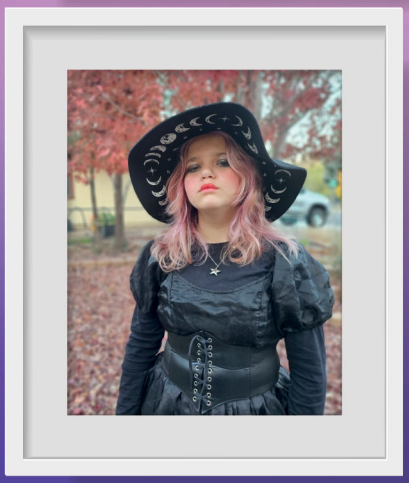






# preparing for life

## Early Childhood Intervention

## Summary Report

### The Age 14 Follow-up of the Preparing for Life Study

UCD Geary Institute for Public Policy

Preparing for Life

*Support • Nurture • Thrive*

An Roinn Leanaí, Comhionannais, Míchumais, Lánpháirtíochta agus Óige
Department of Children, Equality, Disability, Integration and Youth

TUSLA
An Ghníomhaireacht um Leanaí agus an Teaghlach
Child and Family Agency

Northside Partnership

The ATLANTIC Philanthropies

# preparing for life

## What is the *PFL* programme?

*Preparing for Life* (*PFL*) is a prevention and early intervention programme designed to promote children's school readiness by working with families from pregnancy until their children start school. Results from an extensive randomised controlled trial (RCT) evaluation showed that the programme was effective at improving the children's school readiness when they were 5 years old, as well as having a sustained effect on their development at age 9. This report examines the long-term impact of the *PFL* programme now that the cohort (high and low treatment groups) have reached adolescence.

## Why was the *PFL* programme developed?

*PFL* was developed as evidence showed that over half of the children living in the area were starting school without the necessary skills to make a successful transition to school life. The programme aimed to promote children's development and improve these low levels of school readiness by supporting parents to develop the skills and knowledge to help prepare their children for school.

## How did the *PFL* programme and evaluation work?

From 2008 to 2015, the evaluation team from the UCD Geary Institute for Public Policy followed the journey of 233 families who agreed to participate in the RCT. When the families consented to join *PFL* during pregnancy they were randomly assigned to either a high treatment group or a low treatment group. Using the RCT design ensured that the types of families in each group were similar before the programme began. This meant that if the outcomes of the two groups were different over the course of the evaluation, we could be confident that the findings were caused by the *PFL* programme.

By following children from birth through to school entry, the evaluation examined the impact of *PFL* on children's cognitive development, language development, approaches to learning, socio-emotional development, physical wellbeing, and motor development. Information was gathered at multiple time points from parents, children, hospitals, schools, and teachers using questionnaires, observations, direct assessments, medical records, and interviews. The evaluation found that *PFL* was effective at improving children's school readiness across all these domains, particularly in terms of children's cognitive development and physical health. The programme also had some impacts on parenting and the quality of the home environment; however, these impacts were smaller and less consistent.

The first follow-up of the *PFL* cohort took place when the children were 9 years old. The evaluation found that the programme continued to have an impact on children's cognitive development and achievement tests of reading and math. The programme had no impact on absenteeism or the use of school resources, and the impacts on children's socio-emotional skills and health which were found at age 4 were no longer present at age 9. Now that the *PFL* cohort have started secondary school, the Age 14 Follow-up study examines whether the impact of *PFL* has been sustained 10 years after the programme ended.

### Key results at the end of the programme

| | | |
|---|---|---|
| **Cognitive Development** | Better cognitive functioning, spatial abilities, non-verbal reasoning skills, and basic numeracy skills | e.g. 10 point IQ gap between children in the high and low treatment groups |
| **Socio-emotional Development** | Reduction in hyperactivity and inattentive behaviours | e.g. 2% of the high treatment group at risk of behavioural problems compared to 17% of the low treatment group |
| **Health** | Improved diet, used fewer hospital services, less likely to be overweight | e.g. 24% of the high treatment group classified as overweight compared to 41% of the low treatment group |
| **Parenting** | Better parenting practices and screen time supervision | e.g. high treatment parents less likely to engage in punitive and hostile parenting |

## Key results at the Age 9 Follow-up

| | | |
|---|---|---|
| **Cognitive Development** | Better cognitive functioning, spatial abilities, non-verbal reasoning skills, and verbal abilities | e.g. 8 point IQ gap between children in the high and low treatment groups |
| **Executive Functioning** | Improved inhibitory control, attention flexibility, and working memory | e.g. high treatment group better at retaining and using information over brief periods of time compared to low treatment group |
| **Reading and Maths Scores** | Better 2nd and 3rd class standardised test scores in reading and maths | e.g. 34% of high treatment group had below average math scores compared to 55% of low treatment group |

## What did the families receive?

### HIGH TREATMENT SUPPORTS

#### HOME VISITING

Through regular home visits, the *PFL* mentors built good relationships with parents and provided them with high quality information about parenting and child development using Tip Sheets. The home visits started in pregnancy (at~21 weeks) and continued until the child started school at age 4 or 5.

#### TRIPLE P

The Triple P Positive Parenting Programme aimed to improve positive parenting through the use of videos, vignettes, role play, and Tip Sheets in a group-based setting. Parents participated in Triple P training when their children were between 2 and 3 years of age.

#### BABY MASSAGE

Baby massage classes were offered during the first year to equip parents with skills which would allow them to interact with, stimulate, relieve, and relax their baby, and to emphasise the importance of communication between parents and babies.

### *PFL* PARTICIPANTS

R

| HIGH TREATMENT (GREEN) | LOW TREATMENT (BLUE) |
|---|---|
| 1 €100 worth of child developmental toys annually and book packs | 1 €100 worth of child developmental toys annually and book packs |
| 2 Facilitated access to enhanced pre-school | 2 Facilitated access to enhanced pre-school |
| 3 Public health workshops | 3 Public health workshops |
| 4 Facilitated access to local services | 4 Facilitated access to local services |
| 5 Access to social events | 5 Access to social events |
| 6 Home Visiting | |
| 7 Triple P | |
| 8 Baby massage | |
| **N = 115** | **N = 118** |

## ENGAGEMENT

### How much support did high treatment families receive?

#### Home Visits

Families received on average **51 hours** of home visits

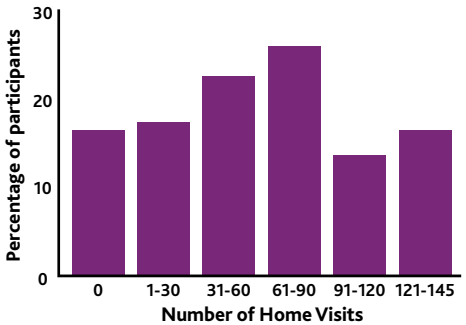
Visits lasted **49 minutes** on average

The number of visits ranged from **0 to 145**

Families received on average **50** visits

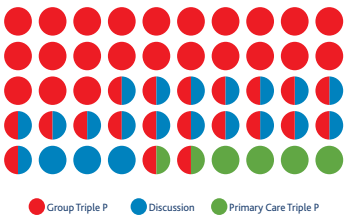
**96 families** had at least one home visit

Older mothers with higher cognitive resources who were employed during pregnancy and had better knowledge of child development during pregnancy **engaged** in more home visits

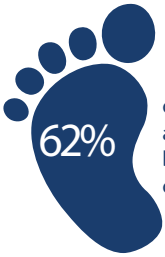



#### Parenting Skills Training

50 families engaged in Triple P training




#### Baby Massage




of families attended baby massage classes

## CONTAMINATION

**Did the low treatment group receive the high treatment supports?**

The potential for contamination was high in *PFL* as it took place in a small community where families in the high and low treatment groups may have known each other. However, our measures of contamination found that the low treatment families did not benefit from the supports offered to the high treatment families.

## How was the Age 14 Follow-up study conducted?

At the Age 14 Follow-up, the *PFL* cohort (high and low treatment groups) ranged in age from 12 and 16 years, with an average age of 14 years old. Families were invited to take part in the follow-up through two methods:

### Community Event Recruitment

- *PFL* Age 14 Birthday Celebration
- Open to all *PFL* families (high & low)
- UCD researchers in attendance to discuss study and recruit interested families

### Targeted Recruitment

- Phone/email/letter contact with all families who had not withdrawn from the study to invite them to take part in the follow-up

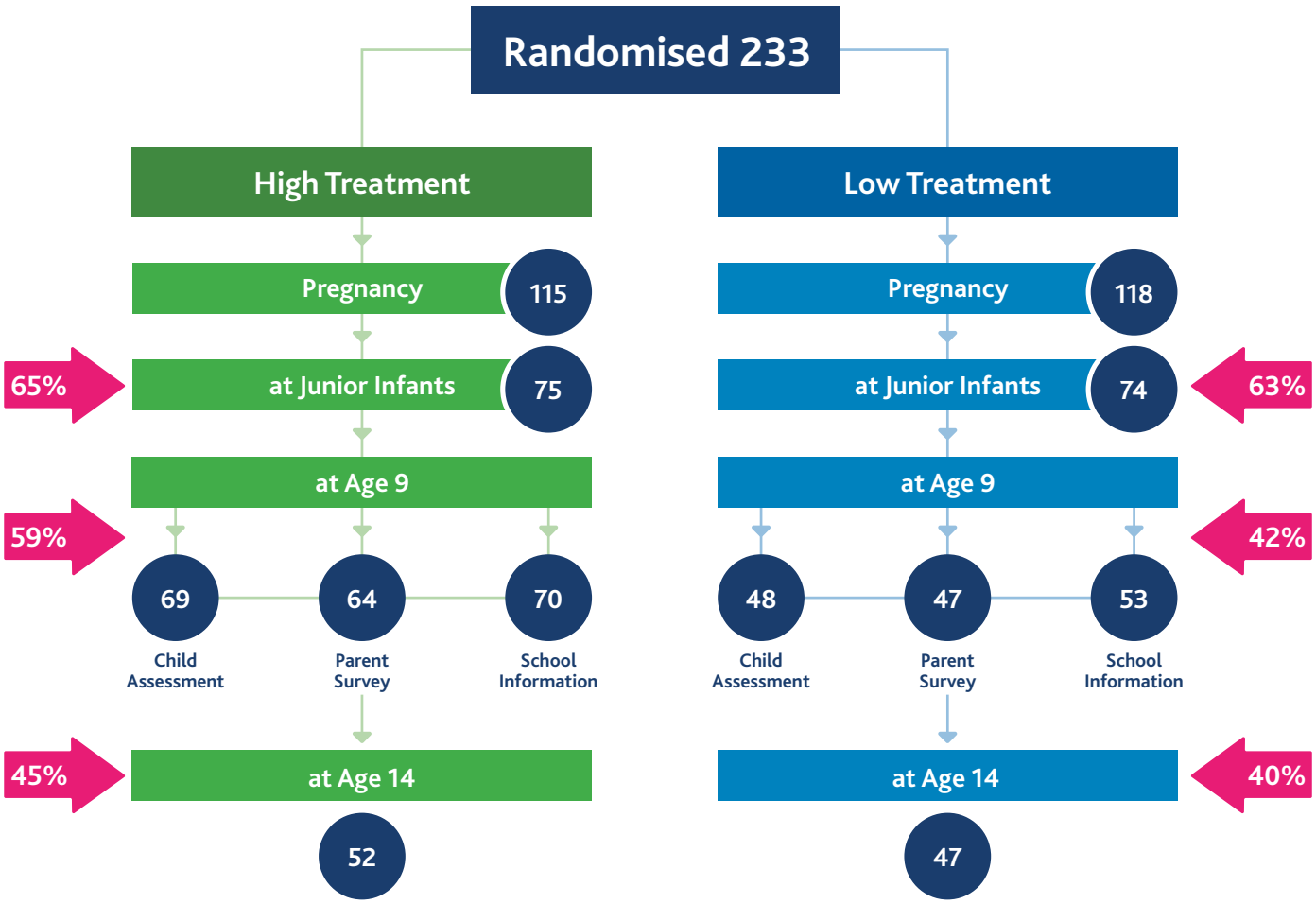
## What data were collected in the Age 14 Follow-up study?

Data for the Age 14 Follow-up were collected between January and September 2024. Most assessments took place in the child's secondary school (75%), and the remainder took place in the family home or the village centre. There were four assessment components – (1) direct assessment of the children's cognitive skills and executive functioning conducted by trained researchers, (2) a self-completed questionnaire completed by the *PFL* child on an iPad, (3) height and waist measurements recorded by trained researchers, and (4) a saliva sample to test for biological aging.

## Who took part in the Age 14 Follow-up study?

In total, 99 of the original 233 participants (43%) took part in the assessment (high treatment = 45%; low treatment = 40%). Despite the substantial time and effort invested in recruitment efforts by both the research and implementation teams, the participation rate was lower than that achieved at age 9 (50%). While the level of attrition was relatively similar in both groups, a higher proportion of the high treatment group dropped out of the study at age 14, however, the types of participants who took part in the age 14 assessment were similar to those who took part at age 9. A comparison of the baseline characteristics of the high and low treatment groups found that the groups were still balanced at age 14.

## How many families took part in the Age 14 Follow-up study?



## How were the Age 14 Follow-up data analysed?

All the results were estimated using permutation tests with 100,000 replications, with adjustments for attrition using inverse probability weights and for multiple hypotheses testing using the stepdown procedure. The results are discussed using p-values to indicate statistically significant effects, where $p<0.1$ is considered statistically significant, and Cohen's d effect sizes, where a small effect is 0.2, a medium effect is 0.5, and a large effect is 0.8.

## What results did we find at Age 14?

### Cognitive Development

At age 14, the *PFL* programme continued to have a significant and large impact on children's cognitive development. Children who received the high treatment supports during their first 5 years of life had better general cognitive functioning, spatial abilities, non-verbal reasoning skills, and verbal abilities. The programme improved their overall cognitive functioning by 0.70 of a standard deviation, which is similar to the effect sizes found at age 4/5 and at age 9. *PFL* also had a significant and positive impact on one dimension of children's executive functioning – their working memory (the ability to retain and manipulate or use information over brief periods of time). Unlike the Age 9 Follow-up, there was no impact on the children's inhibitory control or attention flexibility.

#### *British Ability Scales & NIH Executive Functioning*

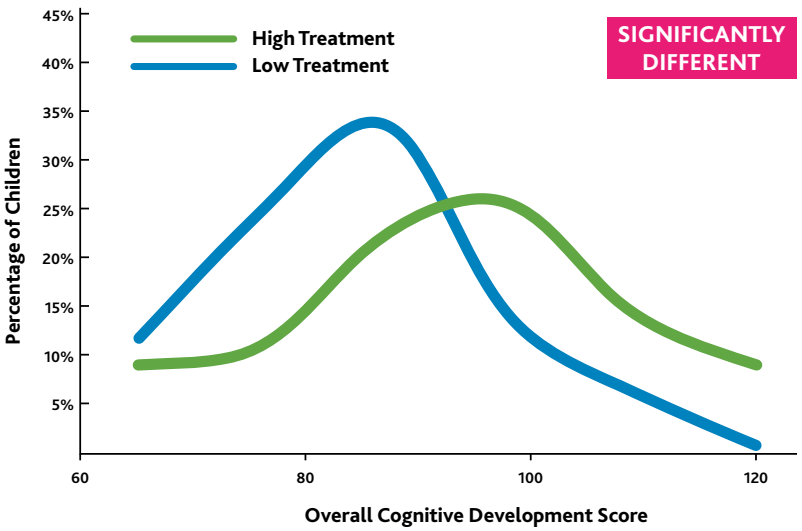
| British Ability Scale Scores | $M_{HIGH}$ (SD) | $M_{LOW}$ (SD) | p value | Effect Size |
|---|---|---|---|---|
| General Conceptual Ability | 85.41 (14.04) | 76.76 (10.74) | 0.010 | 0.70 |
| Spatial Ability | 94.09 (17.77) | 86.28 (13.02) | 0.012 | 0.51 |
| Non-Verbal Ability | 82.94 (12.36) | 76.57 (11.62) | 0.023 | 0.53 |
| Verbal Ability | 87.39 (12.82) | 80.42 (9.89) | 0.023 | 0.61 |

| NIH Toolbox Executive Functioning | $M_{HIGH}$ (SD) | $M_{LOW}$ (SD) | p value | Effect Size |
|---|---|---|---|---|
| Inhibitory Control | 95.10 (17.78) | 98.27 (17.57) | 0.790 | -0.18 |
| Attention Flexibility | 111.49 (20.52) | 113.94 (19.84) | 0.794 | -0.12 |
| Working Memory | 102.44 (16.20) | 94.68 (13.89) | 0.052 | 0.52 |

***Note:*** $M_{High}$ is the average score of the high treatment group and $M_{Low}$ is the average score of the low treatment group. A p-value less than 0.100 means that the difference between the high and low treatment groups is statistically significant. The effect size is a measure of how large the difference between the high and low treatment group is in terms of standard deviations.

The figure across shows that the distribution of cognitive development scores for the high treatment group is shifted to the right of the low treatment group's distribution. This means that *PFL* improved the skills of children of all different types of ability.

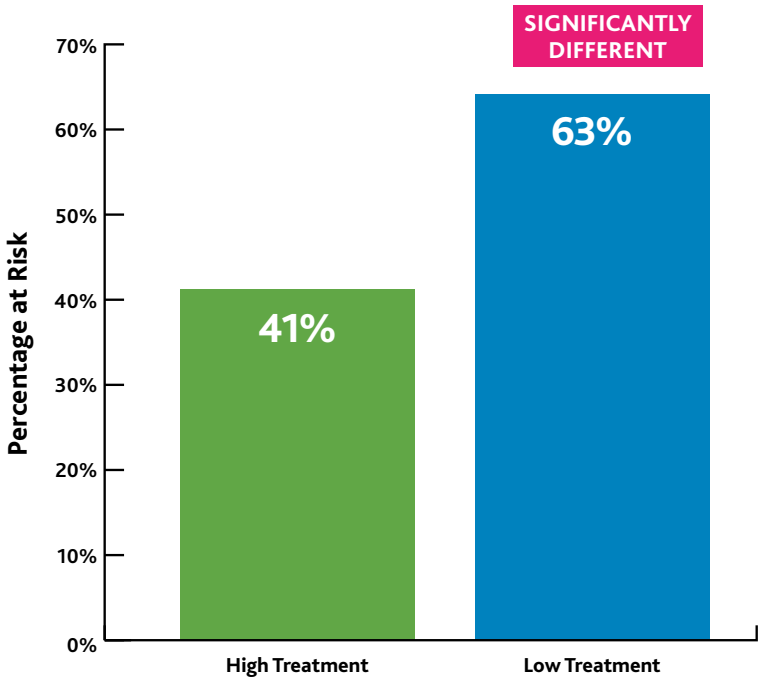
Overall, the effects on cognitive development at age 14 are similar in magnitude to those measured at the end of the programme and at age 9, demonstrating the sustained impact of *PFL* almost 10 years after the families finished the programme.



## Socio-emotional Development & Mental Health

Consistent with the age 9 findings, *PFL* had little impact on children's socio-emotional development and mental health at age 14. Although the high treatment group had mostly better outcomes than the low treatment group, among the 24 measures considered, there was only one significant difference – children in the high treatment group had less attention problems (41%) compared to children in the low treatment group (63%). A comparison of the *PFL* cohort (high and low treatment groups) to a nationally representative sample of children from the Growing Up in Ireland (GUI) study, shows that over 40% of the *PFL* cohort reached the cutoff indicative of experiencing depression, compared to only 16% in the GUI cohort. Thus the *PFL* cohort have significantly poorer socio-emotional development compared to the average teenager in Ireland.

Socio-Emotional Outcomes: *% Children at risk of attention problems*



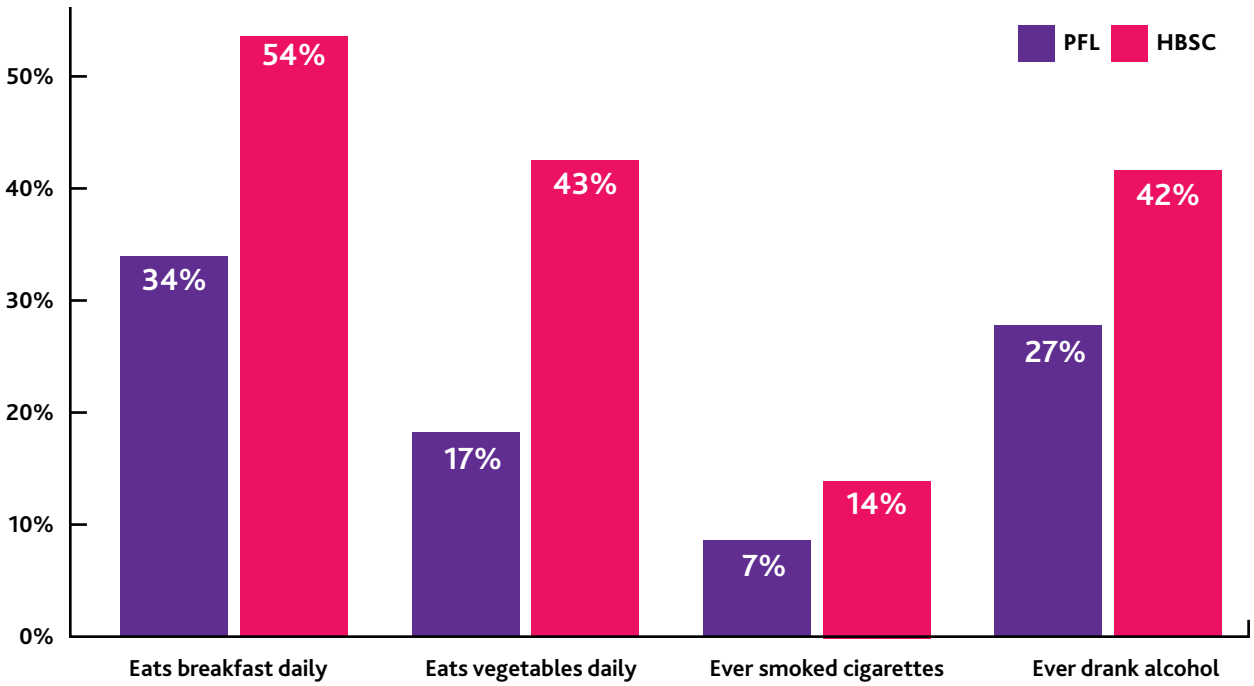

## Health

At age 14, the *PFL* programme had an impact on one dimension of children's health (waist-to-height ratio) but not others. For example, there were no differences between the high and low treatment groups regarding substance use (smoking, alcohol, or drug use), diet, or self-rated health.

A comparison of the *PFL* cohort (high and low treatment groups) to a nationally representative sample of Irish children from the Health Behaviour of School-Aged Children (HBSC) study, shows that the *PFL* cohort have a poorer diet than the average Irish teenager, however they engage in better behaviour regarding substance use. For example, the *PFL* cohort are less likely to have smoked cigarettes and drunk alcohol compared to the HBSC cohort.

The high treatment group had a lower waist-to-height (WTH) ratio compared to the low treatment group. Specifically, there was almost a 6cm difference in the waist circumference of both groups. Although this result was not significant in the more conservative statistical test, it is suggestive that *PFL* has had a long-term impact on reducing the risk of obesity. This result is consistent with findings from the age 4/5 assessment whereby the high treatment group were less likely to be categorised as obese/overweight.

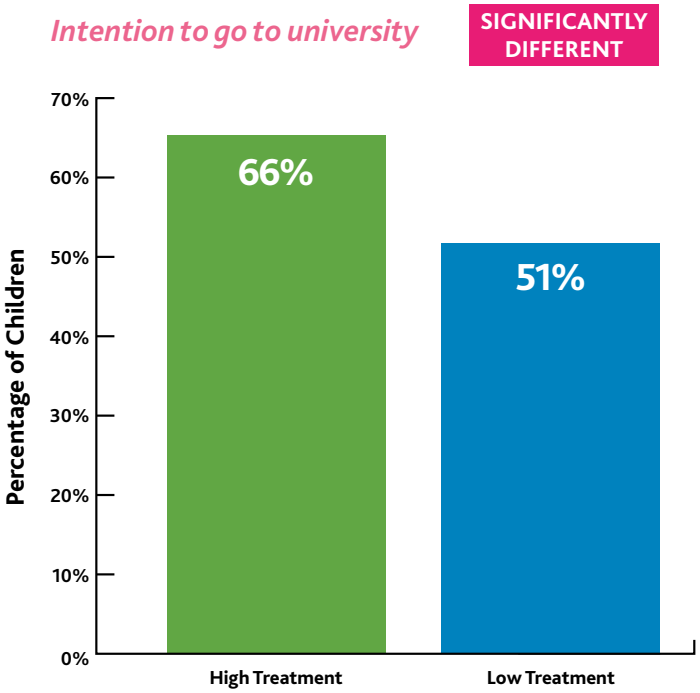
*Diet & Substance Use of PFL and HBSC Cohorts*



## Educational Engagement, Time-Use, & Antisocial Beliefs

At age 14, the *PFL* programme had no impact on the children's sense of school belonging, school liking, school engagement, or school absences. For absences, 57% of the high treatment group reported never missing school without permission in the last 12 months, compared to 48% in the low treatment group, but the difference was not statistically significant. Also, it is significantly lower than the proportion reporting never missing school in the GUI cohort (97.5%). The programme also had no impact on how much time the children spend on homework and social media or their attitudes around antisocial behaviour.

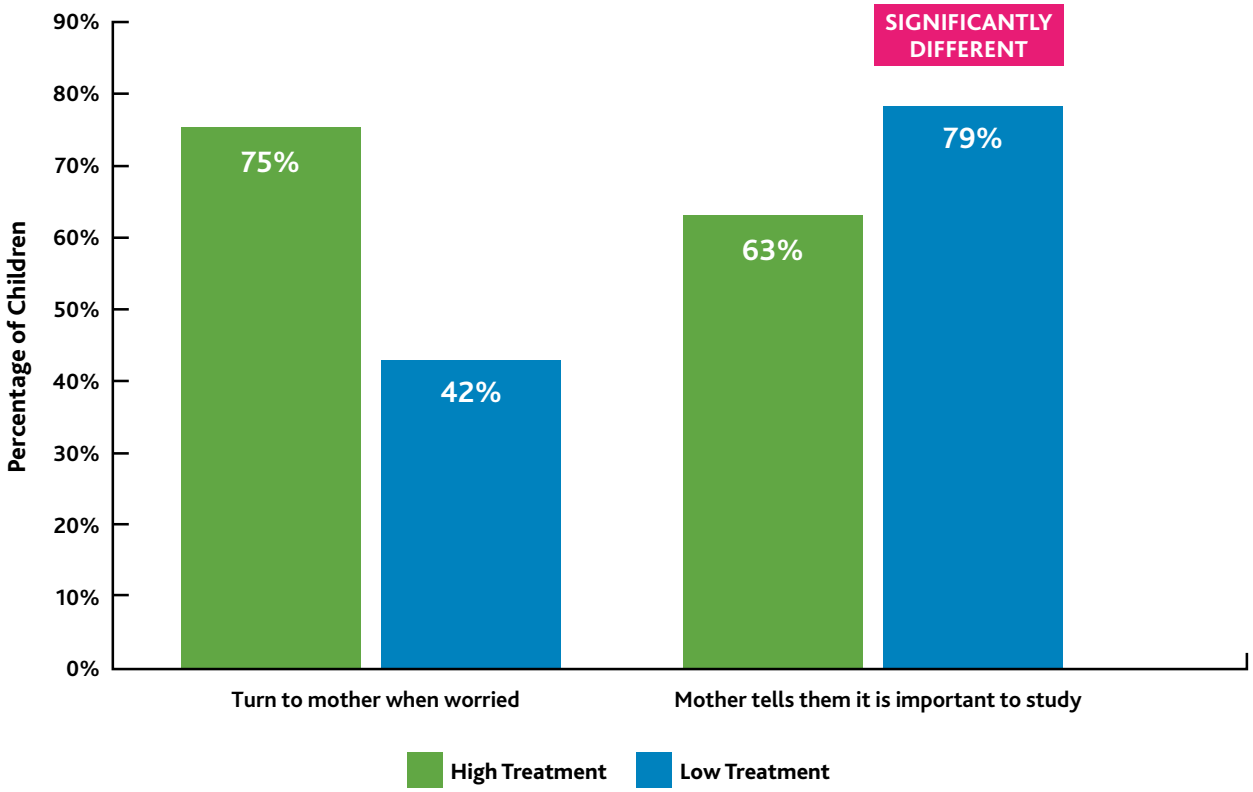
One important difference was found however - 66% of the high treatment group stated that they intend to go to university in the future compared to 51% in the low treatment group. Thus, *PFL* has changed educational expectations.




## Parent-Child Relationship

At age 14, the *PFL* programme had impacts on some dimensions of the parent-child relationship. The high treatment group reported significantly better communication with their mothers and trust with their fathers, with effect sizes of 0.36 and 0.45 of a standard deviation respectively. Also, the high treatment group reported that they are more likely to turn to their mothers when worried compared to the low treatment group. They also reported that their mothers and fathers are more likely to encourage or help them with something important. Conversely, the low treatment group was more likely to report that their mothers tell them it is important to study.

### Parent-Child Relationship Outcomes



## Concluding Remarks

The aim of the Age 14 Follow-up study was to examine whether the large and significant impacts of *PFL* found at the end of the programme and at age 9 were sustained into adolescence. Evidence on the impact of home visiting programmes into adolescence are inconclusive, as very few studies continue to track children beyond the lifetime of the intervention, and those that do often fail to find significant long-term effects. In contrast, *PFL* continues to have a sizeable impact on children's cognitive skills approximately 10 years after finishing the programme. There is no evidence of cognitive fade-out, with effect sizes of 0.70 of a standard deviation, and significant effects on some dimensions of executive functioning, health, and the parent-child relationship. The magnitude of the effects are similar to those found at the end of the programme and substantially larger than those found in much of the existing home visiting literature. This may be attributed to the specific features of *PFL* including its prenatal start, its longer programme duration, and its multiple connected treatments.

Similar to the age 9 findings, there were a number of areas where no effects were found including various dimensions of educational engagement such as liking school, a sense of belonging at school, school absences, and time use outside of school. Given that *PFL* raised children's cognitive scores, it is somewhat surprising that this did not translate into more positive feelings about school. However, a significantly higher proportion of the high treatment group reported that they plan to attend university. While this is lower than the national average found in the GUI cohort, it suggests that *PFL* was effective in improving educational expectations, which is likely to have positive long-term consequences.

Also consistent with the age 9 findings, *PFL* had little impact on children's socio-emotional well-being at age 14. While the high treatment group had less attention problems compared to the low treatment group, there were no differences regarding life satisfaction, depression, self-esteem, or other dimensions of socio-emotional skills. Given that *PFL* has had consistent effects on what were traditionally called 'hard' skills (e.g., cognitive skills, working memory, attention), and no lasting effects on 'soft' skills, suggests that the programme may have had a permanent impact on areas of the brain that are particularly malleable to intervention during early childhood (e.g., the frontal lobe).

In-line with other home visiting programmes, *PFL* has no long-term impact on children's health in terms of general health, substance use, and dietary intake. However, consistent with the age 4/5 findings, the programme reduced the risk of obesity at age 14. This is important as obesity in adolescence is associated with a range of poor health outcomes later in adulthood including cardiovascular disease and a range of autoimmune diseases.

For the first-time, the quality of the parent-child relationship from the perspective of the child was assessed, and there was some evidence that *PFL* improved the child's relationship with their mothers and fathers, particularly regarding communication and trust. This confirms the theoretical underpinnings of the *PFL* model which places the parent-child relationship at its core.

To conclude, *PFL* is one of the few experimental home visiting programmes that tracks participants into adolescence and finds evidence of significant impacts on important dimensions of children's skills. While 43% of the original sample took part in the Age 14 Follow-up, the treatment groups are still balanced on all key baseline characteristics. One concern as we move forward with the *PFL* evaluation will be the difficulty in retaining the cohort as participants become older and start attending university or leaving the family home. Therefore, maintaining the *PFL* cohort is a priority. This is particularly important given the magnitude of the cognitive effects, especially in comparison to other intervention programmes, as *PFL* could provide a model for other communities aiming to reduce long-term socioeconomic inequalities.

## This story presents the life of a typical *PFL* child at Age 14 based on the data collected.

Kirsty is now 14 years old and is attending secondary school. From taking part in *PFL*, Kirsty is one of the smartest kids in her class and plans to go to university. When she was a baby, the *PFL* home visitor encouraged her parents to read books to her, and as a result, she has very good vocabulary skills and is good at thinking logically and learning. Compared to her classmates, she has better verbal and non-verbal skills, and she is better at concentrating and paying attention in school. However, Kirsty, like many teenagers her age, sometimes suffers from low mood and emotional problems, and she spends a long time each day on social media. She is less likely to smoke cigarettes and drink alcohol compared to other teenagers in Ireland, however her diet could be improved, particularly around breakfast. In general, Kirsty is in good health, and has already started puberty, and she has a lower risk of being overweight compared to others in her community. Kirsty has a very good relationship with her parents because they learned how to establish a secure base for her - by giving her the freedom to explore but always being there when she needed comfort. At age 14, Kirsty has all the important foundations in place to ensure she successfully navigates through the teenage years and beyond.

**A more detailed report of the *PFL* evaluation can be found at the following website under publications:**

**http://geary.ucd.ie/preparingforlife**