0.43	40	0.83	0.38	ns
Married	37	0.19	0.40	40	0.10	0.30	ns
Living with parent(s)	37	0.57	0.50	40	0.53	0.51	ns
First time mother	37	0.46	0.51	40	0.63	0.49	ns
Low education	37	0.35	0.48	40	0.25	0.44	ns
Mother employed	37	0.43	0.50	40	0.35	0.48	ns
Saves regularly	37	0.38	0.49	40	0.58	0.50	ns
Social housing	37	0.57	0.50	40	0.55	0.50	ns
Cognitive resources (WASI) at 3MO	35	86.06	11.45	39	78.41	11.33	p<.01
Mental well-being (WHO5) at BL	37	13.68	5.17	40	13.50	4.71	ns
Vulnerable attachment (VASQ) at BL	37	18.41	3.95	40	17.83	3.57	ns
Self efficacy (Pearlin) at BL	37	2.84	0.54	40	2.93	0.40	ns
Self esteem (Rosenberg) at BL	37	12.65	2.58	40	12.95	2.44	ns
Knowledge of infant development (KIDI) at BL	37	73.13	7.20	40	71.86	6.63	ns
Positive parenting attitudes (AAPI) at BL	37	119.68	13.23	40	119.68	13.00	ns
Physical Health Condition at BL	37	0.70	0.46	40	0.83	0.38	ns
Mental Health Condition at BL	37	0.38	0.49	40	0.18	0.38	p<.10
Smoking during pregnancy at BL	37	0.51	0.51	40	0.55	0.50	ns
Drinking during pregnancy at BL	37	0.35	0.48	40	0.25	0.44	ns
Drug ever used at BL	37	0.19	0.40	40	0.10	0.30	ns
Child is a girl	37	0.65	0.48	40	0.40	0.50	p<.05

Note: N= sample size, M=mean, SD=standard deviation. § p <.10, * p < .05, ** p < .01. p-values were obtained from two-sided t test based on permutation testing with 1000 replications.

Post-Birth Engagement

Since participants entered the programme at different stages of pregnancy, thus affecting the total number of home-visits received, the comparison in Table 6.5 may be misleading. To remove the effect of differing lengths of time in the programme, Table 6.6 examines the characteristics associated with high and low engagement between the baby's birth and six months. It shows that of the 23 maternal characteristics examined, five were statistically significant. Specifically, mothers who were married during pregnancy, mothers with higher cognitive resource scores ($p<.05$), mothers with more positive mental well-being during pregnancy ($p<.10$), mothers who had a greater knowledge of child development during pregnancy ($p<.10$) and mothers who have used drugs ($p<.10$) were more likely to receive more than 7 (median) home visits between the birth of their child and six months. Note, however that only maternal cognitive resources was significant at the 5% level.

Table 6.6

Testing Differences between High Engaged Participants versus Low Engaged Participants from Child's Birth to Six Months

Variables	High Engaged Group			Low Engaged Group			Individual Test
	N	Mean	SD	N	Mean	SD	p
Weeks in pregnancy at entry	37	22.81	8.33	40	21.90	7.12	ns
Mother's age	37	26.14	5.51	40	24.53	5.90	ns
Partnered	37	0.86	0.35	40	0.73	0.45	ns
Married	37	0.22	0.42	40	0.08	0.27	p<.10
Living with parent(s)	37	0.51	0.51	40	0.58	0.50	ns
First time mother	37	0.49	0.51	40	0.60	0.50	ns
Low education	37	0.32	0.47	40	0.28	0.45	ns
Mother employed	37	0.43	0.50	40	0.35	0.48	ns
Saves regularly	37	0.43	0.50	40	0.53	0.51	ns
Social housing	37	0.57	0.50	40	0.55	0.50	ns
Cognitive resources (WASI) at 3MO	35	85.49	11.13	39	78.92	11.92	p<.05
Mental well-being (WHO5) at BL	37	14.54	4.76	40	12.70	4.93	p<.10
Vulnerable attachment (VASQ) at BL	37	18.43	3.55	40	17.80	3.93	ns
Self efficacy (Pearlin) at BL	37	2.92	0.49	40	2.86	0.47	ns
Self esteem (Rosenberg) at BL	37	13.19	2.49	40	12.45	2.48	ns
Knowledge of infant development (KIDI) at BL	37	73.90	6.96	40	71.14	6.65	p<.10
Positive parenting attitudes (AAPI) at BL	37	119.84	13.08	40	119.53	13.14	ns
Physical Health Condition at BL	37	0.70	0.46	40	0.83	0.38	ns
Mental Health Condition at BL	37	0.30	0.46	40	0.25	0.44	ns
Smoking during pregnancy at BL	37	0.54	0.51	40	0.53	0.51	ns
Drinking during pregnancy at BL	37	0.30	0.46	40	0.30	0.46	ns
Drug ever used at BL	37	0.22	0.42	40	0.08	0.27	p<.10
Child is a girl	37	0.62	0.49	40	0.43	0.50	ns

Note: N= sample size, M=mean, SD=standard deviation. § p <.10, * p < .05, ** p < .01. p-values were obtained from two-sided t test based on permutation testing with 1000 replications.

Multivariate Models

Although Tables 6.5 and 6.6 provide some descriptive information on the relationship between mother characteristics and programme engagement, in order to investigate this issue more rigorously, we also conducted regression analyses. Two linear regression models were estimated. The first model, presented in Table 6.7, reports the impact of the maternal characteristics on the total number of home visits between programme entry and six months. The second model, presented in Table 6.8, reports the impact of the maternal characteristics on the total duration of home visits between programme entry and six months.

Total Engagement

Table 6.7 shows that 5 of the 23 maternal characteristics had a significant impact on the frequency of home visits between programme entry and six months. Specifically, mothers who joined the programme earlier during pregnancy (p<.05), mothers with higher cognitive resource scores (p<.10), mothers with more vulnerable attachment style during pregnancy (p<.05), and mothers who ever used drugs (p<.10) received a greater number of home visits, while those who smoked during pregnancy received less home visits between programme entry and six months. The only characteristic which was significant in both the bivariate and multivariate analyses was maternal cognitive resources

Post-Birth Engagement

Three of these characteristics, weeks in pregnancy at entry (p<.10), maternal cognitive resources (p<.05), and vulnerable attachment style (p<.10) were also associated with a greater number of home visits between the child's birth and six months. Finally, while smoking during pregnancy and drug use was not associated with the number of home visits in the post-birth period, mothers who had a past physical health condition (p<.10) were engaged in less home visits during this period.

Table 6.7

OLS Regression Model of Frequency of Home Visits

Dependent	Total Frequency of home visits			Post-natal Frequency of home visits		
Variables	Coef.	SE	p-value	Coef.	SE	p-value
Weeks in pregnancy at entry	-0.198	0.096	p<.05	0.105	0.059	p<.10
Mother's age	0.301	0.201	ns	0.176	0.124	ns
Partnered	0.828	2.036	ns	1.520	1.258	ns
Married	-1.156	2.317	ns	-1.490	1.431	ns
Living with parent(s)	0.882	1.658	ns	0.265	1.025	ns
First time mother	-0.108	2.073	ns	0.424	1.281	ns
Low education	0.198	1.717	ns	-0.215	1.061	ns
Mother employed	1.551	1.621	ns	1.001	1.002	ns
Saves regularly	-0.956	1.535	ns	-0.854	0.949	ns
Social housing	-0.088	1.520	ns	1.032	0.939	ns
Cognitive resources (WASI) at 3MO	0.136	0.075	p<.10	0.107	0.046	p<.05

Mental well-being (WHO5) at BL	0.001	0.165	ns	-0.010	0.102	ns
Vulnerable attachment (VASQ) at BL	0.458	0.218	p<.05	0.251	0.135	p<.10
Self efficacy (Pearlin) at BL	-0.992	1.965	ns	-0.030	1.214	ns
Self esteem (Rosenberg) at BL	0.180	0.401	ns	-0.062	0.247	ns
Knowledge of infant development (KIDI) at BL	0.071	0.119	ns	0.016	0.074	ns
Positive parenting attitudes (AAPI) at BL	-0.022	0.057	ns	-0.013	0.035	ns
Physical Health Condition at BL	-2.930	1.919	ns	-2.372	1.186	p<.10
Mental Health Condition at BL	1.260	1.756	ns	0.720	1.085	ns
Smoking during pregnancy at BL	-2.955	1.640	p<.10	-0.633	1.013	ns
Drinking during pregnancy at BL	-0.669	1.576	ns	-0.576	0.974	ns
Drug ever used at BL	3.602	2.115	p<.10	2.037	1.307	ns
Child is a girl	1.468	1.528	ns	0.322	0.944	ns
Constant	-9.644	15.344	ns	-11.252	9.481	ns
N	74			74		
Adj. R2	0.2522			0.094		

Notes: Regression coefficients (Coef), standard errors (SE) and p-values obtained from an OLS regression.
§ p<.10, * p < .05, ** p < .01.

Duration of Home Visits

Table 6.8 shows that 5 of the 23 maternal characteristics had a significant impact on the total duration of home visits between programme entry and six months. Specifically, mothers who joined the programme earlier in pregnancy (p<.10), older mothers (p<.05), mothers with higher cognitive resource scores (p<.01) and mothers with a more vulnerable attachment style during pregnancy (p<.05), spent more time in home visits between programme entry and six months, while mother's previously diagnosed with a physical health condition spent less time in home visits during this period (p<.01). Similarly, the same characteristics, with the exception of vulnerable attachment style, were associated with the duration of home visits in the post-birth period.

Table 6.8
OLS Regression Model of Duration of Home Visits

Dependent	Total Duration of home visits			Post-natal Duration of home visits		
Variables	Coef.	SE	p-value	Coef.	SE	p-value
Weeks in pregnancy at entry	-10.16	6.02	p<.10	7.54	4.08	p<.10
Mother's age	26.35	12.65	p<.05	13.98	8.57	ns
Partnered	60.08	127.88	ns	96.59	86.61	ns
Married	-173.06	145.54	ns	-149.46	98.57	ns
Living with parent(s)	27.33	104.17	ns	-18.02	70.55	ns
First time mother	100.63	130.21	ns	72.65	88.19	ns
Low education	-21.30	107.87	ns	-38.44	73.06	ns
Mother employed	83.25	101.85	ns	61.82	68.98	ns
Saves regularly	-131.74	96.46	ns	-68.59	65.33	ns
Social housing	-23.43	95.50	ns	59.45	64.68	ns

Cognitive resources (WASI) at 3MO	12.78	4.72	p<.01	8.80	3.20	p<.01
Mental well-being (WHO5) at BL	4.18	10.37	ns	-1.05	7.02	ns
Vulnerable attachment (VASQ) at BL	28.14	13.72	p<.05	17.56	9.29	p<.10
Self efficacy (Pearlin) at BL	36.87	123.45	ns	44.55	83.61	ns
Self esteem (Rosenberg) at BL	5.44	25.16	ns	-7.92	17.04	ns
Knowledge of infant development (KIDI) at BL	1.68	7.49	ns	1.22	5.07	ns
Positive parenting attitudes (AAPI) at BL	-3.12	3.57	ns	-1.68	2.42	ns
Physical Health Condition at BL	-221.9	120.54	p<.10	-149.13	81.64	p<.10
Mental Health Condition at BL	92.23	110.33	ns	82.75	74.72	ns
Smoking during pregnancy at BL	-142.16	103.04	ns	-13.75	69.78	ns
Drinking during pregnancy at BL	-40.98	98.99	ns	-11.65	67.04	ns
Drug ever used at BL	102.03	132.88	ns	88.07	90.00	ns
Child is a girl	86.31	96.02	ns	-3.48	65.03	ns
Constant	-1034.09	963.95	ns	-1013.29	652.86	ns
N	74			74		
Adj. R2	0.2821			0.1227		

Notes: Regression coefficients (Coef), standard errors (SE) and p-values obtained from an OLS regression.
§ p<.10, * p < .05, ** p < .01.

6.2.5 Key Findings

The analysis of participant engagement found that families in the high treatment group received an average of 14 home visits by the *PFL* mentors between programme entry and six months. This was substantially below the target of weekly home visits as set out in the *PFL* manual, representing just 31% of the guideline number of home visits for this period. When the *PFL* programme began in 2008, it became apparent that many of the participants did not wish to participate in weekly home visits. Therefore, fearing that continuing to attempt to schedule weekly visits would alienate the participants and possibly cause them to leave the programme, the mentors moved to a model of trying to schedule bi-monthly home visits. Thus, while the original *PFL* manual was based on weekly visits, in reality, bi-monthly visits were a more realistic measure of guideline visits. Re-calculating the proportion of home visits based on bi-monthly visits shows that 62.4% of all guideline home visits were delivered during programme entry and 6 months. This corresponds to the participant data whereby the majority of participants reported meeting their mentor twice a month (68%). In addition, it is consistent with the majority of home visits programmes which are typically based on bi-monthly visits, rather than the weekly model originally adopted by *PFL*. This change in implementation practices reflects a modification to the original *PFL* model in order to improve programme delivery and participant satisfaction.

While the number of home visits delivered deviated from the original *PFL* manual, the average duration of home visits was in line with the manual which recommended that each visits lasted between 30 minutes and two hours. The average duration of home visits during this period was just less than one hour, with visits varying from 34 minutes to just less than two hours. The duration of the visits did not differ across the pre- and post-natal periods.

The results of the implementation analysis also indicate fidelity regarding the low treatment group, with the majority of participants reporting that they met the information officer less than once per month. This is in line with the original *PFL* model which states that the information officer is a resource which participants can avail of, if needed, and the information officer should not play the same role as a mentor.

The analysis regarding whether the level of engagement differed for different types of participants indicated that few individual participant characteristics were associated with the frequency or duration of home visits. The four primary factors consistently associated with engagement in the multivariate analysis were timing of programme entry, cognitive resources, vulnerable attachment style and physical health. As expected, mothers who entered the programme earlier in pregnancy had more home visits and subsequently spent more time in the programme. We also found that mothers with higher cognitive resources engaged in a greater number of home visits and spent more time in the programme. To the best of our knowledge, few studies to date have linked cognitive scores to participant engagement; therefore it is difficult to corroborate this finding in the literature. However, an evaluation of the Nurse Family Partnership found that the number of home visits decreased as the level of psychological resources increased, measured by intelligence (Shipley Scales of Adaptive Living), mental health, coping skills, self-efficacy, and active coping (Olds and Korfmacher, 1998). Yet this finding was attributed to nurses varying their contact with families based on perceived need. In addition, an evaluation of the Infant Health and Development Program (IHDP) found that children who received a higher dosage of the programme, defined as more than 400 days of centre-based care, were more likely to have mothers with a high school degree (Hill, Brooks-Gunn, Waldfogel, 2003). The finding that mothers with relative higher cognitive resources engaged more with the programme may be related to their ability to understand the programme materials and recognise the need for the programme in their lives. It may also indicate that the programme may not be meeting the needs of mothers with relatively lower cognitive resources.

The association between mother's attachment style and programme engagement is also rarely examined in the literature, yet it can be linked to theory. Mentoring is based on building a one-to-one relationship with participants, thus mothers with vulnerable attachment may appreciate the efforts of the mentor to engage with the participant and reciprocate this relationship. Finally, there is also evidence that participants who had a physical illness were less likely to engage with the programme. This finding is not unexpected as participants with health problems may be less able to engage with the programme.

Overall, we found little evidence to suggest that factors which are often identified as determinants of engagement are present in this sample. For example, factors such as maternal age, marital status, employment status, personality and socio-emotional functioning were not associated with engagement in *PFL*. In addition, it is important to note that the level of engagement was not associated with socioeconomic factors, (i.e. education, social housing, savings) or parenting behaviour (as measured by the AAPI and KIDI). However, this analysis was restricted to engagement with programme from entry to six months. It is possible that the individual factors associated with engagement may change over time. Thus we will continue to monitor engagement in future reports.

6.3 *PFL* Participant Satisfaction up to Six Months of Age

Participant satisfaction is an important aspect of any intervention as it can greatly impact commitment and engagement (Rao, 2000). Participant satisfaction i.e. the perception that the programme has been personally valuable, has been used as an indicator of the quality of care received from a programme (Christ et al, 2007; Duggan et al, 1999) and is a central factor in most definitions of service effectiveness (McMurtry & Hudson, 2000). In addition, client satisfaction data may be used to convince funders and other stakeholders of programme effectiveness (Scheirer, 1978). Researchers have suggested that satisfaction may act as a moderator of treatment outcomes as less satisfied clients may have different responses to the intervention (Atkisson & Pascoe, 1983); however, to our knowledge, this relationship has not been tested.

According to previous findings, parents have reported high levels of satisfaction with home visiting programmes (Barth, 1991; Chaffin et al, 2004; McNaughton, 1994). Parents who report the highest level of satisfaction tend to be from a higher SES backgrounds (Jansson, Sivberg, Larsson, & Uden, 2002), have younger children (Summers, Hoffman, Marquis, Turnbull & Poston, 2005), and have the lowest expectations from the programme (Meyers & Blacher, 1987). In addition, satisfaction ratings are generally higher for home visiting programmes than for clinic based programmes (Christ et al., 2007). Other factors which are related to client satisfaction include the perceived quality of care and the quality of personal relationships with the programme staff (Horvath & Greenberg, 1989; Laferriere, 1993). Programmes which are perceived to provide more personal care in terms of communication and client involvement have also received higher satisfaction ratings (Cleary & McNeil, 1988).

However, there are a number of problems with measures of client satisfaction. High ratings of satisfaction have been provided for programmes which have been shown to have negative outcomes (Chafin & Friedrich, 2004), as well as for programmes where families reported not being able to access the services that they wanted (McWilliam et al., 1995). It may be that parents feel indebted to service providers and therefore obliged to give high satisfaction ratings. Parents may also fear disruption of services if poor satisfaction is reported. Alternatively, participants may feel that providing negative ratings of parenting programmes might reflect poorly on their skills as a parent, as they have the ultimate responsibility for their child's development and growth (Wesley, Buysse & Tyndall, 1997). This literature suggests that while client satisfaction may be an important indicator of engagement in intervention programmes, it may not be an accurate reflection of programme efficacy.

6.3.1 Instruments

Client Satisfaction

Client satisfaction was measured using the Client Satisfaction Questionnaire (CSQ: Turner, Markie-Dadd, & Sanders, 1998). The CSQ *(*α = .88) is an adaption of the Therapy Attitude Inventory (Eyberg, 1993) which was developed to measure consumer satisfaction with parent training programmes. The CSQ addresses the clients' perception of the quality of the service that they received, how well the programme met both their needs and their child's needs, and whether the programme increased the parent's skills and reduced the child's problem behaviours. The CSQ contains 14 questions relating to how the participant feels about the programme. Questions

1-12 are scored on a 7-point scale ranging from negative to positive ratings while items 13 and 14 are open ended questions. The 'Total Satisfaction' measure is the sum of the other twelve measures *except* the 'improved relationship with partner' measure, as this was a rooted question dependent on whether the participant reported having a partner, thus implying a minimum value of 11 and a maximum value of 77 for the total score. Imputation was used to a limited extent for the CSQ measures (one to two observations in most cases), based on replacement with a sample mean plus a random residual, except in the case of the rooted question mentioned above, which had an increase in sample size of about 30% following imputation.

6.3.2 Results

Comparison of Client Satisfaction in High and Low PFL Treatment Groups

Table 6.9 compares the high and low treatment groups based on the Client Satisfaction Questionnaire. The first row reflects the 'Total Satisfaction' score and the remaining rows reports the 12 individual item measures. The third and fourth columns of Table 1 report mean values for the high and low treatment groups, respectively, with the respective standard deviations given in parentheses below. Right-sided *p*-values are reported beside the mean values, with t-tests based on unequal sample size and variance, where permutation is conducted with 1,000 replications. The final column gives the standardised effect size as measured by Cohen's *d*-statistic.

First, total satisfaction with the programme is in the hypothesized direction, such that the high treatment group reported greater satisfaction with the programme than the low treatment group, with mean values of 70.93 and 64.04 for each group, respectively ($p<.01$, $d=0.82$). Ten of the individual twelve programme satisfaction measures showed statistically significant differences between the high and low treatment groups, with the high treatment group consistently reporting greater satisfaction than the low treatment group on quality of the services received ($d=0.52$); whether the participant received the type of help they wanted ($d=0.69$); whether the programme met the child's needs ($d=0.66$); whether the programme met the mother's needs ($d=0.61$); the amount of help the mother and child received ($d=0.55$); whether the programme helped the mother to deal more effectively with their child's behaviour ($d=0.74$); whether the programme helped the mother to deal more effectively with family problems ($d=0.58$); whether the programme improved the mother's relationship with their partner ($d=0.50$); overall satisfaction with the programme ($d=0.54$); and whether the programme helped to develop skills that can be applied to other family members ($d=0.62$). Mothers' reports of child behaviour ($p>.10$, $d = 0.10$) and mothers' feelings about their child's progress ($p>.10$, $d=0.02$) were not statistically significant across the two groups.

In terms of the areas in which the participants were most satisfied, the high treatment group reported the greatest satisfaction with whether they had received the type of help they wanted, followed by feelings about the child's progress and overall satisfaction with the programme. They reported the lowest level of satisfaction with whether the programme had improved the participant's relationship with their partner and help with family problems. The low treatment group reported greatest satisfaction with child's progress, followed by satisfaction with the child's behaviour. Similar to the high treatment group, the low treatment group reported least satisfaction with whether the programme improved their relationship with their partner.

Table 6.9
Participant Satisfaction: ***High and Low Treatment Groups***

Variable	N (n_{HIGH}/ n_{LOW})	M_{HIGH} (*SD*)	M_{LOW} (*SD*)	Individual Test p[1]	Effect Size *d*
Total Satisfaction	83/90	70.93 (5.87)	64.04 (10.33)	<0.01	0.82
Quality of services received	83/90	6.63 (0.78)	6.13 (1.09)	<0.01	0.52
Received type of help wanted	83/90	6.82 (0.50)	6.16 (1.25)	<0.01	0.69
Programme met child's needs	83/90	6.28 (1.03)	5.29 (1.85)	<0.01	0.66
Programme met mother's needs	83/90	6.41 (0.96)	5.56 (1.74)	<0.01	0.61
Amount of help received	83/90	6.65 (0.89)	5.99 (1.44)	<0.01	0.55
Help deal with child's behaviour	83/90	6.31 (1.02)	5.46 (1.29)	<0.01	0.74
Help deal with family problems	83/90	5.78 (1.33)	5.04 (1.25)	<0.01	0.58
*Improved relationship with partner**	83/90	4.65 (1.26)	4.08 (1.05)	<0.01	0.50
Overall satisfaction	83/90	6.72 (0.65)	6.16 (1.31)	<0.01	0.54
Helped develop skills	83/90	6.22 (1.16)	5.28 (1.79)	<0.01	0.62
Child's behaviour	83/90	6.37 (1.03)	6.27 (1.15)	ns	0.10
Child's progress	83/90	6.73 (0.63)	6.72 (0.56)	ns	0.02

Notes: 'N' indicates the sample size. 'M' indicates the mean. 'SD' indicates the standard deviation. '*' indicates that this measure was not used to compute 'Total Satisfaction'. [1] one-tailed (right-sided) p value from an individual permutation test with 1,000 replications. 'ns' indicates the variable is not statistically significant. 'p<.01', 'p<.05' and 'p<.10' indicate that the test is statistically significant at the 1%, 5%, and 10% level respectively.

6.3.3 Key Findings

Overall, participant satisfaction with the programme between programme entry and six months was high. As expected, the high treatment group reported greater satisfaction with the programme than the low treatment group. This reflects the greater number of supports and services provided to the high treatment group. However, it is interesting to note that the low treatment group reported relatively high levels of satisfaction with the programme given the minimal supports they receive. The high treatment group participants reported greatest satisfaction with having received the type of help they wanted, followed by satisfaction regarding child progress and overall satisfaction with the programme. The low treatment group reported that they were most satisfied with the child's progress and behaviour. That both groups reported less satisfaction with how the programme has improved relationships with their partner may reflect the goals of the programme which aim to improve child outcomes rather than family relationships.

CHAPTER 7: Participant and Staff Perceptions of the *PFL* Programme

The quantitative data collected as part of the impact evaluation provides useful information concerning the impact of the *PFL* programme. However, the qualitative data collected as part of the implementation evaluation can enrich these findings by examining the experiences of the *PFL* programme staff and participants during the early stages of the programme. This information can be used to address the issues of programme fidelity and satisfaction, in addition to providing insights into the findings of the main results. In order to gain insight into the views and experience of both the *PFL* participants and the *PFL* implementation team focus groups were held with *PFL* programme participants and individual semi-structured interviews were conducted with seven *PFL* staff members. Sections 7.1 and 7.2 present a summary of the findings from the qualitative data collected from participants and staff respectively. Section 7.3 discusses the interrelatedness of both sets of findings regarding the main themes and issues which emerged.

7.1 Focus Group

Focus groups are a research technique consisting of a series of discussions designed to elicit participant views in relation to a specific topic of interest in a casual, non-threatening environment (Krueger & Casey, 2000). The primary function of this technique is to gather qualitative data from a group of individuals who have undergone a similar concrete experience on which the focus group is grounded (Stewart, Shamdasani, & Rook, 2007).

7.1.1 Methods

Selection of Participants

Focus groups were conducted with a sub-sample of mothers participating in the *PFL* programme. Consent to participate was obtained during initial recruitment into the programme. *PFL* participants from both the high and low treatment group were invited to take part in focus groups if 1) they had consented to participate in group discussions at initial recruitment and 2) their baby was at least two months old. 96% of child-age-eligible mothers gave permission to be contacted regarding group discussions. In total, 24 mothers in the high treatment group and 31 mothers in the low treatment group were eligible to take part in the first wave of focus groups.

Response and Attendance Rates

Of the 16 high treatment group participants who agreed to take part in the focus groups, 11 (68.8%) participated resulting in an overall participation rate of 45.8% for participants in the high treatment group. Five (31.3%) of the participants who agreed to participate did not show up for the focus group at the scheduled time.

Of the 19 (61.3%) low treatment group participants who agreed to take part, 12 (63.2%) participated resulting in an overall participation rate of 38.7% for participants in the low treatment group. Seven (36.8%) participants indicated that they would participate in the focus group, but did not show up at the scheduled time.

Procedure of Focus Groups
The focus groups were led by a trained and experienced moderator. An assistant moderator was also present to take notes of issues that may not have been evident on the audio recording.

Five focus groups were conducted including two with high treatment group participants (5 participants in each) and three with low treatment group participants (8, 3, and 2 participants, respectively). Although focus groups were conducted separately for each treatment group, a high treatment group participant attended one of the focus groups designed for low treatment group participants. This did not become evident until after the focus group began. While we considered using this focus group as a pilot, we found that there was a richness of data within the transcripts from this focus group which could contribute to the findings. Additionally, the same themes identified in this focus group were common across other focus groups and the presence of this participant did not seem to compromise the quality of the group. Therefore, this information was included in the present analysis.

Focus groups were audio recorded after gaining participant consent to do so. Prior to the focus groups, a topic guide was designed by the research team to ensure the group discussion was focused on the questions believed to be most relevant to the process evaluation. This topic guide consisted of a series of six discussion points outlined below.

- How do you all feel about the *Preparing for Life* programme?
- How have your experiences in *PFL* matched your expectations?
- Discussion of relationship with mentor/information officer.
- Do you all feel you have benefitted/not benefitted from the programme?
- How do you all find *PFL* fits in with your daily routine?
- Discussion of suggested improvements for the programme.

The moderator used the above points to facilitate the focus groups and generate discussion related to participant satisfaction and experiences with the *PFL* programme. To encourage further discussion, each key point contained a series of probing questions. The moderator proposed questions to the group as whole, but participants were encouraged to talk about their responses between themselves in a conversational manner. Before concluding the focus group, the moderator invited participants to share any additional information or thoughts about the *PFL* programme to ensure that the sentiments of all participants were reflected in the data. All focus groups were fully transcribed and checked for accuracy by members of the *PFL* evaluation team.

Description of Participants and Duration of Focus Groups
All participants were Irish and female. They ranged in age from 18 to 37 years old and were, on average, 26.73 (*M*green= 28.90; *M*blue= 24.92) years old. They had been in the *PFL* programme for between five and 21 months, with an average of 11.59 (*M*green= 11.80; *M*blue= 11.42)

months. Finally, their babies ranged in age from two to 17 months old and were, on average, 7.41 (*M*green= 8.00; *M*blue= 6.92) months old.

Focus groups held with the high treatment group were longer in duration than those held with the low treatment group (*Mins*green= 37.84; *Mins*blue= 28.54). Given the structure of the intervention, participants in the high treatment group have more interactions with the programme, thus they may have had more to discuss.

7.1.2 Thematic Analysis

An inductive approach was used to identify latent themes or ideas that were relevant and significant for the research question. Specifically, a thematic analysis was conducted to identify, analyse, and report themes, or 'patterned responses' in the data.

The thematic analysis was conducted by two researchers to allow greater reliability in the coding of themes. The analysis involved a six step process as outlined by Braun & Clarke (2006). Firstly, the researchers familiarised themselves with the data. This involved each researcher independently reading and re-reading focus group transcripts and making notes about possible themes, or meanings, from the content of the data. Secondly, the researchers independently generated initial codes, or labels given to units of meaning within the transcript (e.g., a phrase, an interaction between participants, a lengthy description), which represented relevant information for the research question. Thirdly, the researchers met to search for themes in the data. During this phase, the researchers discussed the codes that they had identified within the dataset and they grouped the codes with similar meaning into overarching themes. During the fourth phase, the researchers reviewed the themes and designed a thematic map of the data. In this step of the process, there was further development of the themes previously identified and adjustments were made as necessary. Fifth, the researchers defined and named the themes. This involved individual deliberation of each theme wherein the researchers developed an understandable and clear description of each theme. Finally, the researchers produced the current report. This involved selecting excerpts from focus groups to clearly illustrate the identified themes and prepare a description and analysis of the themes. As the focus group transcripts represent an interactive group discussion, rather than individuals talking in isolation, relevant examples illustrating group construction of an idea are provided where possible.

7.1.3 Focus Group Results

Note: All names in this section have been changed to protect the anonymity of participants.

A total of five main themes were identified in the focus group data: *PFL* Staff and Participant Rapport, Efficacy of Intervention Delivery, Whole Family Model of Support, Familiarity with the *PFL* Programme Affect Satisfaction, Autonomy of Mother within *PFL*. Four of these themes were common to both the high and low treatment groups, and one was unique to the high treatment group. Within some main themes, a number of subthemes were identified and these also are presented and discussed where relevant. Themes and subthemes are reflected in Table 7.1 below.

Table 7.1
Focus Group Themes and Subthemes

Themes	Sub Themes
***PFL* Staff and Participant Rapport**	Positive Interpersonal Attributes of *PFL* Staff Perceived Support One on One Dynamic of Relationship Valued Respectful Delivery of Service Less Comfortable Initiating Contact with Information Officer
Efficacy of Intervention Delivery	Increasing Awareness of Child Development for Parents Information Help with Other Life Issues
Whole Family Model of Support	
Familiarity with the *PFL* Programme Affect Satisfaction	Comprehension of *PFL* Programme Affects Satisfaction Original Perception of *PFL* as Interfering or Supervisory Confusion Regarding Treatment Groups Expectation of *PFL* as a Social Group
Autonomy of Mother within *PFL*	Control and Choice Flexibility Greater Contact in Beginning Stressful

PFL Staff and Participant Rapport

Participants from both the high and low treatment groups made reference to the level of rapport which their mentor or information officer has developed with them. Overall, the relationship between the mothers and the mentors or information officers was perceived positively. Several subthemes emerged relevant to this rapport. These include Positive Interpersonal Attributes of *PFL* Staff, Perceived Support, One-to-one Dynamic of Relationship Valued, Respectful Delivery of Service and Less Comfortable Initiating Contact with Information Officer.

Positive Interpersonal Attributes of PFL Staff

Participants in the high treatment group referred to the interpersonal attributes of their mentors in positive terms. Words and phrases such as 'She's brilliant,' 'friendly,' 'nice,' 'welcoming,' 'thoughtful,' 'patient,' and 'lovely' were used by focus group participants when describing their mentors, illustrating the positive feelings and the personal nature of the relationships that have developed.

> *Aisling:* It's like a friendship as well, isn't it?
> *Amy:* Yeah.
> *Aisling:* 'Cause you see them a lot and you're building up relationships with people.
>
> *(High Treatment Group)*

Similarly, some participants in the low treatment group referred to the positive interpersonal attributes of their information officer, which have made the interaction with the *PFL* programme a more enjoyable experience.

> *Mary:* None of them are very pushy or anything. They're all really nice and every time you go in they always have a smile for ya and you know you're not going to meet, to meet a grouch. […]And it's nice to go too because you know you're going to see someone nice that'll be nice to you and that you can have a chat with and have a laugh with as well, you know? So it takes some of the

> stress away 'cause you're focusing on something else. I know you're talking about the kids, but you're focusing on something else.
>
> *(Low Treatment Group)*

Participants felt that they had developed personal relationships with their mentor or information officer and, in both treatment groups, indicated that they would be reluctant to change their allocated mentor or information officer after such a relationship has developed.

> *Moderator:* You got to know (your mentor)?
> *Aisling:* Yeah and she got to know me baby, like she knows him, he's one and a half now, she met him when he was about six months so he knows her now. You know like that and I don't think he will know that other one.
>
> *(High Treatment Group)*

Perceived Support

Participants in both the high and low treatment groups referred to the support they perceive in their relationships with their mentor or information officer. Although this theme emerged in both treatment groups, the types of support discussed differed. Specifically, the high treatment group discussed psychological and emotional support from their mentors. They expressed that their mentors were someone they could trust and talk to candidly about not only parenting issues, but other life difficulties as well.

> *Niamh:* She's like my counsellor.
> *Shauna:* I know, definitely. You could say anything and you know it won't go any further.
> *Aoife:* No, it doesn't go any further.
> *Shauna:* Yeah, absolutely. It's brilliant.
>
> *(High Treatment Group)*

Participants in the low treatment group discussed their perception of support more generally.

> *Mary:* Like it is great and if you need something you can ring up and that, 'cause there has been a time where me, meself, I was going through a bad stage and I did ring up for phone numbers and all and it was great. Got them straight away. […] There's great support for mothers, especially young parents, people around here do you know? When you think you've nobody.
>
> *(Low Treatment Group)*

One-to-one Dynamic of Relationship Valued

Some participants within the high treatment group discussed how much they valued the one-to-one dynamic of the relationship with their mentor. Given that *PFL* is operating in a small community, participants stated that they would feel more comfortable discussing sensitive parenting issues on a one-to-one basis, rather than in a group format. This one-to-one dynamic was considered a positive feature of the programme as it allowed participants to form a personal relationship with the *PFL* staff.

> *Amy:* …but I don't think that a group would suit because I know meself that I wouldn't be into, into sitting here like expressing how I felt about me baby or me life or what I went through in labour. I'd rather do it one-on-one. […] But I

wouldn't be into it if I had a mentor and three other, three other girls sitting there. I wouldn't speak or ask for things.
Leah: Or if there is something bothering ya
Amy: Yeah, I wouldn't say it.
Leah: …or if you were feeling down you wouldn't say it because you'd feel like you'd be judged or something.

(High Treatment Group)

Respectful Delivery of Service

The high treatment group participants discussed how the mentors work with the mother in a non-judgemental manner; providing parenting information, while simultaneously respecting the opinion and experience of the mother.

Aisling: Yeah, but as well when you have another kid and they don't really like, if they know you know something they just say like, ah well I won't bother you with that because you don't want to be listening to them rambling on about stuff you know like. They just give you the tip sheets to read them yourself like if they think you know it yourself. I think that's good because they're not sitting there reading it off the tip sheets.

(High Treatment Group)

Less Comfortable Initiating Contact with Information Officer

Although participants in the low treatment group feel they have good rapport with their information officer, some participants said that they would feel less comfortable initiating contact with their information officer for a specific issue related to their child's development. It is important to note, however, that some participants would contact their information officer for issues other than child development or parenting, which is in line with the design of the *PFL* programme.

Moderator: Do you think you would approach your information officer though, if you wanted information?
Rebecca: I wouldn't really…
Saoirse: Like if there was something wrong with [my child] I wouldn't ring her …
Eimear: I'd just ring me ma.
Saoirse: I just texted her the other day about a childcare place because I'm starting back in college and I want him to go to crèche, but other than that I wouldn't ask her about anything.

(Low Treatment Group)

Efficacy of Intervention Delivery

Participants in both the high and low treatment groups discussed how useful they perceived the more structured aspects of the intervention to be, particularly in terms of increasing parental awareness, fulfilling information needs, and assisting with other life issues. The sub-themes in this section include: Increasing Awareness of Child Development for Parents, Information and Help with Other Life Issues.

Increasing Awareness of Child Development for Parents

Both the high and low treatment groups indicated that participating in the *PFL* programme provided an increased awareness of issues related to child development and raising children in a safe environment. Participants expressed satisfaction with the information and developmental packs provided by the *PFL* programme and they indicated that the contents of the packs were not items that they would have initially thought of providing for their children.

> *Shauna:* [group discussing the developmental packs]…It's like a starter pack for safety 'cause I didn't even think about it.
>
> *(High Treatment Group)*

> *Saoirse:* and like with the free little mats and all like. I woulda never thought of buying him one of them little play mats and he loves playing with it.
>
> *(Low Treatment Group)*

Information

Both the high and low treatment groups discussed their satisfaction with the practical information provided by the *PFL* programme and the idea that their mentor or information officer is a source of information for a variety of issues that they may experience. It is interesting that, not only did participants view the information provided by *PFL* as practical and helpful, but that they also found the information reassuring. Participants in the high treatment group stated that the information provided helped to put their mind at ease and provided reassurance to a sometimes nervous mother or mother-to-be.

> *Shauna:* Maybe with the labour, before, 'cause it was obviously my first and I was really nervous about the labour, like really working myself up into a sweat and every time I talked to [my mentor] I'd feel better afterwards 'cause she'd be like, just, just, kinda like embrace it. Not embrace the pain, but like she was giving me hints on things to do. Like I started doing that exercise that she told me to do and it made me feel better straight away like. So things like that, that was a major one for me now 'cause I was terrified, absolutely terrified.
>
> *(High Treatment Group)*

In the case of the low treatment groups, although the information officer does not provide information related to parenting, the information that was provided was appreciated and seen as practical and helpful.

> *Moderator:* And how do you find the information that you got from [IO]?
> *Eimear:* I think it's great, the information. Like they give you this thing of phone numbers. You know, emergency numbers like.
> *Rebecca:* Ah yeah, I think that's good.
> *Eimear:* Yeah, that's great. And then they give you like books. Like how to just say how to do this like, do you know? […] Like health and safety, do you know things like that? Like things like that.
> *Saoirse:* Yeah. They were helpful.
>
> *(Low Treatment Group)*

Additionally, some participants in the low treatment group referred to how the information helped to reassure them about their child's development. For example, participants noted that a

PFL organised talk given by a child behaviour specialist was helpful at providing information regarding typical child development.

> *Mary:* Like with your man, [child behaviour specialist], is it? Yeah. I found him great, the first time I came up to him I found him great and he got some of the worries away from me – do you know about how kids act and all 'cause I'm sitting there and it was more [my older child] I was worrying about than the baby. But um, do you know, just information things about kids. As they get older, not what they should be doing, but do you know stuff that normal, not normal, but average kids do. Do you know, just average stuff, they'll climb this, they'll do this.
>
> *(Low Treatment Group)*

Furthermore, both the high and low treatment groups discussed the added benefit of the *PFL* programme for first time or young mothers. Although both groups discussed this added benefit, their reasons were different. Specifically, the high treatment group discussed the extra benefit of parenting information for first time mothers, whereas the low treatment group focused on the added benefit of support.

> *Erin:* Like when it's your first baby and you don't know anything it's grand getting the tip sheets because it kinda prepares you a little bit more.
>
> *(High Treatment Group)*

> *Emma:* ...just knowing the support is there. That's it really.
> *Mary:* It does take some of the weight off your shoulders.
>
> *(Low Treatment Group)*

Although the overall sentiment in the high treatment group about the information provided, particularly on the tip sheets, was positive, one participant did express a desire for the *PFL* programme to offer more information regarding managing sibling rivalry and jealousy of older children when a new baby enters the family.

> *Amy:* …The one thing I will say to you is that you should give more tips on regards to how the nine year old feels when the baby arrives as regards to jealousy and things like that.
>
> *(High Treatment Group)*

The high treatment group discussed their thoughts regarding the timing of the intervention delivery via the *PFL* tip sheets. Specifically, the tip sheets regarding labour were discussed and it was advised by participants that these sheets should be given out earlier in the programme in case the pregnant woman goes into labour earlier than expected.

> *Amy:* Just the stages of labour and things like that. They need to be given out first off and not waiting until you're like eight and a half months or nearly nine months pregnant, do you know what I mean?
> *Leah:* Just to be prepared like if your waters break or anything like because I nearly had heart failure, like me waters broke in work so I didn't know what to do.
>
> *(High Treatment Group)*

The high treatment group also indicated that more information was needed for fathers. Although participants felt that the *PFL* mentors worked well with and included fathers, the idea of tip sheets specifically focused on fathers was suggested.

> *Erin:* It's a good way they do the tips for the dad as well because me fella was, didn't, hadn't even held a baby before. Probably better to have like more tips for them as well though. 'Cause he got a few that weren't too bad, but they kinda left out a bit.
>
> *(High Treatment Group)*

Finally, although the majority of the low treatment group found the information practical and helpful, one participant expressed her disregard for the information provided by *PFL*.

> *Saoirse:* Yeah, yeah. I got that. It went into the bin when I got home.
>
> *(Low Treatment Group)*

Help With Other Life Issues

The final subtheme to emerge in both the high and low treatment groups in relation to intervention delivery was the willingness of the *PFL* team to help with other life issues. Specifically, the participants discussed the helpfulness of *PFL* staff in terms of issues related to social welfare benefits, locating a place in the crèche, and attending courses.

> *Aisling:* They give you all different courses to go on and all and if you need help with education or anything like that they try to get you into places and they're very helpful.
> *Leah:* Yeah, she's helping me get a place for me baby in a crèche for when I go back to work as well. So if you need a place with Jigsaw I think it is, I think his name is [*PFL* staff name], he'll go over and talk to them and see if there's anything he can do for me.
>
> *(High Treatment Group)*

Whole Family Model of Support

A theme that was unique to the high treatment group involved the notion of a whole family model of support provided by the *PFL* mentor. Participants stated that *PFL* not only has benefits for the specific *PFL* child within the family, but for the older children, the mother, and the father as well.

> *Aoife:* Well if you have questions about your other kids I find it very helpful.
> She's very good, yeah. It's not just [*PFL* baby]. It's the three of them.
> *Sinead:* It's not just about the baby, it's about the whole lot of them.
> *Aoife:* Yeah, it's the whole family as one, it's not just separately.
>
> *(High Treatment Group)*

Also, participants in the high treatment group appreciated that the *PFL* mentor had a genuine interest in the mother's well-being, in addition to that of the child. Participants referred to how motherhood was often a time when the focus of others was on the new baby, so the consideration which the mentors show for the mothers themselves was appreciated.

> *Sinead:* And they ask about yourself as well like, 'are you ok?' and 'how's things?' and 'hope you're not sick or anything.'
>
> *(High Treatment Group)*

Familiarity with the *PFL* Programme Affects Satisfaction

An important finding from the focus groups was that original misconceptions of the programme may have discouraged new participants from joining and that confusion or misunderstanding regarding the level of contact or activity among the different treatment groups may affect satisfaction with the *PFL* programme. The sub-themes identified in this section include: Original Perception of *PFL* as Interfering or Supervisory, Confusion Regarding Treatment Options and Expectation of *PFL* as a Social Group.

Original Perception of PFL as Interfering or Supervisory

Originally, both the high and low treatment groups believed that *PFL* would play more of a supervisory role in its approach to parenting. Participants in both groups indicated that they expected *PFL* to interfere and critique their parenting skills, rather than to provide support. However, participants reported that their feeling about the programme changed over time.

> *Niamh:* To be honest? I thought it was gonna be somebody interfering. I did, no seriously. Like social services or something, oh no you're not doing this right, you're not doing that right.
>
> *(High Treatment Group)*

> *Laura:* Yeah, I thought it was about like people just seeing how you're rearing your child. Comparing ya to other people. Checking on ya.
> *Clodagh:* I thought that as well.
>
> *(Low Treatment Group)*

Confusion Regarding Treatment Groups

Members in the low treatment group stated that they did not feel that the programme was as beneficial as the overall community's perception of it. It is plausible that the positive perception of the *PFL* programme in the community may be based on the supports provided to those in the high treatment group. In turn, this could result in a lower appraisal of the programme for those in the low treatment group who do not receive these extra supports. This may also represent a lack of understanding of the randomised design employed by the *PFL* programme and may elucidate why some participants do not view the programme in the same way as others in the community. Furthermore, this may highlight why some participants in the low treatment group are disappointed with their experience of *PFL* to date.

> *Rebecca:* I don't understand how like everyone's telling us it's brilliant like. The questionnaires – are they great, yeah, but other than that I don't really know anything else at all. Like other than getting the free packs off people there, [IO name] and all. Other than that I don't know anything else about it. Everyone's saying it's great, but it's fine.
> *Saoirse:* Everyone, yeah everyone is going around talking about it as if like it's the best thing but…
> *Moderator:* And who's everyone?...

Saoirse: Other people. Like me ma works in a school like and all the schools and teachers and all are talking about it as if like, aw it's great – you get this, you get that.

(Low Treatment Group)

Expectation of PFL as a Social Group

A strong theme common to both the high and low treatment groups related to the extent of social activities and interactions within *PFL*. Both groups stated that their original perception was that *PFL* would have greater a social component. They noted that there were few social interactions among mothers in the programme and were somewhat disappointed that this was the case. In light of this, participants discussed their desire for *PFL* to organise social events where mothers and children could interact.

Kate: I thought it was going to be kinda like, ya know, a play group, ya know like parents and babies come to kinda like a room like this…
Kinda like a crèche kind of a thing, ya know?
Shauna: A mother and baby thing.

(High Treatment Group)

Rebecca: I was expecting like more group discussions and all and more interactions with other people and family groups.
Saoirse: Yeah. You were told about all these tea mornings and all.
Eimear: Yeah, that was cancelled.
Saoirse: That was ages ago. And that was it. I thought that there was loads of them and all. Not that I'd come to them all. I'm just saying that like I just thought that there was loads of things like that.

(Low Treatment Group)

Participants in the high and low treatment groups expressed their desire for more social activities and opportunities to meet with other mothers from the programme. The participants believe that such interactions would benefit both the mothers and children.

Sinead: I was saying to get more, like even once a month or whatever, that all the people […] have coffee and tea together and a nice chat and then all, even with the babies, like a room like this in the kids can be playing at once and the mothers can be sitting and having a nice cup of coffee or tea.
Shauna: Yeah, that'd be nice.
Later in the same focus group…
Kate: Yeah, I think what Sinead was saying as well there about like group meetings like with the children as well, as I think for, they get older a kind of fun day you know like face painting […] Little bouncy castles. They'd be lovely for them all for the children to bond as well as the mothers bond.

(High Treatment Group)

Megan: I think even just getting people together, even when they join the programme 'cause their kids are only born. Like 'cause a lot of us only had newborns then, ya know what I mean? Just so we were able to sit down and 'cause the atmosphere was really relaxed, the babies got their pictures done. Like that there was tea and coffee supplied, but everybody sat down and had a

> little chat and talked about their birth horror stories and that. And then you got to know girls that you mightn't know from around the area, so stuff like that is good.
>
> *(Low Treatment Group)*

Autonomy of Mother within *PFL*

Another theme identified from both the high and low treatment groups concerned the level of autonomy they felt they had within the *PFL* programme. Participants discussed their feelings regarding the amount of contact they have with the programme, the control they have in their relationship with their mentor or information officer, and their frustrations with the inability to attend some of the *PFL* activities. The sub-themes identified in this section include: Control and Choice, Flexibility, and Greater Contact in Beginning Stressful.

Control and Choice

Many participants in the high and low treatment groups expressed satisfaction with the level of control they have in the *PFL* programme. For example, participants in the high treatment group liked the fact that they have the ability to determine how often they meet their mentor.

> *Amy:* Well, I see her every week or two weeks, but she said that whatever suits me like is fine. If I want to see her every week that's fine, every two weeks, that's fine. […] But, I think she's great now.
>
> *(High Treatment Group)*

However, a few participants in the high treatment group voiced some frustration at the level of contact from their mentor and the difficulty in responding to the texts or calls during busy times in their lives. In these cases, they noted that their *PFL* mentor continued to make contact, which participants found frustrating.

> *Aisling:* No, they just ring you all the time.
> *Erin:* Yeah, like if you don't get back to the text like you get bombarded. You just get more and more. 'Cause sometimes you're real busy. Like I was moving and I couldn't.
> *Aisling:* And I'm in hospital a lot of the time so I don't be able to get back to them all the time.
>
> *(High Treatment Group)*

Many participants in the low treatment group were pleased that contact with the information officers is centred around their own schedule and within their control.

> *Mary:* 'Cause you know the way there's some programmes you get in there and you really get in there and they don't leave you alone like and I'd just be like leave me alone, I have things to do, but with *PFL* it goes by you, it doesn't go by them.
>
> *(Low Treatment Group)*

One frustration noted in the low treatment group focused on the difficulty in attending *PFL* events. In line with this, participants in the low treatment group expressed that they would like

to have more input or control as to when such activities take place, therefore affording them a greater opportunity to attend.

> *Tara:* But you'd have to try and get a balance, time-wise and things like that.
> *Megan:* They should ring like to see what times suit ya and then you can say, right well we'll try to get so many days and the people that say three to four, all right well yous have to come this time and then say well the next day, well these are the people that picked four to five and say will yous come at that time.
> *Tara:* and you might get a bit more input that way, do you know what I mean?
> *(Low Treatment Group)*

Flexibility

Another subtheme identified in the high treatment group was the flexibility of the *PFL* staff. In particular, some participants greatly appreciated the flexibility of their mentor.

> *Sinead:* It's good like the way it's flexible because ya don't know when children, something's gonna happen or you're gonna have to go somewhere so it is good in that way that you can even cancel if (interrupted)…
> *Shauna:* And they really don't mind, they're real 'ah yeah, whenever, that's fine, don't worry about it.'
> *Aoife:* They work around us, not themselves. It's around us.
> *(High Treatment Group)*

Greater Contact in Beginning was Stressful

Although many of the participants in the high treatment group indicated that they were currently satisfied with their level of contact with the *PFL* programme, several explained that they did not always feel this way. Specifically, participants expressed frustration with the high level of contact with *PFL* at the beginning of the programme.

> *Sinead:* At the start it was sort of a little bit too much for me because having five children is a lot of work at home, but then once the baby was getting that much older it was more easier for me to come and see them, so it was grand. Just at the start it was a bit stressful, but now it's grand. I don't have to go so many times.
> *(High Treatment Group)*

7.1.4 Focus Group Results Summary

The results from the qualitative data from the *PFL* participants suggest that the high and low treatment group are satisfied with the *PFL* programme. Both the high and low treatment group referred to the support they perceived from the programme, with the high treatment group focusing more on the emotional support for the programme and the low treatment group focusing on the instrumental support provided. The *PFL* participants valued the support provided by *PFL* staff and they reportedly felt comfortable seeking out support if required. Interestingly, participants in the high treatment group perceived that their mentors provided psychological and emotional support, whereas participants in the low treatment group perceived that the information officer provided instrumental support. The different types of support (i.e., emotional vs. instrumental) discussed by participants offer qualitative evidence of fidelity to the *PFL* model as these two types of support are indicative of the differential roles of the mentors

and information officers. Moreover, these differences are in line with the service delivery models for the two treatment groups as outlined in the *PFL* Programme Manual.

Rapport between participants and *PFL* staff was cited as an important aspect of the programme. Participants appreciated that mentors take their individual knowledge, experience and needs into account when introducing new information. This suggests that the relationships the mentors have developed with participants reflect a client-centred approach to delivering the intervention. Participants acknowledged and appreciated the fact that *PFL* operates under a whole family model approach. They discussed how the programme provides support for fathers as well as other children in the family.

Participants in the *PFL* programme reportedly view the relationships with their mentors or information officers in a positive light. This relationship is characterized by good rapport, positive interactions, and support. However, some participants in the low treatment group stated that they do not feel comfortable approaching their information officers about issues related to child development and parenting. Again, this reflects the remit of the information officer who may not provide such supports to families in the low treatment group.

Participants reported overall satisfaction with the delivery of the *PFL* intervention. The delivery of the intervention was seen as having many positive qualities such as increasing awareness for parents, providing information related to both child development and other life issues, and the *PFL* staff are seen as available and willing to assist participants when needed. Participants found the information provided by the *PFL* programme helpful. They stated that the information was practical and offered reassurance for issues related to their child's development. Participants noted that the programme may have added benefits for young or first time mothers who are often in need of extra support. Although participants in the high treatment group were pleased with the tip sheets, they noted areas, such as dealing with sibling rivalry, on which they would like to see more information included. In addition, participants in both the high and low treatment groups voiced their dissatisfaction with the lack of social activities involving *PFL* children and mothers and discussed the benefits they perceived in *PFL* organising and facilitating such social events in the future.

Participant understanding of the *PFL* programme appears to affect participant evaluation of the intervention and satisfaction with the programme. Additionally, misunderstanding of the programme may have prevented new participants from joining. Participants in the low treatment group noted that members of the community have a positive perception of the programme, but noted that they did not feel this accolade was warranted. Again, this finding suggests fidelity to the *PFL* model and suggests that contamination between the high and low treatment group was not evident.

For the most part, participants expressed appreciation for their current level of autonomy within the *PFL* programme. Participants in the high treatment group expressed frustrations with the greater amount of contact with *PFL* staff at the beginning of the programme, but noted that they were happy with their current level of contact. Some participants in the low treatment group expressed frustration regarding the scheduling of *PFL* activities. Overall, participants discussed

numerous positive aspects of the Preparing for Life programme and they indicated that they were satisfied with the programme and its implementation to date.

7.2 *PFL* Staff Interviews

Qualitative one-to-one interviews can provide rich and in-depth information (DiCicco-Bloom & Crabtree, 2006). They are a way to give individuals an opportunity to tell the stories of their own experiences, which allows for a more nuanced, detailed and genuine account of a phenomena of interest (Stein & Mankowski, 2004). Qualitative interviews have been used as a respected method of assessing home visiting interventions (Korfmacher & Marchi, 2002). As home visitors are an integral component of home visiting interventions, gaining their perspectives allows for a much richer interpretation of the home visitation process (Schaefer, 2010).

7.2.1 Methods

Semi-structured, one-to-one interviews were conducted with the *PFL* implementation team in December, 2009 and January, 2010. These interviews focused on five major themes including the mentors/information officers' a priori expectations of the programme, staff experience of working on the PFL programme, staff satisfaction with the programme, barriers to implementation, and staff perceptions of programme benefits for the participants.

All interviews were audio recorded and transcribed by members of the *PFL* evaluation team. Interviews lasted between 41 minutes and 68 minutes. The average interview time was 53 minutes.

7.2.2 Thematic Analysis

Utilizing the same approach as outlined in the Focus Group section above, transcribed interviews were analysed to identify latent themes and/or ideas that were relevant and significant for the research question.

7.2.3 Interview Results

Note: All staff names have been removed to protect the anonymity of those interviewed. Staff members are referred to as M for mentors and IO for Information Officers.

Three main themes were identified in the implementation interview data: Components of Service, Challenges to Implementation, and Programme Impact. Within these main themes, a number of subthemes were identified, as shown in Table 7.2. These themes and subthemes are presented below.

Table 7.2
PFL Staff Interview Themes and Subthemes

Themes	**Subthemes**
Components of Service	Programme Materials Rapport and Service Delivery Approach Changes to Service Delivery

Challenges to Implementation	Fidelity to Programme Inconsistent Engagement and Communication Administrative and Practical Barriers Role Boundaries and Restrictions
Programme Impact	Changes in Perceptions Over Time Appreciation of Small Changes for Families Anticipated Future Outcomes

Components of service

Components of Service reflects staff thoughts regarding elements of the programme that are used to deliver the intervention and how that information is delivered. The team reported generally positive feedback regarding programme materials and the tools at their disposal. Furthermore, they expressed confidence in the manualised service delivery strategies as well as their ability to seek engagement with participants. Three sub themes of Components of Service were identified: programme materials, service delivery, and changes to service delivery. The sub-themes are outlined in detail below.

Programme Materials

All of the *PFL* implementation team members discussed the materials that they use to deliver the programme. They talked about "tip sheets", "healthy food made easy", "the milestones booklet", "baby massage", "Triple P" and "the baby DVD". The mentors serving the high treatment group made particular reference to the tip sheets. They spoke of the content of the tip sheets, emphasising that the information was practical and accessible.

> *M3*: It's all the stuff that's already out there on the streets. It's information that they've heard from the public health nurse, and the schools. So it's stuff that even the kids have heard.

Staff members also spoke positively about the benefit of the tip sheets and how they can be useful in engaging participants.

> *M4:* You're basically armed going in with a piece of material so that if there isn't anything to talk about or you haven't kinda gotten over the barriers [...] you're there to deliver a piece of information.

Members of the implementation team who worked with the low treatment group referred to the development packs. One information officer felt that the development packs were beneficial and helped the low treatment participants to feel part of the programme.

> *IO1:* People are just getting the developmental packs, but even for them still being a part of a programme, it still seems to help them.

Similarly to the mentor's reflections on the tip sheets, the information officers mentioned how programme materials helped them to interact with participants.

> *IO2:* The packs can like make people open up a bit more to you [...] it helps you build a rapport.

Rapport and Service Delivery Approach

The *PFL* implementation team made reference to the strategies that they use to engage the participants in order to effectively deliver the information. Their approach to communication was a main topic when discussing service delivery. They reported that they relay the information using a simple straightforward manner using "very everyday" language or without using "technical terms".

Those interviewed discussed the importance of developing a relationship with participants

> *M2:* I think first of all that one of the most important is the mentor and family relationship, to be able to work, and to be able to engage them, to keep the programme going, you need a really really good relationship.

Many of the team members emphasised a personal role in the delivery of services

> *M3:* Acknowledging the work they do as parents [...] Giving them help where is necessary, and linking them in to the relevant services [...] as well, the opportunity to build a challenge their views and beliefs.

They also mentioned activities that they do when working with parents, such as, modelling behaviours to communicate programme information.

> *M2:* When you sit down with the child on the floor and you try to play with with him, so you are kind of giving an example to the mom.

Several of the team members also made reference to the impact that the research was having on service delivery.

> *M5:* I don't think I was aware of the impact that can have [...] in the way of like what you do and the way you have to keep your files and the way certain information have to be um passed on and can't be passed on.

Team members who engage with the low treatment group emphasised the participant driven nature of the treatment service.

> *IO1:* I think another thing is that there's no pressure on people [...] they're well-able to turn around and say 'we want this' and 'we don't want that'.

> *IO2:* It's purely driven by the, y'know, the participant.

Changes to Service Delivery

Adaptations to the service relates to changes that were made as the programme was adapted to meet participant needs. *PFL* staff spoke of several changes that had to be made to the programme as they began implementation. For instance, several staff members mentioned the inclusion of baby massage.

> *M1:* We put in the baby massage [...] so I suppose we have made some small changes [to the manual],[…] I think we learn something as we go.

Several team members spoke of the decision to reduce the home visits from weekly to once per fortnight.

> *M4:* The 60 minute a week is not realistic [...] it's not realistic as workers and it's not realistic [...] for the families.

They also talked about changing the time of delivery of the Triple P parenting programme.

> *M5:* It was meant to be delivered at like 9 months [...] but it was decided not to go up to 18 months [...] See the parents react to what they need [...] a child is very young at 9 months and wouldn't necessarily display difficult behaviours.

Overall the team reported feeling that the implementation of the programme was a learning process and that changes made would be beneficial in the future.

> *M1:* We're learning as we're going along, it's not going to be beneficial to us, it will be beneficial to you know, the people who do it after us.

Challenges to Implementation

The team spoke about some of the challenges which affect implementation of the programme. Subthemes included in this category are; Fidelity to the Programme, Inconsistent Engagement and Communication, Administrative and Practical Barriers and Role Boundaries and Restrictions.

Fidelity to the Programme

Members of the team were keenly aware of the importance of fidelity to the *PFL* manual and strongly associated it with the research evaluation.

> *M1:* The whole thrust is that everybody has to get exactly the same thing so it can be measured.

The implementation team reported that initially this manualised approach was difficult as it was a new way of working.

> *M3:* I didn't realise it was gonna be so rigid, I didn't realise the fidelity was gonna be such a huge thing with the programme because it is like, and I suppose it was difficult to comprehend, initially.

> *M1:* You just have to be rigorous about your role and your boundaries and what you can and can't do.

The implementation team also expressed frustration that some families who could have benefited from the mentoring service (high treatment group) were randomised into the low treatment group.

IO1: She's the one that would need an awful lot more intervention. She's one that would need to be in the green [high treatment] group.

Further, the mentors spoke about how there were some families whom they felt may have required more intervention than *PFL* were providing. This higher level of need was described as interrupting the implementation of the manualised programme. In these instances, those interviewed found it difficult to balance fidelity to the programme and attending to these family issues.

> *M1:* Where it's difficult is with families with like multiple issues, then it's quite difficult to just stick with what's there, because there's so many issues, em, getting in the way, and demanding your attention and taking up their attention.

Inconsistent Engagement and Communication

The inconsistent communication with some participants was described as frustrating by some implementation team members. The team reported that some participants "were great", while others would not respond to the mentor's attempt to contact them for long periods of time, and then re-engage spontaneously. Yet, the mentors experienced this reengagement as a positive. The team members said that their initial frustration was eased once they accepted that this inconsistent communication pattern was common to the community. Overall engagement was reported as the biggest challenge to service delivery.

> *M1:* Keeping participants engaged, getting them to attend, you know getting them to just keep the momentum going. That's the biggest thing. Em, getting them to, tell us, when they're not going to come.

The implementation team reportedly talked with each other "quite often about disengagement" (M2). They related how they adopted a policy of not asking a participant why they missed an appointment, as they did not want to alienate participants by seemingly 'giving out to them'. They also discussed the use of incentives, such as "photos" to keep participants engaged.

Administrative and Practical Barriers

The database and the file keeping methods were reportedly a "constant source of frustration" *(M1)*.

> *M4:* One of the other things I find frustrating is the files […] because we're recording contact times, we're recording them on the computer, we're recording them on paper […] I don't know how many times I thought about throwing the computer out the window.

The time and the effort required to record a meeting was mentioned as well as the lack of a way to record informal, short interactions with a family. One team member felt that by omitting these interactions the database appointment figures were not reflecting the amount of work the mentors do.

> *M4:* Like I met one of my participants out on the square for fifteen minutes talking to her the other day because she changed her number […] and I sent her a little note to say I've been trying to ring ya. Like where does that go, it's not a family visit.

Role Boundaries and Restrictions

Cultivating a positive relationship with families was cited as an important aspect of the mentoring role; but the team also discussed the challenge of developing this relationship while maintaining professional boundaries.

> *M4:* Sometimes you have to be very careful of you own boundaries as well cos you don't want them to think that they're your friend.

Most of the mentors had professional experience working with families and providing hands on support and advice, and found that the role of a *PFL* mentor constrained them. This subtheme is similar to that of fidelity to the manual, but refers to the mentors perceptions of the role, as many staff members come from a different professional perspective.

> *IO2:* The biggest challenge is probably [...] that you can't impart information onto people, that like you, you'd like to offer them certain things and you can't, that's what I find challenging.

> *M1:* You know when you've spent years, you know when someone mentions something you go "ah right, ok" and, and leaping into action, you just have to say (inaudible) and not do anything.

Programme Impact

The implementation team was generally positive about the impact of the *PFL* programme. The mentors reported being proud of the small changes in behaviour that they see, as well as appreciating the growing acceptance of the programme in the community. Overall, the mentors expressed an optimistic prediction of the outcomes for the families involved. The main subthemes identified were; Changes Since Programme Implementation, Appreciation of Small Changes for Families and Anticipated Future Outcomes.

Changes in Perceptions Over Time

The implementation team spoke of the changes that were observed since the programme began. These were apparent in two key areas; the acceptance of *PFL* by the community and the changes in the mentor expectations.

The mentors reported that, over time, there was a change in attitude towards the programme within the community. At the time of interview many team members felt that although it had taken a long time and a lot of work for the *PFL* programme to be accepted in the community, they had, "turned a corner". Those interviewed reported that recruitment had been "disheartening" and difficult, but improved as time had passed. They felt that community members could see that *PFL* had "no hidden agenda". This achievement was acknowledged as a crucial first step in implementing the programme, and the mentors talked about how this might influence the ultimate success of the *PFL* programme.

> *M1:* The first step towards that is becoming known and I suppose respected as a, as an organisation, and I think that has started and definitely you know, when you're going from one family to another, you know, your crossing "oh hello, hi, how are you" you see so many people and you know they recognise the jacket and the logo so that's, I think that's encouraging.

Another area in which the implementation team reported a change over time was in their own expectations. Their initial expectations of what the programme could achieve were cautious and rooted in their previous professional experience. Some of the mentors reported that while they expected that it would be difficult to change behaviours and that engagement would be an issue, they did not expect recruitment to take so long or did not expect as much resistance.

> *M1:* I knew that some families would be difficult to engage and there would be dropouts and that. I don't think I expected quite so much, eh, resistance, [...], if you didn't put in this really hard work you wouldn't see them. [...] Em, so just making sure that the visits happen regularly has turned out to be more of a, sort of trudge, you know, a process.

The implementation team had to adjust to a different way of working, in particular with regards to fidelity to the manual, as discussed earlier. Overall the team had reportedly reached a comfortable place at the time of interviews where they could appreciate the small day to day changes in the participants behaviour and actions, but they all acknowledged that this had not been an easy place to get to and that there had been a period of adjustment where they had to alter their expectations of the programme.

> *M3:* I still believe that [this is gonna change everything] I do think eh, I do think it's gonna need a lot of work [...] and seeing things, families making small changes, eh I suppose I believe more that it will work now.

Appreciation of Small Changes for Families

As mentioned above the implementation team expressed cautious optimism in their initial expectations of behavioral changes. However, the team did relate several changes that they had observed in the day to day behaviours of participants and in participant approaches to parenting. The team spoke with great enthusiasm when they discussed the small changes that they had observed.

There were commonalities across the areas in which the mentors reported important small changes in behaviour. Some of the reported family changes were; chip pans were used less, mothers reported eating vegetables, babies were being started on solids at more appropriate ages, the televisions were turned down or off during home visits, the developmental packs were being used, mothers were bringing babies for regular medical check-ups, families were using safety gates and more adults seemed to smoke outside the home. The implementation team highlighted the potentially positive influence that these small changes in parenting behaviours might have on child outcomes.

> *M3:* Through the information that they receive, through the tip sheets- the honey on the dummy is a huge thing, ah, the tea in the bottle, getting rid of the deep fat fryers, d'you know, getting the kids to school on time, little things, that to us makes a big difference, and in turn, will make a big difference to their kids. Em, there's loads, but it very much comes down to all the information that they're given em, and it's again, it's through the tip sheets.

Some of these behaviours were applicable to the mentor visit and signified to the mentors that the visits were valued by the participants.

The mentors also reported small changes in communication patterns which they perceived as positive.

> *M2:* They text back to you to say em "I can't come today, could we rearrange" and em these things are positives.

According to the mentors, participants seemed uncomfortable receiving direct praise and appeared to have a nonchalant attitude to the small changes they were making. However parents were noticed repeating information received through the *PFL* programme as their own, which the mentors appreciated as a subtle change and an indication of programme impact.

> *M3:* So many times where the families have just dropped some of the information in- in a conversation, like, relayed it back to me.

According to the team members noticing these small behavioural changes was a source of motivation to the team.

> *M1:* I just think if, if I can get one or two mums reading, sitting there with the child on their knee reading to them, like that's, that's fantastic. And that's going to have huge impact eh later on in that child's life so the biggest satisfaction is observing those little things, and, and, and em, just the, you know the little interactions em, that, that can just keep you, a small thing like that can just keep you going for ages.

It was also noted that many *PFL* staff members felt the parents were beginning to think a bit more about the importance of their role as a parent and also an awareness of their child's need and abilities; or as M1 describes "a sense of being a little bit prepared and having more knowledge about stages of development". These shifts in thinking were viewed positively by many of the mentors.

> *M1:* When there's a small shift, even when someone starts to think about something a little bit differently and starts asking questions and talking to you in a slightly different way you think "ah great" you know [...] You know, that process has started.

On a community level, the team reflected that there was a positive attitude towards *PFL* in that –

> *IO1:* It seems to be that nobody is ashamed of being a part of *Preparing for Life*. They're proud to be part of Preparing for Life.

Anticipated Future Outcomes

The team made positive predictions for the future outcomes of the *PFL* children. They associated the small shifts in behaviour and attitudes that they were observing to potentially greater future benefits.

> *M3:* Initially, it's always gonna be the small things, that lead to the bigger things, that lead to the bigger things.

They projected that improvements in parenting could interrupt the cycle of disadvantage for the community;

> *M1:* Somebody becoming a, you know a good parent if you like, and knowing em that, 'cause that child is going to have a, a good experience of, of, of, you know of a mother or father, a parent, the chances are they're going to be a good parent, and that's where you're really going to see, in the whole community…[...] when people have had a good experience and know how to be, em, a good, loving effective parent themselves em, like, you've cracked it then haven't you cause that's just going to repeat.

7.2.4 PFL Staff Interview Results Summary

This analysis allows us to investigate the experiences of the *PFL* staff in delivery the early stages of the programme. Throughout the interviews the *PFL* implementation team spoke very positively about their experience of being part of the *PFL* programme. Further, the *PFL* team is comprised of staff from varied professional backgrounds and this mix of skills was described as both a benefit for the programme and as a challenge for the team as individuals.

The mentor role was described as somewhat restrictive, due to the constraints of both the evaluation and the manualised nature of the *PFL* programme. This restriction however was recognised as necessary as it prevents the team from providing any extra support, which not only ensures that the intervention remains measurable, but also facilitates and encourages the empowerment of the *PFL* participants. The team did introduce some service changes to the programme as part of the initial process, changes which acknowledged the needs of the *PFL* community as they became apparent, e.g. less frequent visits.

The programme materials were described positively and the team appreciated how they can be utilized to engage participants. This was particularly noted by the team members who work with the high treatment group. The mentors reported that they take particular care in the way that they communicate the information to participants and also acknowledge the importance of developing a relationship with the participant. The team emphasised their straightforward approach and how they aimed to empower the participants.

The team appeared to be comfortable with *PFL*'s position in the community at the time of interview, but did refer to the difficulties at the initial stages. Recruitment was found to be difficult and the team did not feel accepted into the community at the start of the programme. They spoke of how they proactively worked to integrate themselves, by saying hello to everyone on a daily basis and allowing the community to see that they had nothing to hide. This effort was seen to have helped the community understand and accept the programme.

Participant engagement with the programme was inconsistent and the mentors described the challenge of striving to engage and maintain contact with the participants while at the same time

respecting the voluntary nature of the programme. The team had devised some strategies to deal with this and had come to accept the inconsistent communication patterns of participants.

While the team did describe the challenges they face, it was apparent that they all believed in the programme and anticipated positive future outcomes. At the time of interviews, the team talked proudly of the small changes that they had already witnessed in the participants. They acknowledged that these changes, while small, were indicative of cumulative effects for the parents, children and community. This motivated the team. Interestingly, the team indicated that the participants were seemingly nonchalant about the changes that they were making.

Despite the difficulties at the early stages, or perhaps through overcoming these difficulties, the *PFL* Team members believe that the programme has become an integral part of the community, and the team is prepared and eager to meet the daily challenges of implementing the programme. Overall the implementation team reported great optimism in the future potential of *PFL*.

7.3 Combined Qualitative Results Summary

The focus group participants and *PFL* implementation team spoke positively about the *Preparing for Life* programme and their involvement with it. There were some commonalities and differences across the themes emerging from the qualitative data from the *PFL* team and participants. This similarities and differences are discussed in this section.

Both *PFL* participants and the implementation team described the importance of the mentor-participant relationship. The participants appreciated the emotional support they received from the mentors and described a client-centred approach. They felt that the mentors adapted the programme to suit their individual needs. This was in contrast with the mentors who described frustration with not being able to meet individual participant needs, due to the constraints of the *PFL* manual and the programme parameters. This difference in perception is perhaps due to the mentors' skill in balancing the challenge of engaging participants while remaining faithful to a manualised intervention model.

Both parties spoke highly of the programme materials and their usefulness. The mentors appreciated the tip sheets, and on the whole, the participants found them useful. The DVD, training courses and Triple P were described as useful in themselves, as well as useful tools to encourage participant engagement, i.e. Dad's in particular enjoyed the DVD. It is promising that the manualised materials are received positively by those implementing and those receiving them.

There was a general sense that the *PFL* programme was growing and changing in the community, for both the *PFL* team and for the participants. Both parties discussed difficulties at the beginning, where the community did not know or understand the programme and the implementation team experienced this as resistance to recruitment. The team's open and approachable ethos led to a sense of trust, and the community began to accept *PFL*. Further, the participants expressed frustration at the amount of contact they had from the team at the beginning, which they described as excessive. This is mirrored by the team's experience of poor engagement and communication in the early stages of the intervention, in particular at the pre-

birth stage. The team spoke frankly about the challenge in balancing the engagement of participants and respecting their decision to be less involved. It appears that once the mentors accepted the inconsistent patterns of engagement with participants they relaxed the levels of contact, and the mothers reported that they were satisfied with the contact levels at the time of the focus group.

The implementation team spoke of the small changes and improvements that they have witnessed in the homes of the participants, and how these changes were not openly talked about by the participants. This was evident in the focus groups where the changes the participants have made were not discussed. The participants did say that they were satisfied with the programme and that they had increased their awareness and knowledge about child development. They also mentioned that they felt the mentors involved the whole family in the programme. Interestingly, the mentors did not refer to this aspect of their work. This suggests that while mentors direct the intervention at the mother and target child, the participants perceive programme benefits on a family level.

There were a few distinctions between the high and low treatment groups. The emotional support experienced by the high treatment group was not experienced by the low treatment group, who instead reported instrumental support. This is reflected by the information officer's statement that their role makes it more difficult for them to create/maintain a relationship with the participants. However, the knowledge that they are available does appear to have a positive effect on the participants. The information officers also predicted that there will be greater improvements in the outcomes for those in the high treatment group than those in the low treatment group. In turn, those in the low treatment group discussed how they were not as enthusiastic about *PFL* as others in the community seemed to be. This finding may be an indication of programme fidelity as those in the low treatment group would have limited levels of contact and services from the *PFL* programme.

Both the high and low treatment groups referred to the social aspects of the programme, and the low treatment group in particular desired more opportunities to meet other parents. It is worth noting that in the interim the *PFL* programme has increased the amount of social activities in the programme in response to the participant feedback. Overall it is evident that the early stages of the *Preparing for Life* programme was perceived as beneficial by both participants and *PFL* implementation team.

CHAPTER 8: Contamination in *Preparing for Life*

The aim of this chapter is to examine the level of contamination, if any, in the *Preparing for Life* programme between programme entry and 6 months. Sections 8.1 and 8.2 define contamination and describe the consequences of contamination for the evaluation. Section 8.3 reviews the prevalence of contamination in childhood interventions and discusses the conditions which impede and support contamination from occurring. Sections 8.4 and 8.5 describe the risks of contamination in *PFL* and the procedures used for measuring it. Section 8.6 presents the results assessing the level of contamination in *PFL* based on direct and indirect measures of contamination and finally section 8.7 summaries the results.

8.1 What is Contamination?

Contamination occurs when individuals assigned to the control group either actively or passively receive all or part of the services designed for the treatment group (Cook & Campbell, 1979). Contamination, also known as unintentional crossover, leakage (Plewis & Hurry, 1998), spillover effects (Bloom, 2005) or diffusion (Shadish, Cook & Campbell, 2002), may arise for multiple reasons including administrative error, deliberate subversion by programme staff, or an exchange of information between the treatment and control groups. While contamination may occur in any intervention or trial, it is much more prevalent in social or educational interventions involving behavioural change (Cook & Campbell, 1979), as the information is more readily transferable. Contamination in individual-level interventions, such as *Preparing for Life*, occurs when participants in the treatment group engage in cross-talk or share some information received as part of the intervention with members of the comparison group, thus dispersing the effect of the intervention (Lang et al., 2009).

8.2 What are the Consequences of Contamination?

While contamination is considered a desirable feature of any programme operating under normal service delivery, as providing services to a small group of individuals may have positive externalities for a larger group, for programmes undergoing rigorous evaluation, contamination is a threat to the internal validity of the study. Contamination is particularly undesirable in experimental evaluations as it may bias the results by reducing the mean differences between the treatment and control group (Torgerson, 2001). Thus the reliability of the evaluation results, which are based on observations from a contaminated control group, may be questionable. In particular, if the level of contamination transmitted to the control group was such that it improved the outcomes of the control group to similar levels of the intervention group, it may not be possible to detect a statistical difference between the two groups. As contamination reduces the estimated effect of the intervention, it also increases the probability of failing to reject the null hypothesis that there is no difference between the two groups, thus leading to a type II error (Keogh-Brown et al., 2007). The failure to detect a significant programme effect limits the range of policy recommendations that can be made and may affect the future funding and implementation of the programme.

8.3 How Prevalent is Contamination in Early Childhood Programmes?

Our review of the literature finds very few published studies which document the magnitude of contamination in community or centre-based interventions targeting children and families, such as *PFL*. Much of the contamination literature is confined to studies of clinical and medical education interventions. For example, a review of contamination in trials of medical education interventions found that the reported rates of contamination varied from 0-65% depending on the type of intervention under consideration (Keogh-Brown et al., 2007). One of the few studies to discuss contamination in the context of a parenting intervention was conducted by Stewart-Brown et al. (2004). They suggested that the initial positive effects of the programme observed at 6 months dissipated by the 12 month follow-up due to contamination, as qualitative interviews with the control group revealed that the research questionnaires encouraged the participants to review their parenting practices and 10% of the control group attended another parenting programme before the 12 month follow-up.

One of the most useful texts on contamination, by Howe, Keogh-Brown, Miles & Bachmann (2007), reports the results of a Delphi exercise to gauge expert consensus on the factors that promote and inhibit contamination in educational interventions.
It reported that contamination was most likely to occur in interventions when:

- Participants in the treatment and control groups live, work or interact closely together,
- The intervention is desirable, simple and knowledge based,
- The intervention is aimed at professionals rather than individuals,
- The intervention uses broadcast media, audio visuals or written information.

It reported that contamination was least likely to occur in interventions when:

- Participants are socially or physically separate,
- Interventions are complex or aimed at changing behaviours,
- Cluster randomisation is used.

8.4 How likely is Contamination in *PFL*?

Contamination in the *PFL* programme would result from participants in the high treatment group either intentionally or unintentionally sharing the parenting materials, information, strategies, or advice which they receive from their mentors, with participants in the low treatment group. Based on the above conditions, the likelihood of contamination is exacerbated if allocation to the treatment and control group is made at an individual level, particularly when the individuals assigned to both conditions are in close contact with each other and can avail of opportunities to share experiences and learning. Thus based on this criterion, the potential for contamination in *PFL* is quite high as it is operating in a very small community with a population of <7,000 and participants were randomly assigned to two different treatment conditions at the individual level. Therefore it is very likely that some of the participants in the two treatment groups are neighbours, friends, colleagues or even members of the same family. On the other hand, contamination between the high and low treatment groups may be low as *PFL* is a complex intervention which aims to change the behaviour of participants by building relationships between mentors and participants in the high treatment group. As it is often difficult to achieve

behavioural change, even if contamination between the two treatment groups exists, it may not be enough to significantly affect the results.

8.5 Strategies for Minimising Contamination in *PFL*

As the potential for contamination between the two treatment groups in the *Preparing for Life* programme is high given the geographical proximity of the participants, a number of strategies were used to both minimise and measure contamination. First, the high and low treatment groups are also being compared to a 'services as usual' comparison group, who do not receive the *PFL* Programme, and are geographically separated from the *PFL* catchment area. This comparison group was identified using quasi-experimental methods. Specifically, hierarchal cluster analysis was used to identify the degree of similarity between the matched comparison group and the *PFL* treatment community by calculating the Euclidean pairwise distance between communities. Small area population statistics (SAPS) from the Census 2006 were used to rank all 322 communities in Dublin in terms of their closeness to the *PFL* community based on standard demographic and socio-economic characteristics. Dissimilarity matrices showing the degree of similarity between communities were constructed, allowing comparisons of results across variable inputs. Ninety-nine pregnant women were recruited from the comparison community, which is located ~10km from the *PFL* communities. We refer to this comparison group as *LFP* below. Data from the participants in the matched comparison community are collected at the same time points as the *PFL* treatment groups. Having this additional comparison group allows us to evaluate the impact of the programme even if contamination is present within the high and low *PFL* treatment groups.

Second, in order to ensure that the randomisation procedure was not compromised, a computerised randomisation procedure was developed which guaranteed that the recruiters could not influence the assignment of individual participants to the high or low treatment groups. The procedure operated as follows: an unconditional probability computerised randomisation procedure was developed which presented each participant with an equal chance of being randomised into the low or high treatment group. After consenting to take part in *PFL*, the participant pressed a key on a computer which randomly allocated her treatment group assignment. Once the assignment had been made, a permanent record of this assignment was saved in the randomisation database and an automatic email was generated which included the participants unique ID number and assignment condition. This email was automatically sent to the programme manager and the evaluation manager. This was a permanent record of the participants' assignment condition and if any attempt was made to reassign the participant to another group by either directly changing the database or repeating the randomisation procedure, a second email would be generated to automatically highlight this intentional subversion. This process ensured that the randomisation procedure was not compromised and that direct contamination did not occur.

8.6 Strategies for Measuring Contamination in *PFL*

In addition to minimising the potential for contamination, the *PFL* evaluation team also devised several strategies for measuring cross-talk and information flows between the two treatment groups. Specifically, indirect and direct measures of contamination were collected.

8.6.1 Indirect Measures

First, information to track contamination indirectly was collected from participants during the six-month interview. Specifically, questions related to how many people the participants know with babies the same age as their baby, how many people they know in the *PFL* programme, how often they meet with other *PFL* participants, and whether they share their *PFL* materials with anyone. While these questions do not identify whether participants in the low treatment group have been contaminated by participants in the high treatment group, it provides some information on the potential for contamination.

8.6.2 Direct Measures

Second, a series of 'contaminations' or 'blue-dye' questions were included in the six-month interview. These questions asked participants from the high and low treatment groups and the matched comparison group if they have heard of particular child development phrases, and if they know what these phrases mean. All of the phrases are related to topics which only participants in the high treatment group should be aware of as the mentors discuss and promote these behaviours with participants during programme delivery - for example *'mutual gaze*', *'circle of security*', and '*secure base*'. Specifically, the mentors have developed 'tip-sheets' on these topics which they give to the participant during the home visits. The contamination questions included in the participant interviews change in each data collection wave to relate to information that has been delivered by the mentors during that time period and is relevant to the participant's children at that age.

These questions may be used to measure contamination as if the participants in the low treatment group state that they know what these phrases mean and they correctly identify how to promote such behaviour, it is indicative that they may have accessed material or information intended for the high treatment participants only. Specifically, if there is no statistical difference in the proportion of the low treatment group and the high treatment group reporting knowledge of these phrases, it suggests contamination has occurred. A comparison of the responses of the high and low treatment groups to the matched comparison group, where contamination could not have occurred given the geographic distance (~10km), can then be used to estimate the magnitude of contamination. If contamination did not occur, a significantly higher proportion of the high treatment group should state that they are aware of these terms or engage in these behaviours compared to the low treatment group and the matched comparison group. If contamination between the high and low treatment groups is present, there should be a significant difference in the responses of the low treatment group and the matched comparison group - this difference represents the magnitude of contamination.

Table 8.1 describes the expected findings under the hypotheses that contamination is not present and contamination is present. If contamination is not present there will be a statistical difference in the proportion of the high treatment group and the proportion of the low treatment group reporting knowledge of these phrases and a statistical difference in the proportion of the high treatment group and comparison group reporting knowledge of these phrases, and no statistical difference between the proportion of the low treatment group and comparison group reporting these phrases. If contamination is present there will be no statistical difference in the proportion of the high treatment group and the proportion of the low treatment group reporting knowledge

of these phrases and a statistical difference in the proportion of the high treatment group and comparison group reporting knowledge of these phrases, and a statistical difference between the proportion of the low treatment group and comparison group reporting these phrases.

Table 8.1
Contamination Hypotheses

Tests	*No Contamination Scenario*	*Contamination Scenario*
High - Low	DIFFERENCE	NO DIFFERENCE
High - *LFP*	DIFFERENCE	DIFFERECE
Low - *LFP*	NO DIFFERENCE	DIFFERENCE

Note: 'DIFFERENCE' indicates that there is a statistical difference in the mean responses of the two groups. 'NO DIFFERENCE' indicates that there is no statistical difference in the mean responses of the two groups. High indicates the high treatment group. Low indicates the low treatment group. *LFP* indicates the matched comparison group.

8.7 Results

8.7.1 Indirect Measures of Contamination

Participants in the high treatment group, low treatment group and the matched comparison group were asked how many people in their area they know with a child around the same as age their child. Responses were coded into five categories indicating *none*, *1-3*, *4-6*, *7-10*, *10+*. This measure was used to generate a binary indicator representing whether the participants know any or no neighbours with children the same age as their child. Table 7.2 shows that 66% of participants in the high treatment group know neighbours with children the same age as their child, compared to 56% in the low treatment group and 54% in the matched comparison group. There were no statistical differences in the proportion across the three groups.

Participants were also asked the number of people they know taking part in the programme. Responses were coded as above, indicating whether the participants know any or no participants in the programme. Note, for the *PFL* participants, they were not asked to differentiate between the high and low treatment groups. Table 7.2 shows that 67% of the high treatment group and 56% of the low treatment group reported knowing other participants in the programme, yet only 7% of the matched comparison group reported knowing other participants in the programme. There was no statistical difference between the high and low treatment groups, however a significantly higher proportion of the high and low treatment group reported knowing people in the programme compared to the matched comparison group ($p<.01$, $d=1.57$; $p<.01$, $d=1.24$).

As the matched comparison group are not receiving any treatment, the final two questions were only asked of participants in the high and low treatment groups. Participants were asked to indicate whether they share any of the information they receive as part of the programme with other parents of young children. Table 7.2 shows that 68% of participants in the high treatment group shared *PFL* information and 60% of the low treatment group shared *PFL* information with parents of young children. There was no statistical difference between the two groups.

Finally, participants were asked to indicate how often they meet with other people in the programme on a 4-point scale ranging from *never* to *often*. Note, they were not asked to

differentiate between the high and low treatment groups. Responses were recoded to create a binary variable indicating whether they *never/rarely* or *occasionally/often* met with others in the programme. Table 8.2 indicates that 49% of participants in the high treatment group regularly met with participants in the programme compared to 37% of participants in the low treatment group. This difference was not statistically significant.

Table 8.2
Comparison of Indirect Contamination Responses across Groups

	M_{HIGH} (*SD*)	M_{LOW} (*SD*)	M_{LFP} (*SD*)	High – Low		High – LFP		Low – LFP	
				p	*d*	*p*	*d*	*p*	*d*
Knows neighbours with same age child	.66 (.48)	.56 (.50)	.54 (.50)	.203	.21	.149	.24	.874	.03
N	82	88	83						
Knows neighbours taking part in *PFL*	.67 (.47)	.56 (.50)	.07 (.26)	.200	.21	.000	1.57	.000	1.24
N	81	87	84						
Shares *PFL* material with others	.68 (.47)	.60 (.49)	~	.278	.17	~	~	~	~
N	82	90							
Regularly meets with *PFL* participants	.49 (.50)	.37 (.48)	~	.127	.25	~	~	~	~
N	82	90							

8.7.2 Direct Measures of Contamination

Three 'blue-dye' questions were included in the six-month survey: "*Have you heard of mutual gaze?*", "*Have you heard of the circle of security?*", "*Have you heard of the phrase secure base?*". Each question had three possible responses – *yes*, *no*, *don't know*. This information was used to generate a set of binary variables indicating whether the participants had heard of each phrase or not. Participants who stated '*don't know'* were treated as having not heard the phrase. It is possible, on social desirability grounds, that some participants who were not familiar with the phrases stated they were familiar with the phrases. In order to capture this, participants who stated they had heard the phrases were asked follow up questions to determine if they accurately knew what the phrase meant. The following questions were asked: "*What are the best times for you and your baby to share a mutual gaze?*", "*How do you help to create a circle of security for your baby?*", "*How can you make a secure base for your baby?*". These were open ended questions which were subsequently recoded based on whether the respondent provided a valid response.

Table 7.3 shows that a 59% of participants in the high treatment group reported having heard the phrase '*mutual gaze'*, compared to 8% of the low treatment group and 4% of the matched comparison group. The differences between the high treatment group and the low treatment group ($p<.01$; $d=1.31$) and the high treatment group and the comparison group ($p<.01$; $d=1.50$) were statistically significant. There was no statistical difference between the low treatment group and the comparison group in the proportion having heard the phrase 'mutual gaze'. A similar pattern was observed for 'circle of security' and 'secure base'. 49% of the high treatment group reported having heard the phrase '*circle of security*', compared to 12% of the low treatment group and 5% of the comparison group. Again, the differences between the high treatment group

and low treatment group (p<.01, d=.89) and the high treatment group and the comparison group (p<.01; d=1.16) were statistically significant, while there was no statistical differences between the low treatment group and the comparison group. While a lower proportion of the high treatment group reported having heard the phrase '*secure base*' (23%) compared to the other phrases[3], it was still significantly higher than the 10% of the low treatment (p<.05, d=.36) and the 10% of the comparison group (p<.05, d=.38) reporting having heard the term. Again, there was no statistical difference between the low treatment group and the matched comparison group.

Table 8.3
Comparison of Direct Contamination Responses across Groups

Have you heard the phrase ____ ?	M_{HIGH} (*SD*)	M_{LOW} (*SD*)	M_{LFP} (*SD*)	High – Low		High – LFP		Low – LFP	
				p	*d*	*p*	*d*	*p*	*d*
'Mutual Gaze'	.59 (.49)	.08 (.27)	.04 (.19)	.000	1.31	.000	1.50	.308	.18
N	83	90	84						
'Circle of Security'	.49 (.50)	.12 (.33)	.05 (.21)	.000	.89	.000	1.16	.105	.27
N	83	90	84						
'Secure Base'	.23 (.42)	.10 (.30)	.10 (.30)	.030	.36	.017	.38	1.000	.02
N	82	90	84						

Table 7.4 indicates the proportion of participants who accurately responded to the contamination questions in each group. Among the high treatment group participants who stated they had heard of the respective phrases, 92% and 66% provided accurate responses regarding how to engage in *mutual gaze* and *circle of security* with their children respectively. The corresponding figures for the low treatment group are 86% and 82% respectively and for the comparison group, 100% and 25% respectively. The pattern of responses is similar across the groups, with greater proportions of participants reporting correct responses to the *mutual gaze* phrase than the *circle of security phrase*.

As shown in Table 8.5, there were no statistical differences between the proportions of respondents accurately responding to the contamination questions across the three groups. Overall, quite a low proportion of respondents who reported that they had heard of these parenting behaviours provided incorrect responses when asked how best to engage in these

[3] All three 'blue-dye questions were dispersed throughout the six-month survey to ensure the participants did not feel we were testing their knowledge. The 'secure base' question was placed at the end of the Environment section of the survey. The questions preceding the contamination questions were all concerned with child safety regarding transport, in particular the questions directly preceding it were 'Where do you place your child's car safety seat in the car?' and 'Does your child ride on your bicycle with you?'. Through the course of the interviews, it became evident that the participants assumed the secure base question 'Have you heard of the phrase secure base?', was related to these child safety questions and that 'secure base' was some form of safety mechanism. If the participants stated it was such an item, they were coded as having not heard the phrase. Thus, few participants accurately reported having heard the phrase or knowing what the phrase means. For this reason it is removed from further analysis.

behaviours. Please note, however, that the sample sizes for some of these sub-analyses were small as relatively few (<10% on average) of the low treatment group and comparison group stated they had heard these phrases, and thus they were not asked the follow up questions.

Table 8.4
Correct and Incorrect Responses to the Contamination Questions

How do you engage in_____?	HIGH		LOW		LFP	
	% Correct	% Incorrect	% Correct	% Incorrect	% Correct	% Incorrect
'Mutual Gaze'	92%	8%	86%	14%	100%	0%
N	45	4	6	1	3	0
'Circle of Security'	66%	34%	82%	18%	25%	75%
N	27	14	9	2	1	3

Table 8.5
Comparison of Correct Responses to the Contamination Questions across Groups

How do you engage in_____?	High – Low	High – LFP	Low – LFP
	p	*p*	*p*
'Mutual Gaze'	1.000	1.000	1.000
'Circle of Security'	.435	.271	.077

In order to provide an accurate measure of contamination, participants who stated that they had heard of the child development/parenting phrases, yet provided incorrect responses regarding how best to engage in these behaviours, were removed from the analysis and the results reporting the proportion of participants who have accurately heard of the phrases were re-estimated.

Table 8.6 shows that, as before, a significantly higher proportion of the high treatment group reported having heard the phrase '*mutual gaze*' compared to the low treatment group ($p<.01$, $d=1.30$) and the comparison group ($p<.01$, $d=1.45$) and there was no statistical difference between the proportion of the low treatment group and comparison group reporting knowledge of '*mutual gaze'*. Similarly, a significantly higher proportion of the high treatment group reported having heard the phrase '*circle of security'* compared to the low treatment group ($p<.01$, $d=.73$) and the comparison group ($p<.01$, $d=1.11$). However, there was a statistical difference between the proportion of the low treatment group and comparison group reporting knowledge of the phrase, with a higher proportion of the low treatment group stating they heard the phrase '*circle of security'* ($p<.05$, $d=.39$).

Table 8.6
Comparison of Contamination Question Responses across Groups

Have you heard the phrase ____ ?	M_{HIGH} (*SD*)	M_{LOW} (*SD*)	M_{LFP} (*SD*)	High – Low		High – LFP		Low – LFP	
				p	*d*	*p*	*d*	*p*	*d*
'Mutual Gaze'	.57 (.50)	.07 (.25)	.04 (.19)	.000	1.30	.000	1.45	.499	.14
N	79	89	84						
'Circle of Security'	.39	.10	.01	.000	0.73	.000	1.11	.013	.39

	(.49)	(.30)	(.11)
N	69	88	81

However, as discussed above, due to the placement of the *secure base* question in the survey, many respondents believed this term to be related to a child's care seat, rather than child development, thus its reliability as a contamination question is questionable.

8.8 Summary & Conclusion

The aim of this chapter was to discuss and measure potential contamination across the high and low *PFL* treatment groups between programme intake and six months. Contamination may have occurred if the high treatment group engaged in cross-talk and shared materials with participants in the low treatment group. If substantial contamination occurred during this period it would impede the ability to identify programme effects for the six month outcomes. The indirect and direct measures used to gauge contamination provided an indication of whether contamination occurred during this period.

The indirect measures of contamination show that over half of the *PFL* participants, across both groups, knew neighbours with the same age children as their child and knew other participants in the programme during this period. Thus there was an opportunity for contamination between the high and low treatment groups as participants across the two groups may interact with each other. The finding that a relatively large proportion of the high and low treatment groups reported sharing the information they receive as part of the *PFL* programme with other parents in the community again suggests that there was a potential for contamination across the groups. As the high treatment group received substantially more information and materials from the *PFL* programme than the low treatment group, one would have expected a greater proportion of sharing among the high treatment group, however this was not the case with relatively similar proportions of the high and low treatment groups reporting sharing information. Thus this finding does not necessarily indicate the presence of contamination.

Similarly, the finding that about half of the high treatment group regularly met with other *PFL* participants and over a third of the low treatment group regularly met with other *PFL* participants indicated a relatively high level of contact between participants. That there was no significant difference in the proportion of participants across the high and low treatment groups reporting contact with other participants is somewhat surprising as participants in the high treatment group were presented with many opportunities of interacting with others in the programme during the baby massage classes and *PFL* coffee mornings, while there was less scope for interaction among the low treatment group. Note however that it was not possible to determine whether this was within-group or between-group meetings.

While the indirect measures only provide an indication of the likelihood of contamination, they cannot be used to directly determine whether contamination occurred. The 'blue-dye' or 'contamination' questions were therefore used to elicit a direct measure of contamination. The results indicated that the high treatment group consistently reported a greater knowledge of the child development phrases than the low treatment group, thus suggesting that minimal

contamination occurred between the high and low treatment groups between intake and 6 months. This finding was validated by the matched comparison group which reported similar levels of knowledge of the child development phrases as the low treatment group. As the low treatment group is geographically closer to the high treatment group than the matched comparison group, and reported having substantially more contact with other participants in the programme compared to the matched comparison group, if contamination was present between the high and low treatment groups we would have expected to observe higher rates of knowledge among the low treatment group, however this was not the case.

However, it is possible that all respondents may have reported knowledge of the phrases regardless whether they were aware of the phrase or not for social desirability purposes. This may be a more frequent occurrence among the *PFL* treatment groups as they are participating in a parenting programme and therefore believe that they *should* have heard of these phrases. An argument can also be made that the high treatment group may be more likely to state that they have heard of these phrases as the mentors specifically focus on parenting behaviour during the home visits. However, an analysis of the proportion of correct responses reported across the three groups, elicited through follow up questions gauging participants' true knowledge of the phrases, indicated that there were no differences across the three groups regarding the proportion stating incorrect answers. Approximately one-tenth of the high treatment group who stated they had heard the phrase '*mutual gaze'*, did not provide an accurate response concerning when best to engage in this behaviour, with over a third providing incorrect responses to the '*circle of security*' question. For the low treatment group, less than one-fifth mis-reported on the contamination questions, while the figures for the matched comparison group are too low to draw a firm conclusion. While the level of mis-reporting is not overly high, it may represent either a social desirability bias or genuine misunderstanding or knowledge about the meaning of these phrases. For our purposes, the key finding is that the level of mis-reporting was low and did not vary across the treatment and control groups.

The information on inaccurate responses was then used to purge the contamination analysis of social desirability bias by removing the responses of any participant who provided inaccurate responses to the follow-up contamination questions. This analysis, comparing whether the participants had heard the phrases or not, largely confirmed the original analysis. It found that participants in the high treatment group reported more knowledge of child development ('*mutual gaze'* and '*circle of security'*) than the low treatment group or the matched comparison group. In addition, there were no differences between the low treatment group and matched comparison group regarding knowledge of '*mutual gaze'*, however a significantly higher proportion of the low treatment group (10%) reported knowledge of '*circle of security'* compared to the matched comparison group (15%), thus suggesting some small level of contamination (~9%) between the high and low treatment groups for the '*circle of security*' phrase.

Finally, both the indirect and direct measures of contamination validate the use of the matched comparison group as a safeguard against contamination. A relatively small proportion of the matched comparison group stated they knew other people in the programme. In addition, relatively few of the matched comparison group reported knowledge of the child development phrases (<4%). These results are as expected as there were no opportunities for the matched comparison group to interact with the *PFL* treatment groups. These findings suggest that the

matched comparison group is a suitable comparison group for evaluating the impact of the *PFL* programme if contamination between the high and low treatment groups emerges in the future.

Overall, this analysis revealed three important findings. First, it showed the treatment provided by the mentors to the high treatment group is being absorbed by the participants as they reported a higher awareness of certain child development phrases compared to the two other groups. The level of knowledge, however, depended on the areas of child development analysed. This analysis is restricted as it only included three areas of development. Second, the indirect measures of contamination indicated that the potential for contamination in the *PFL* programme was high as participants are regularly in contact with each and share material. Third, while the conditions for contamination were present, the analysis of the direct measures of contamination suggests that these practices did not necessarily translate into improved parenting knowledge. The large discrepancies in knowledge of child development across the three groups indicate that the overall level of contamination in the *PFL* programme up to 6 months is quite low and is not a concern regarding biasing the six-month outcome results.

CHAPTER 9: Report Summary & Conclusion

9.1 Overview

This report presented the results on the effectiveness of the *Preparing for Life* programme between programme entry and when the *PFL* child was approximately six months of age. It included an analysis of the quantitative information derived from interviews with *PFL* participants and implementation data from *PFL*'s database, as well as qualitative information from *PFL*'s implementation team and participants. Overall, the six month evaluation suggests that the programme is progressing well. Although there were limited significant differences reported between the high and low *PFL* treatment groups (14%) at six months. These findings are consistent with previous evaluations of home visiting programmes which report limited results at six months (Gomby, Curloss, & Behrman, 1999). However, many of the relationships were in the hypothesized direction, with the high treatment group reporting somewhat better outcomes than the low treatment group. There were some significant findings in the domains of parenting, the quality of the home environment and social support across all groups, which correspond directly to information on the *PFL* Tip Sheets delivered to participants during this period. However, the programme had no significant impact on key factors such as pregnancy behaviour, infant birth weight, breastfeeding, and child development. These lack of effects may be attributed to dosage and timing. As participants, on average, joined the programme during the 22nd week of pregnancy and received 14 home visits in total, the intervention may not have been sufficiently intensive to generate significant treatment effects at this early stage. These results are also supported by the findings from the qualitative interviews which highlighted the small changes in behaviour and attitudes in the participants witnessed by the mentors. They acknowledged that these changes, while small, may be indicative of cumulative effects for the parents, children and community in the future. Despite these relatively modest effects, the low level of attrition and high participant satisfaction are indications that programme engagement is high which may result in positive future outcomes.

The results comparing the high and low treatment groups to the comparison community can be interpreted as confirming the main treatment results, as well the integrity of the RTC design. The comparison of the high treatment and comparison groups largely mirrored the findings of the high and low treatment groups, indicating that the high treatment group differed from both the low treatment and comparison groups in a positive direction. Moreover, the mixed results identified in the comparison of the low treatment and comparison groups suggest that, as expected, the *PFL* programme is not having a significant impact on the outcomes of the low treatment group. This finding echoes the results of the contamination analysis which suggest that despite the high risk of contamination within the community between the high and low treatment groups, contamination was not a significant issue at this stage of the study. As the programme progresses, the evaluation team will continue to test for potential contamination between the treatment groups. In addition, further work on the comparison group analysis, regarding the properties of the conditioning set, is on-going and may further inform the main treatment results.

The purpose of this concluding chapter is to discuss and interpret the main results comparing the high and low *PFL* treatment groups in the context of the larger report content. As such this

chapter uses the all information contained in this report such as relevant research literature, implementation results, qualitative findings, attrition and engagement analyses and differential subgroup effects to explain the main findings. Each section below discusses the main results for each of the eight key domains.

9.2 Child Development

Consistent with previous evaluations of early childhood interventions, there was no significant programme effect found for Child Development. Although these results may indicate that the programme failed to impact the *PFL* children in this domain, it should be noted that both developmental advances and delays are extremely difficult to detect in children at six months of age (Smitsman & Corbetta, 2010). The reasons for this are two-fold. First, normal, healthy infants develop at vastly different rates during the first two years of life. For example, infants can sit unaided between 4 and 9 months and walking with assistance can begin anywhere between 6 and 14 months of age (Smitsman & Corbetta, 2010; WHO, 2006). Indeed, the reliability alphas on the Ages and Stages Questionnaire instrument used to measure child development in this study, only ranged between .35 and .55, indicating poor reliability for this sample, thus supporting the hypothesis that it can be difficult to detect developmental advances and delays at six months. This finding is also consistent with the literature which typically does not identify significant programme effects for child development at six months. Of the multiple home visiting programmes reviewed in Chapter 1, only two identified effects on aspects of child development at six months (Nurse Family Partnership (Olds et al., 2002) and Pro Kind (Jungman et al., 2011). In addition, the Healthy Families America programme, which also used the Ages and Stages Questionnaire to evaluate child development at six months, found no significant treatment effects.

Treatment effects on child development may also have been difficult to detect in the *PFL* evaluation at six months due to timing of the study. At six months of age, there were an average of 14 visits between parents and *PFL* programme mentors, with most participants joining the programme during the third trimester. *PFL* is designed to create opportunities for changes in parenting in order to improve child outcomes, thus the only avenue by which child outcomes can improve is via parental change. Given that the home visiting model is based on building relationships of trust between participants and mentors, it is essential that there is sufficient time spent with mentors and sufficient exposure to programme materials in order to generate behavioural change. Parents need to have ample opportunity to learn and try the new techniques, and these new strategies will take time to have an impact on infant behaviour and development. It is worth noting that the bulk of the content contained in the Tip Sheets from baseline to age six months focuses on subjects such as health, nutrition, sleep, crying and safety. Very few Tip Sheets contain information about factors such as motor development or problem solving. It is possible that the limited contact between *PFL* staff and participant parents over a relatively short period time may not have been sufficient to make an impact on these domains. Findings in the subgroup analysis support this notion, where modest treatment effects were found particularly in the realm of gross motor development for children of non-first time mothers, partnered mothers and those at low familial risk. Arguably, these subgroups of parents are more likely to have previous experience with children, support from others, and fewer stressors and distractions and

therefore are perhaps more likely to have the time and inclination to put parenting strategies into practice.

9.3 Child Health

One of the key aims of home visiting programmes is to improve child health outcomes which are imperative for later development. Within the PFL intervention at six months, many of the Child Health factors that were expected to have been impacted by the *PFL* Programme were not. For instance, there appeared to be no significant programme effects on either birth weight or breastfeeding. Since birth weight is generally considered a reliable indicator of overall infant thriving this is not a positive finding. In interpreting these results, or lack thereof, it is important to note that most participating mothers were recruited just after their first visit to the maternity hospital. Thus, given the challenges of making appointments in busy hospital settings, the mothers were, on average, in their 22nd week of pregnancy at the time of recruitment. As a result, programme staff did not have the opportunity to intervene and impact upon many of the factors associated with birth weight, such as substance use and eating habits, until about half way through the pregnancy. Given that much of the literature suggests that mother's behaviour and habits have the most profound effects on infant health within the first trimester (i.e. the first 12 weeks of pregnancy), much of the effort to modify mother's behaviour may have come too late to make a significant impact (Mainous & Hueston, 1994; Smith, et al., 2002). Despite these challenges, there was a modest treatment effect found for infant birth weight in the subgroup analysis for non-first time mothers indicating that the treatment benefited at least some families on this domain. In addition, very few other home visiting programmes have been successful at impacting birth weight including the Nurse Family Partnership (Kitzman et al. 1997), Pro Kind (Jungman et al. 2011), and Early Intervention Program for Adolescent Mothers (Koniak-Griffen et al., 2000). The Healthy Families America programme is an exception, as it reduced the incidence of low birth weight in the New York trial (Lee et al. 2009). Finally, it is important to note that birth weight was self-reported by the mothers, therefore measurement error and recall bias may be an issue. An examination of the hospital records, when obtained, may be more informative.

The programme also had no impact of breastfeeding. Rates of breastfeeding are relatively low in Ireland (Tarrant & Kearney, 2008) and the decision to breastfeed is largely impacted by family and community norms (Fitzpatrick, Fitzpatrick, & Darling, 1994). An intervention which begins half-way through pregnancy may not be effective in changing longstanding, deeply engrained, intergenerational beliefs for most mothers. While just over a third of the sample (33% and 30% for high and low treatment groups respectively) stated that they intended to breastfed their child when asked during pregnancy, the actual breastfeeding rate was 24% and 22% respectively. However, there were breastfeeding treatment effects identified for female children, indicating that, for at least some mothers, the programme may have made an impact in this area. In addition, none of the home visiting programmes reviewed successfully impacted on breastfeeding e.g. Healthy Steps (Johnston et al. 2004), Family Care (Armstrong et al. 1999).

Although there were no significant findings on the majority of the child health outcomes, there were some significant treatment effects with small-moderate effect sizes, most notably regarding the frequency and appropriateness of eating and immunization rates. These findings are

consistent with results from similar evaluations, which report that infant feeding and immunization rates can be impacted early in programme implementation (Guyer et al., 2003; Barnes-Boyd, Fordham & Nacion, 2001; Johnston, et al., 2006; Bull et al., 2004; Haire-Joshu et al., 2008). The content included in the *PFL* Programme Tip Sheets for infants up to six months reflect this, as much of the material addresses the benefits of healthy infant diet and the importance of early and consistent immunization. Finally, there was one effect in a non-hypothesised direction such that mothers in the high treatment group reported that their children had more breathing difficulties than children in the low treatment group. While this may suggest a negative programme effect, it is possible that the programme has made the high treatment mothers more aware of their children's health. For example, there are a number of Tip Sheets focusing on child health and one in particular which lists potential health problems which the mothers should look out for in the children, including breathing difficulties.

9.4 Parenting

Improved parenting behaviour is a primary outcome of the *PFL* programme. There were significant treatment effects with small to moderate effect sizes found for parental stress, maternal ratings of the child, and the quality of parent-child interactions. The parent-child interaction effect is particularly robust as, not only was it significant in the individual test, it remained significant in the step-down test, which is a more conservative statistical procedure. There were no significant treatment effects found for many of the measured variables however, most notably in the realms of parental self-efficacy and attachment. There is also suggestive evidence from the sub-group analysis that parents of girls and lone parents particularly benefitted regarding improved parenting behaviour. Thus overall the programme had some success in improving parenting outcomes at six months.

These findings are consistent with results from similar evaluations of home visiting programmes, many of which find few, if any, parenting effects at six months. For instance, to our knowledge there are no empirical findings which report links between home visiting programmes and maternal attachment style and parental locus of control. Moreover, there are mixed findings regarding the associations between home visiting programmes and parental stress and improvement in parent-child interactions (Kendrick et al., 2000). Our review of home visiting programmes in Chapter 1 found that positive effects on parenting were generally restricted to providing a safe environment for the child. In light of these limitations, finding a strong association between programme efforts and improved parent-child interactions early in programme implementation is promising.

Parenting very young infants can be challenging. Many normal healthy infants cry often and for seemingly no reason. Parents employ different strategies for addressing issues that arise. However, reactions to infant behaviour can be harmful when parents act out of anger or hostility. Behaviours such as spanking, shaking, and leaving an infant on their own can be potentially damaging. Moreover, these behaviours are often seen as potential risk factors for future abuse. For these reasons, it is encouraging to find a treatment effect, particularly this early in programme implementation, which indicates that those in the high treatment group are significantly less likely to engage in potentially harmful reactive behaviour. One main reason for this finding may be the amount of time and effort the mentors dedicate to the subjects of infant

safety and appropriate care. Much of the content of the Tip Sheets reflect strategies for dealing with fussy children, the differences between appropriate and dysfunctional parent-child interactions and maternal self-care, all subjects which are likely to reduce parental hostile reactions.

Similarly, a treatment effect was found for parent–child interactions. Some ways in which parents can optimise time with very young infants is by reading to them or playing with them. For this reason, the developmental packs received by all treatment families contain age appropriate toys and books. Since both high and low treatment families received these items, the mentoring component of the programme was likely the crucial element in improving parent-child interactions, as significant results were found for high treatment families only. *PFL* mentor interviews confirm that a focus on improving parent–child interaction was a priority during the first six months of the child's life. The contents of the Tip Sheets reflect this, as several sheets contain information outlining the details of safe, appropriate and beneficial parent-infant interaction. Healthy parent child-interactions can impact on other aspects of parenting as well. For example, developing healthy interaction between mother and child during the first six months is likely to contribute to the lower levels of parenting stress reported by the mothers in the high treatment group. Furthermore, high treatment parents were more likely to hold favourable views of their infants when compared to other children. This too may be due to the time spent interacting with the child.

9.5 Home Environment & Safety

At six months the *PFL* Programme appeared to have the most impact on safety and home environment factors such as the variety of play things and people available to the infant in the home, appropriateness of infant care, the availability of age appropriate toys, books and other learning materials. The size of these effects ranged from 0.2-0.4, thus indicating moderate effect sizes. This is consistent with the literature which finds that home visiting programmes can improve the quality of the early home environment. For example, similar to *PFL*, the Family Care program (Armstrong et al. 1999) and the Community Based Family Resource Service Program (Culp et al. 2004) also had a positive effect on the Home Observation Measurement of the Environment (HOME) instrument at six months. Moreover, there were programme effects found for indicators of general environmental safety, as well as the availability of safety equipment such as baby gates and electrical socket covers. The finding that more families in the high treatment group reported using electrical socket covers may be attributed to the programme mentors. Families in both the high and low treatment groups received information in the developmental packs regarding baby-proofing the home environment, however the mentors only worked with those in the high treatment group directly. In addition, the Tip Sheets contain information on infant safety in general and focus particularly on steps to improve safety within the home, such as covering electrical sockets. This suggests that the information and advice received through programme delivery is having an impact on these domains. These results are also in line with other home visiting programmes such as Healthy Families America (LeCroy & Crysik, 2011), which also had significant effects on safety practices at six months.

Findings in the subgroup analysis identified many treatment effects in the HOME sub domains particularly for partnered mothers, mothers with higher cognitive resources, and those at high

familial risk. It is possible that two-partner households and mothers with high capabilities have the necessary social and financial resources, as well as the required skills, to operationalize the information provided by the mentors on providing a safe and stimulating environment for their child.

Although many treatment effects were found in relation to the home environment and safety, there were no significant programme effects factors associated with the parent-child relationship such as parental responsively, involvement, and acceptance. This is in contrast to findings in the Parenting domain which indicate that parents in the high treatment group were more likely to have higher quality interactions with their children. The reasons for these differences may lie in the instruments used. For example, the types of interactions measured in the Parenting domain reflect mother assessments of interactions with their child whereas the interaction subscale of the HOME measures warmth and responsiveness.

9.6 Maternal Health & Pregnancy

The programme had almost no impact on maternal health and pregnancy outcome. The exception is that fewer high treatment mothers were hospitalised directly after having given birth for specialised medical care. The rationale underlying this finding, which has the largest effect among all six month outcomes, is unclear. The evaluation team will be reviewing participant maternity records in order to obtain a more comprehensive account of pregnancy progress and birth complications, which may explain this effect. Although, there is no current measure of labour complications in the evaluation data, the labour and birth are subjects addressed at length in the Tip Sheets provided to the high treatment group early in the intervention. Therefore, it is possible be that high treatment mothers were more prepared for labour than those in the low treatment group which may have affected how they responded to the birthing process and subsequent complications.

Given the high rates of substance use during pregnancy reported by *PFL* participants at the baseline assessment, one of the key aims of the programme was to address these issues. However, there were no significant treatment effects found for mother behaviour during pregnancy. Factors related to healthy infant development, such as reduced substance use and smoking during pregnancy, appeared to be unaffected by the programme. However, it is important to note that ingrained addictive habits such as smoking are extremely difficult to change and that previous findings have shown that simply giving people informative pamphlets on the hazards of substance use may be ineffective (Babain & Craciun, 2007). Moreover, given that the average first time interaction with the mentors occurred at 22 weeks, more than half way through a normal 40 week pregnancy, the intervention may have come too late to effectively address these issues. In addition, as reviewed in Chapter 1, there is no evidence that previous home visiting programmes have been effective in reducing risky behaviour during pregnancy.

Despite these limitations, the sub group analysis reveals that the programme may have been particularly effective in the realm of maternal health and pregnancy for first time mothers and lone parents. For instance, first time mothers in the high treatment group were significantly more likely to report a change in smoking habits during pregnancy, and fewer mothers without partners were more likely to report having had health complications during birth and having used

drugs during the first six months of their child's life. Moreover, lone mothers in the high treatment group were significantly less likely to report symptoms associated with postpartum depression. These differential effects may indicate that the *PFL* programme may be particularly helpful for certain mothers. However, it should be cautioned that findings at six months may not occur at subsequent data collection waves. As the programme progresses, future data analyses will reveal the nature of these differential effects over time.

9.7 Maternal Social Support

A number of significant treatment effects were identified in the social support domain with small to moderate effect sizes. Many of the factors associated with maternal social support can be interpreted as inherent effects of being in the high treatment group. For instance, participants in the high treatment group were more likely to know other mothers who had children of a similar age, were more likely to meet with friends frequently, and were more likely to discuss the programme with others. The programme includes several components such as baby massage classes and coffee mornings, which were designed to bring mothers from the community together.
Therefore mothers in the high treatment group may have more opportunities to develop friendships with other parents than those in the low treatment group. Similarly, the high treatment group supports are designed to create more opportunities to gain parenting knowledge through the Tip Sheets and meetings with mentors. For this reason it is perhaps unsurprising that mothers in the high treatment group would discuss the programme more often with family and friends as they may simply have more information to talk about. This phenomenon was reflected in focus group findings which indicated that those in the low treatment group have little to comment on regarding programme content. It is interesting to note that the only home visiting programme to evaluate maternal social support at six months reviewed in Chapter 1 found no effect on perceived social support (Healthy Families American, Anisfeld et al. 2004).

A higher number of mothers in the high treatment group also reported frequent interaction with their child's grandparents compared to those in the low treatment group. The benefits of familial support for mothers of young children is emphasized in the programme Tip Sheets, however it is important to note that at both baseline and six months more mothers in the high treatment group were residing with their parents. Therefore, given that there were no significant differences found in levels of social support from friends, parents or other relatives, this finding may be an artefact of living arrangement rather than a reflection of improved social support.

There was one interesting social support finding in an unexpected direction. More mothers in the high treatment group reported dissatisfaction with the father's level of involvement in the child's life compared to mothers in the low treatment group. This can be interpreted in several ways. First, it may be that the programme's efforts to engage fathers did not have the desired effect. The second plausible explanation is that mothers in the high treatment group, having become more educated regarding the benefits of healthy father-child interactions, are less likely to be satisfied with the current level of father's involvement. Given that this finding reflects one time point, it is not possible to discern if this is the case. Future statistical analyses and focus group findings may reveal the nature of this relationship.

9.8 Childcare & Service Use

There were no significant differences between the high and low treatment groups regarding childcare use at six months. One potential reason for this is that less than one-fifth of the sample was placed in childcare before six months of age. In addition, maternity leave in Ireland includes six months paid leave and a further four months of unpaid leave. Therefore, for the mothers in the sample who are working, they would not have returned to work at this stage. Children of families in both the high and the low treatment groups are entitled to a subsided placement in a local crèche, therefore differences in childcare utilization may be revealed in future data collection waves as the children age.

The main analysis also showed that there was no difference in service utilisation across the two groups. In contrast, the Nurse Family Partnership, one of the few studies to report service use, found that the treatment group were more likely to avail of community services (Kitzman et al. 1997). While some of the services available to participant families are arguably helpful and positive, such as education and employment services, others, such as the utilization of emergency services, may reflect risk or harm. Although there were no significant programme effects found for service usage in the main analysis, the subgroup analyses revealed some differences. High treatment mothers who were partnered, those who had more than one child and those with relatively higher cognitive resources were more likely to utilize employment services. Although further analysis is necessary to ascertain if there is a connection amongst these factors, it is possible that mothers with partners have more support and are therefore more likely to seek work outside the home while their children are very young. Also, high treatment families at high risk were more likely to utilize adult-education services. It is possible that these services provide information of particular interest to high risk families, however more research is needed.

Although there were no significant differences found regarding the participant's voting behaviour at baseline, there was a significant treatment effect found for reported levels of voting at six months, with a moderate effect size (0.4). Significantly more mothers in the high treatment group reported having voted in the last general election than those in the low treatment group. It is possible that the social aspect of the programme creates an environment where mothers are more likely to discuss politics and current affairs. Alternatively, mothers in the high treatment group are receiving an intensive programme with multiple supports which is partly funded by the state. Therefore they may turn out to vote to support the continuation and expansion of the programme. Similarly, the programme aims to support and empower parents, thus it is possible that parents in the high treatment group feel they have a voice and contribute to society. It is also possible that this finding may reflect a level of social desirability, whereby mothers in the high treatment group feel more inclined to report having voted whether they actually voted or not. At the moment, these hypothesis are conjecture; in the coming months the *PFL* evaluation team plan to compare reported voting to available voting records in an effort to investigate this finding further.

9.9 Household Factors & SES

Despite a certain level of attrition between baseline and six months (10%), there were no significant differences found between the high and low treatment groups in terms of SES factors such as family composition, employment, education and family income. The exception is that, consistent with baseline data, more mothers in the high treatment group continue to reside with their parents. These results suggest that randomisation is maintained at six months. Demographic data will continue to be monitored at each wave of analyses to ensure the integrity of the evaluation.

In addition to comparing household factors and demographics that should not be influenced by the programme, certain outcomes, such as improvements in educational and employment status between baseline and six months, were also considered. It is possible that these outcomes may be influenced by the programme as parents may become more self-reliant and ambitious; however we find no significant treatment effects in these domains. This is perhaps unsurprising as the parents are currently caring for very young children. Therefore it is possible that such effects will emerge later in the evaluation. In addition, only one home visiting programme, the Early Intervention Program for Adolescent mothers, found a positive effect on education and employment transitions during early childhood (Koniak-Griffen et al. 2000).

9.10 Further Work and Future Reports

As discussed throughout the report, a number of additional analyses using the six month data are on-going. In particular, we are developing new dose-response models which will allow us to examine the impact of variations in the level of participant engagement on participant outcomes. These models will take account of the non-random nature of treatment intensity and allow us to test whether a greater intensity of home visits is associated with better outcomes. One of the main findings to emerge from the quantitative analyses was that mothers with relatively higher cognitive resources received a greater number of home visits and may have benefited more from participation in the *PFL* programme overall. Further analysis will allow us to separate and identify these effects. In addition, we are conducting further sensitivity analysis with the comparison group results and plan to access official maternity and voting records which will allow us to further investigate some of the main findings from the report.

While overall there were few significant treatment effects identified at six months, it is important to keep in mind that programme effects may be difficult to detect at six months and that future waves of data collection will not only capture treatment effects when the programme has been running for a longer amount of time, but will be able to track changes for treatment families longitudinally. Several measures assessed at baseline, for example, the *Adult Adolescent Parenting Inventory* and the *Knowledge of Infant Development* are among the measures that are reassessed when the child is 12 months of age. In addition, several child development measures are assessed at each time point, which will allow us to compare the developmental trajectories of the children over time.

Future reports will continue to track the effectiveness of the *Preparing for Life* programme when the *PFL* cohort is 12, 18, 24, 36, and 48 months of age. Thus, this is the first of six reports

analysing the impact of the programme and should be interpreted in the context of representing the early impact of the programme.

References

Please see the following website for the reference list:
http://geary.ucd.ie/preparingforlife/