

# The Effect of Early Home Visiting on Maternal and Child Mental Health at Primary School Age

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## Abstract

Motivated by the growing evidence on the importance of early investments on human capital development, home visiting programs aiming to improve parenting skills and home environment are becoming increasingly popular worldwide. Yet, most studies on home visiting investigate effects on children's cognitive and socio-emotional skill development in the first years of life, while only few studies investigate effects on mothers' and children's mental health.

Theoretically, it is not obvious whether home visiting programs may affect mental health. On the one hand, these interventions mostly focus on improving parenting skills rather than providing therapeutic counselling. On the other hand, home visits may beget a strong attachment between the nurse and the mother, which may reduce stress and social isolation, common causes of mental health issues. These, in turn, can generate positive spillovers on child's mental health.

In this paper, we study the impacts of the German home visiting program Pro Kind, by evaluating a 5-year follow-up of a randomized controlled trial (RCT, n=755). Born as adaptation of the well-known Nurse Family Partnership (NFP), Pro Kind was specifically designed to improve maternal and child health, as well as parental skills of first-time disadvantaged mothers. Treated women (n=397) received assistance by family midwives and social workers from pregnancy until the child's second birthday.

Using fully standardized diagnostic interviews, we find that the treatment reduced child behavioral and emotional disorders (ICD-10, F-90-98) by 6 percentage points, which is a sizeable effect compared to a mean prevalence of this diagnose in the control group of 22 percent. Hence, Pro Kind improves child mental health in a persistently. These results add to a constellation of short-term improvements of children's development, most probably due to improvements in parenting, and mother-child interactions already reported in previous studies.

In the next step of our analysis, we plan to investigate the mechanisms underlying the mental health improvements, by developing and estimating a dynamic mediation model.

*JEL-Classification:* J13;I10

*Keywords:* Early Childhood Intervention; Mental Health; Long-term Effects

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# 1 Introduction

Home visiting programs consist of an important policy to support disadvantaged families with infants and children worldwide. While many studies show that these programs are effective to improve several outcomes in the short run, evidence on long-term effects is scarce (see Avellar and Supplee (2013); Michalopoulos *et al.* (2019); Olds *et al.* (2007) or Sweet and Appelbaum (2004) for short-term effects.) Further, most studies on home visiting investigate effects on children's cognitive and socio-emotional skill development, while only few studies investigate effects on mothers' and children's mental health.

This is surprising as mental health is an important contributor to physical health and mental health problems lead to a reduction in individuals' economic activity: Mental health issues are a major cause of disability and make of 13 % of all sick days in the UK. However, beyond limitations in economic activity, individuals with mental health problems die on average 20 years earlier compared to individuals without such issues (Liu *et al.* (2017)). These harmful effects at the individual level scale up to the economy. Mental health issues occur very often and alone in the WHO European region, 44.3 million individuals suffer from depression and 37.3 million from anxiety (Lipton *et al.* (2016)). Overall, the costs to the global economy reach around 1 trillion USD every year (WHO (2022) and Chisholm *et al.* (2016)).

Moreover, individuals' mental health problems are likely to spill over to other family members, such as to partners (Bünnings *et al.* (2021)) and to children. The latter may hit with parental mental health problems in a particularly important phase of their life and development: During early childhood. We know that this period and especially early investments are a promising key to promoting human capital development later in life - which got formalized by the hypothesis that *skills beget skills* and empirically proved for outcomes such as IQ, test scores, high school graduation rates and finally earnings (Karoly *et al.* (1998), Currie (2001), Cunha *et al.* (2006)), for health status and health behavior (Campbell *et al.* (2014), Conti *et al.* (2016)) and further social outcomes (Campbell *et al.* (2013)).

Consequently, investigating the effects of home visiting programs on mental health is important for at least two reasons. First, the outlined mental health problems and spillovers to especially children many disrupt their human capital formation. Second, knowing the effects of these kinds of interventions - which possibly increase maternal and children's mental health - will give us an update on the cost-benefit assessments of home visiting programs.

In this paper, we exploit the 5-year follow-up of a Randomized Control Trial (RCT) of the German home visiting program Pro Kind. This program is an adaption of the Nurse-Family Partnership Program (NFP) was specifically designed to improve maternal and child health and parental competencies of women without a previous birth from a highly disadvantaged background. Starting from pregnancy up to the second birthday of the child, treated women got assisted by family midwives and social workers. In the follow-up at the child's age of 7, diagnostic interviews with mother and child were conducted to examine effects on maternal mental health and child mental health and behavioral disorders. We complement these measures based on clinical interviews with additional survey measures.

We find that the treatment reduced child behavioral and emotional disorders by 6 percentage points, which is a sizeable effect compared to a mean prevalence of this diagnosis in the control group of 22 percent. These results confirm results from a previous study (Kliem and Sandner (2021)) of the Pro Kind follow-up using survey scales showing fewer behavior problems of children (measured via the Child Behavior Checklist *CBCL*) and higher life satisfaction of children. Most likely, this finding can be explained by improvements in mothers' parenting, mental health measured via survey questions (measured via the *DASS* scale) and mothers well-being.

We contribute to the general literature that early childhood interventions affect children and mothers (Attanasio *et al.* (2020), Aizer and Cunha (2012), Conti *et al.* (2016), or Attanasio *et al.* (2022)) in two distinct ways. First, we go beyond short-term effects and measure the outcomes five years after the intervention ended. This adds to the extremely scarce literature on mid- to long-term effects of early childhood interventions (Doyle (2020), Doyle (2022)). Second, we look into an outcome (mental health) that received so far less

attention. In contrast to the present study, Kliem and Sandner (2021) did not include the results from diagnostic interviews, which have several advantages in comparison to survey scales. Most prominently, self-reported mental health might be biased (in our case, that mothers under-rate or shy away from reporting about their mental health problems) and thus, clinical assessments are a better, more objective measure.

Our results are promising for home visiting interventions in general: First, Given the high costs due to mental health issues for mothers (less employment, reduced parenting, higher probability of abuse and neglect) and in particular for children (cumulative, less disruptions, violence, crime) and second, as we shed light on the mid-term effects of the intervention, rather than focusing on the short-term effects.

The remainder of this paper is as follows. In section 2 we explain the Pro Kind intervention, the results of the previous literature on this RCT and potential mechanisms on children's and mother's mental health. In section 3 we focus on the follow-up sample and measures of mental health (clinical assessments and survey questions). Next, we explain our empirical strategy and present our results in section 4. We conclude in section 5.

## **2 The home visiting program *Pro Kind* - The intervention and potential mechanisms**

In this section, we will first describe the Pro Kind Home Visiting Program in terms of its implementation, content and the overall goals. Next, we briefly describe the existing evidence on previous assessments of this intervention, which will allow us to discuss potential mechanisms, why and how Pro Kind may causally affect the mental health of mothers and children.

### **2.1 Implementation, Content and Goals of Pro Kind**

Between 2006 and 2012 an adaption of the Home Visiting Program NFP was implemented as randomized control trial in 13 municipalities of three different federal states in Germany,

called Pro Kind. Figure 1 provides a map of Germany and highlights the different project sites and Appendix Table A1 displays, by federal state, the number of individuals in the treatment and control group and the respective enrollment periods of the intervention. About 1157 pregnant women were assessed in terms of their eligibility. All women answered a brief screening questionnaire, typically by telephone, to assess whether they fulfilled the affiliation criteria. Furthermore, strata information was obtained. At this time, women were on average 21 years old and between the 12th and 28th week of pregnancy. In order to be eligible they had to full fill the following criteria: i) pregnant and with no previous live births, ii) at economic risk (for instance, receiving welfare benefits), iii) suffering at least from one additional social or personal risk (such as under-age, loss of a significant other during childhood or depression) and iv) at least a basic understanding of German. If a woman met the criteria, the supervisor visited the woman at her home (see Sandner *et al.* (2018) for details).

Out of a pool of 755 eligible women, the treatment was randomly assigned via a computer routine based on Efrons biased coin approach (Efron (1971)) to 397 women (361 women in the control group).<sup>1</sup> The municipality, maternal age (below or above age of 18) and maternal nationality (German versus non-German nationality) were used as stratifying variables. While women were still between the 12th and 28th week of pregnancy, the baseline survey on demographic and psychological characteristics was conducted and the intervention started until the second birthday of the child. Within this period, at four points in time (36th week of pregnancy as well as 6, 12 and 24 months after the birth of the child) women were re-interviewed. Importantly, a follow-up at age 7 of the children took place, which we will explain in detail in section 3.1.

We refer to this follow-up at age 7 as *Stage II* and all surveys and assessments that were conducted until the second birthday of the child as *Stage I* in this paper.

Women in the treatment group got assistance by family midwives and/or social workers, who were trained and supervised. The home visits follow a highly structured curriculum

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<sup>1</sup>Women in both groups received an address list with support services in their communities, a small monetary incentive for participating in the study and feedback about the children’s developmental status. Overall, all women had access to regular German healthcare services.

according to the original NFP plan, including teaching materials, guidebooks, and visit-by-visit guidelines.<sup>2</sup> Visits are structured by topic, and the curricula sets aims and goals for each visit and topic. A maximum of 52 visits is defined by this curriculum. Visits occurred on a weekly, biweekly, and monthly frequency with an average length of one home visit of 82 minutes and the highest frequency of visits directly before and after birth. The compliance with the treatment was high, which allows us to estimate an Average Treatment Effect (ATE) rather than an Intention-To-Treat Effect (ITT): 97.7 percent of the treatment group had at least one home visit. The mean number of visits is 37.2 and Figure 2 visualizes the distribution of the take-up of home visits.

The main aim of Pro Kind was to improve maternal and child health and to increase parental competencies, which can be categorized into four different domains: i) higher utilization of for instance preventive care, ii) to increase maternal health behavior for instance with respect reducing risky health behavior as alcohol consumption and smoking, iii) to strengthen maternal self-efficacy, mental health and well-being and lastly, iv) to ensure that mothers interact safely with their child. Similarly, as in the NFP, the theoretical concept of the Pro Kind intervention is based on human attachment theory (Bowlby (1979)), human ecology theory (Bronfenbrenner (1979)), and the concept of self-efficacy (Bandura (1982)).

## 2.2 Evidence from the existing literature on Pro Kind and potential mechanisms

**Evidence from the existing literature on Pro Kind:** The Pro Kind trial has been assessed in several dimensions so far. Apart from Kliem and Sandner (2021), these studies analyzed the effects of the intervention for *Stage I*. In terms of *Cognitive Development*, previous findings show improved cognitive development (measured by BSID-II) at 6 and 12 months. However, this effect fades out at 24 months. However, for girls improved language skills were still in place at 24 months. Importantly, there were no effects on

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<sup>2</sup>See Jungmann *et al.* (2009), Sierau *et al.* (2016) and Olds (2006) for more information about the Pro Kind project and NFP.

physical health or psychomotor development overall and no effects for boys (Sandner and Jungmann (2017)). With respect to *Physical and Mental Health*, the study of Sandner *et al.* (2018) reveal less depressive symptoms and less antidepressant utilization of mothers. However, the authors could not find treatment effects on on physical health or health behavior (e.g. smoking, breastfeeding). Another set of outcomes that have already been investigated is *Parenting* (see Sierau *et al.* (2016) and Conti *et al.* (2021)). Here, the existing literature shows improvements in parental skills (e.g. parental self-efficacy and knowledge about child-rearing) and improved mother-child interaction. The latter again concentrates on girls.

Focussing on the *Maternal Life-Course*, Sandner (2019) finds fewer pregnancy terminations (conditional on a further pregnancy), higher rates of second births and, with respect to labor market outcomes, lower maternal employment and higher welfare receipt. Concurrently, mothers report higher life satisfaction and less stress.

In line with the empirical strategy for maternal and children mental health measured at *Stage II* of this paper, which we will outline in section 4.1, we will present the corresponding treatment effects of previous studies on the outlined *Stage I* outcomes and results in section 4.2.

**Potential mechanisms:** From a theoretical point of view, it is not obvious if the intervention has a causal impact on maternal and children's mental health. On the one hand, we can expect no effect, as the primary goal of the home visits is to improve parenting skills. Next, home visits do not provide any therapeutic counseling. However, visits may beget the attachment between the midwives or social pedagogues and the and the mother. This may lead to reduced perceived stress and a higher social integration of the mother. The latter, stress and isolation, are two important determinants of mental health problems. As outlined in section , mothers mental health status is likely to spillover to children's mental health. This link work mainly through a higher feeling of attachment, a higher life satisfaction and a less abusive parenting style of the mother - for all of these link the existing literature on the Pro Kind intervention, which we described earlier, documented reliable treatment effects.



### 3 The Pro Kind 5-year Follow-Up and Data

In this section, we provide details on the follow up that took place 5 years after the intervention ended and, on the several measures on maternal and childrens mental health we will use for our empirical analysis.

#### 3.1 The Pro Kind Follow-Up 5 years after the intervention

Five years after the intervention, a follow-up took place and several telephone interviews, on-site interviews, observations and developmental tests were conducted. Overall, 70.6% of the original baseline sample (533 mothers) could be re-contacted. Of fundamental importance for this analysis is that the difference in the loss to follow-up between the treatment (30.6 % ) and control group (29.1 % ) is not statistically significant. That is, we can rule out concerns of differential attrition. At this time, the time of the follow up, the mean age of children was 7.4 years.

The overall compliance (70.6% , 533 mothers) , breaks down to 523 families, which could be reached via telephone interviews (69,5%) and 430 families participated in the child development assessments (56,9%). During this follow-up at age 7, the mental health of mothers and children has assessed with i) clinical interviews and ii) survey questions, which we are going to explain in detail in section A2 (see Kliem and Sandner (2021) and Kliem *et al.* (2018) for details on the follow up five years after the intervention). Figure 3 summarizes the data collection process of *Stage I* and *Stage II*

#### 3.2 Measures of mental health for mothers and children

We take advantage of several measures for mothers and childrens mental health, both, from diagnostics interviews and from questionnaires. Appendix Table A2 summarizes these different measures, which we explain briefly in what follows.

**Diagnostic interviews:** We will use for our main results information on *mothers* mental health based on clinical interviews; respectively, based on *DIA-X*, which allows measuring

mental health disorders based on ICD-10 and DSM-IV criteria. The interview thereby follows the form from the from the World Health Organization (WHO). Overall, the DIA-X covers more than 100 mental disorder categories, ranging from organic mental disorders over affective disorders (manias, hypomanias, depressive disorders) to anxiety and somatoform and eating disorders. The interview covers four different parts or questionnaires on screening, anxiety, depression and a questionnaire regarding premenstrual syndrome. For the mental health of *children*, mothers as well as children themselves inform about this via a module from the diagnostic interview of mental disorders in children and youths (Kinder-DIPS). Again, this procedure allows revealing mental disorders in a diagnostic way and corresponds to DSM-IV and ICD-10 and includes, among others, attention problems, anxiety and elimination disorders as well as sleep, affective and eating disorders.

In sum, we use the DIAX, i.e. diagnostic interview to detect mental disorders for mothers, which covers ICD10 - F: Mental and behavioral disorders; F 30-39: Mood [affective] disorders (Depression) and F 40-48: Neurotic, stress-related and somatoform disorders. And respectively for children: the DIPS, which includes F 40-48: Neurotic, stress-related and somatoform disorders as well as F 90-98: Behavioural and emotional disorders with onset usually occurring in childhood and adolescence. For both, we present descriptive statistics in Table 1.

For children, the raw means do not indicate any differences between treatment and control group for ICD-10 40. However, this is different for ICD-10 90: Here, we find a mean of 20 % for the whole sample and a difference of 3 percentage points between children of treated (0.19) and not-treated (0.22) mothers. Thus, this indicates a higher prevalence of behavioural and emotional disorders of children in the control group. For mothers, we find pronounced differences for ICD-10 30 (depression), with a gap in the raw means of 6 percentage points (i.e. that the treated mothers show a lower likelihood of suffering from a depression) and a difference of 2 percentage points for ICD-10 40 (stress-related) syndroms.

**Survey questions:** Complementary to the diagnostic interviews, *mothers* mental health is assessed via the Depression-Anxiety-Stress Scale (DASS) , a questionnaire on Life satisfaction

(LS 11), a parenting stress index (EBI) and mothers general life satisfaction (SF 12). For *children*, we additionally measure mental health via the Child Behavior Checklist (CBCL) and ILK scale (in German: “*Inventar zur Erfassung der Lebensqualität bei Kindern und Jugendlichen*”).

**Baseline characteristics at *Stage II* and Check for potential sample attrition:**

In Table 2 we present the balance table for the covariates at baseline on the sample of individuals, that took part in the clinical assessment of their mental health, i.e. the sample we will use in our empirical analysis. Among the strata variables, we find a higher appearance of mothers who resided at baseline in the county of Celle. Further, we find imbalances with respect to being married at baseline: This share is higher among mothers in the treatment group (14.4 %) compared to the control group (6.9 %). The latter indicates more favourable attributes of mothers in the treatment group. In contrast to this, mothers in the control group show higher levels of attachment compared to those in the treatment group, measured at baseline. Meaningful in terms of the size of the difference (14 percentage points) is the risk factor of a psychiatric disorder, of which 21 % in the control group and 8.3 % in the treatment group are suffering from. In line with this, we find imbalances for potential for aggression.

Next, we check for potential difference in specific baseline characteristics between attrititors and non-attrititors, based on the *Stage I* sample, i.e. the sample at baseline. We present the results in Table 3. The results indicate that the loss in *Stage II* applies to those who were under-age at baseline, had a lower self-efficacy, mothers of girls, mothers of lower weight and height, as well as, correspondingly, lower BMI.

In sum, we find imbalances in baseline characteristics in the sample we use for our analysis. Not exclusively, but in a general picture, they go into the direction of a better selection of the treatment group that takes part in the *Stage II* clinical assessment of mental health. However, these imbalances are visible only for a few number of the characteristics at baseline. Further, if we compare attrititors and non-attrititors, those who left the sample have worse characteristics at baseline. We will account for them in our empirical strategy, which we will outline in section 4.1.

## 4 Estimation Strategy and Results

We proceed in this section with presenting our empirical strategy and results.

### 4.1 Estimation Strategy

Against the background of imbalances in our covariates, we estimate models of the following type:

$$Y_{it} = \beta D_1 + \alpha X'_i + u_{it}, \quad (1)$$

the vector  $X'_i$  includes as control variables i) the stata variables (municipalities, under-age, and German nationality) and ii) the imbalanced baseline variables, such as risk factor mental health, risk factor aggression, severe obese, marital status and household size.

Next, we use the post double selection lasso method to estimate treatment effect, and follow thereby Ahrens *et al.* (2019) and Chernozhukov *et al.* (2018). Respectively, the pool of covariates include all baseline variables, dummies of missing values in variables, the quadratic form of continuous variables and dummies of categorical variables. For example, when we will examine the treatment effect on mothers life satisfaction, we use the lasso covariates marital status, household size, risk factor mental health for treatment and the lasso covariates risk factor mental health, baseline anxiety, total risk factors for the outcome.

### 4.2 Results - Stage I - Previous findings with Post Double Selection Lasso

As outlined in section 2.2, we first re-estimated previous finding of *Stage I* outcomes following equation 1 and present the respective results for the whole sample in Table 4. Again, and this time by using the outlined lasso procedure, we find positive treatment effects for the whole sample in terms of childrens cognitive development (a higher 12 months Bailey Scale and a lower probability to reach a value below 86), a lower incidents

of watching TV at months 12 and 24 (covering maternal investments (PCA)) and in terms of maternal mental health, lower levels of treated mothers on the DASS scale at 24 months. In Table 5, we present the same outcomes but this time separately by gender. Notably, all treatment effects that relate to a better cognitive development of children of treated mothers as well as a lower incidence of maternal mental health problems concentrate on girls or mothers of girls. The only exception is CBCL total, measured at month 24 and capturing child development and behavior. Here, positive treatment effects concentrate on boys. Overall, this exercise confirms previous findings on the evaluations of Pro Kind.

### **4.3 Results - Stage II - Maternal and children mental health (Clinical Interviews)**

In Table 6 we present the main findings of our paper - the treatment effect of the Pro Kind intervention on maternal and children's mental health, assessed via clinical interviews. In Panel A. we show the findings for mothers and in Panel B. for children. As evident, Pro Kind reduced childrens mental health problems in terms of behavioral and emotional disorders with onset usually occurring in childhood and adolescence (ICD 10 - 90). In Table 7 conduct this analysis separately by gender. It shows that the treatment effect concentrates on girls, a results that is consistent with previous findings of the intervention we outlined in section 2.2.

### **4.4 Results - Stage II - Sensitivity Analysis: Survey measures on mental health**

[@ Jiaqi: Lasso with survey mental health measures, balance and attrition Table and descriptives](#)

## 4.5 Results - Stage II - Treatment Effects on Other Outcomes

As outlined in section 2.2, the next step of our empirical analysis is conducting a dynamic mediation analysis. For this, we will use *Stage I* measures (as indicated in Table 4 and Table 5). Further, we will use additional information at *Stage II*, which cover preferences (social, time and risk) of children and their behavior. Further, we will use the information, which have been used by Kliem and Sandner (2021) on the development of children and parenting style. Lastly, we use administrative data to access information of fertility as well as fertility as well as labor market outcomes and welfare receipts.

We provide the corresponding descriptive statistics on these outcomes in Appendix Tables A3, A4 and A5. In line with the results for *Stage I* (see section 4.2) and *Stage II* (see section 4.3) we estimated the corresponding treatment effects for this set of further outcomes, which we show in Appendix Tables A8 and A9 for the domains child cognitive development, behavior and well-being as well as maternal well-being, in the Tables A12 and A13 for social, time and risk preferences of children as well as for mothers fertility outcomes, and labor market and welfare receipt (Tables A16 and A19)<sup>3</sup>.

## 5 Conclusions

Mental health problems cause major constraints to individuals health, economic activity and long expectancy and scale up to economic costs of around 1 trillion USD each year. However, the mental health problems of an individual are not isolated to a specific person. Instead, they likely spillover to other family members, like children. Children may be hit by this in an especially sensitive period in their life: When they (should) acquire human capital, which will enhance their future accumulation in human capital, which generates in turn positive monetary and non-monetary (life-time) returns. Concurrently, a number of Nurse Home Visiting Programs have been set up around the world, which aim to support disadvantaged families. However, it is a priori not clear, if these programs help mitigating

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<sup>3</sup>We report the corresponding Balance and attrition Tables in the Appendix A6 , A7, A10 , A11, A14, A15, A17 and A18

mental health problems. In this paper, we used a follow up 5 years after the intervention of Pro Kind to study the question, if home visits have a causal impact on the mental health of treated mothers and their changes. In doing so, we take advantage of clinical assessments of mental health rather than survey questions alone. Our results show that children of mothers who received the treatment, show a significantly lower likelihood to suffer from a behavior disorder. This finding closing the research gap in the literature on the effects of early childhood intervention, by providing evidence on an outcome (mental health) that was not assessed via clinical interviews so far and, by looking into the medium term effects of an intervention rather than only a short term perspective. This finding implies that the positive welfare effects of the intervention are even huger than previously known.

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# Tables and Figures

## Tables

Anica @ Jiaqi : Please update all lasso Tables and additionally include a column with sample size and especially with the mean of the outcome of the control group. I (Anica) did so for the results based on the admin data.

Anica @ Jiaqi: For the Stage I Lasso results, you included in the slides for the Advisory Board Meeting result tables for the whole sample WITHOUT treatment effects (but with effect sizes) and, in the results table when you split the sample by gender, you showed both (TE and E). Please add to the respective table (Treatment Effects (Lasso) - Stage I (Whole Sample)) a column with the treatment effect as well.

Anica @ Jiaqi: Lastly, you need to update all reference in the text and footnotes with respect to column (x) etc..

Balance and Attrition Tables: Anica@Jiaqi: I used the globals you defined in the 21 treatment do file for the analysis. However, please have a look if these covariates, variables I included in the table are correct and, or which set is for the outcome and so on.

Table 1: Descriptive statistics on Main Outcomes -  
Maternal and Children's Mental Health (clinical interviews)

	All		Treatment Group		Control Group	
	(1)	(2)	(3)	(4)	(5)	(6)
	Mean	SD	Mean	SD	Mean	SD
Panel A. Children						
ICD 10 - 40 Children	0.06	0.25	0.07	0.26	0.06	0.23
ICD 10 - 90 Children	0.20	0.40	0.19	0.39	0.22	0.41
Panel B. Mothers						
ICD 10 - 10 Mother	0.03	0.16	0.03	0.16	0.03	0.17
ICD 10 - 30 Mother	0.19	0.39	0.16	0.36	0.22	0.42
ICD 10 - 40 Mother	0.39	0.49	0.40	0.49	0.38	0.49
Observations	418		215		203	

*Notes:* The table displays descriptive statistics (mean and standard deviation) of the main outcomes, maternal and childrens mental health for the whole sample (all), the treatment group and the control group. Panel A.) consists of outcomes for children, namely: ICD 10-40 Children and ICD 10 -90 Children, which are binary indicators that take the value 1 if the child had a diagnosis in the following categories and zero otherwise: D 40-48: Neurotic, stress-related and somatoform disorders and F90-F98 Behavioural and emotional disorders with onset usually occurring in childhood and adolescence. F99 Unspecified mental disorder. Panel B.) covers mental health disorders of mothers, respectively: ICD 10- 10, ICD 10- 30 and ICD 10 - 40 are binary indicators that take the value 1 if the mother had a diagnose in the following categories and zero otherwise: ICD10 - F: Mental and behavioural disorders, F 30-39: Mood [affective] disorders (Depression), F 40-48: Neurotic, stress-related and somatoform disorders. The table shows that, with respect to differences in these raw means, that children in the treatment group show a lower likelihood from suffering from a ICD 10 - 90 diagnose by 3 percentage points. In a similar vein, mothers in the treatment group show a lower likelihood having a ICD 10 - 30 diagnose by 6 percentage points.

Table 2: Balance Table - Characteristics at Baseline:  
Stage II Sample: Mental health (clinical interviews)

	(1)	(2)	(3)	(4)	(5)
	Control	Obs.	Treatment	Obs.	P
Strata					
Site Wolfsburg	0.029	175	0.028	180	0.964
Site Braunschweig	0.057	175	0.067	180	0.711
Site Goettingen	0.040	175	0.056	180	0.494
Site Celle	0.040	175	0.083	180	0.091
Site Bremen	0.206	175	0.250	180	0.322
Site Dresden (urban)	0.126	175	0.072	180	0.091
Site Leipzig (urban)	0.074	175	0.100	180	0.392
Site Plauen	0.034	175	0.028	180	0.724
Site Vogtlandkreis	0.017	175	0.039	180	0.217
Site Leipzig (rural)	0.046	175	0.028	180	0.370
Site Dresden (rural)	0.011	175	0.006	180	0.547
Site Bremerhaven	0.091	175	0.056	180	0.196
Under age	0.131	175	0.156	180	0.518
Mother non-German nationality	0.103	175	0.061	180	0.152
Missing					
Risk factor Loss of significant other during childhood	0.554	175	0.483	180	0.187
Continuous Controls					
Overall self-efficacy	2.941	175	2.919	180	0.627
Boy	0.451	175	0.467	180	0.774
weight before pregnancy	64.925	175	67.046	180	0.284
Height	1.643	175	1.659	180	0.331
BMI	23.395	175	24.251	180	0.194
Severe Obesity	0.103	175	0.150	180	0.205
Severe Low Weight	0.029	175	0.028	180	0.970
Lives alone	0.320	175	0.267	180	0.313
Lives with partner or housband	0.331	175	0.378	180	0.406
married	0.069	175	0.144	180	0.021
First pregnancy	0.811	175	0.800	180	0.786
Smokes	0.760	175	0.750	180	0.917
Smokes daily	0.326	175	0.306	180	0.684
Student	0.143	175	0.139	180	0.915
Risk by being pregnant	0.057	175	0.033	180	0.522
Attachment	3.475	175	3.340	180	0.038
Parental SWE	3.308	175	3.286	180	0.792
Household size	2.017	175	2.156	180	0.463
Binary controls					
Risk of Under age	0.126	175	0.150	180	0.509
Risk factor Low income	0.794	175	0.778	180	0.706
Risk factor unwanted pregnancy	0.189	175	0.161	180	0.497
Risk factor Social isolation	0.086	175	0.072	180	0.638
Risk factor Experience of custodial care	0.137	175	0.189	180	0.188
Missing					
Risk factor Loss of significant other during childhood	0.554	175	0.483	180	0.187
Risk factor Violence during pregnancy	0.097	175	0.072	180	0.400
Risk factor Psychiatric disorder	0.211	175	0.083	180	0.001
Risk factor Potential for aggression	0.189	175	0.111	180	0.041
Risk factor Depression (DASS)	0.103	175	0.117	180	0.678
Risk factor Anxiety (DASS)	0.177	175	0.150	180	0.491
Risk factor Stress (DASS)	0.280	175	0.289	180	0.853
Teenager (below 20 years)	0.406	175	0.394	180	0.829
Risk factor Low education status	0.680	175	0.728	180	0.325
Risk factor No partnership at baseline	0.274	175	0.322	180	0.325
Number of week in pregnancy	1.960	175	1.983	180	0.558
Severe Obesity	0.103	175	0.150	180	0.205
Severe Low Weight	0.029	175	0.028	180	0.970
Lives alone	0.320	175	0.267	180	0.313
Lives with partner or housband	0.331	175	0.378	180	0.406
married	0.069	175	0.144	180	0.021
First pregnancy	0.811	175	0.800	180	0.786
Smokes daily	0.326	175	0.306	180	0.684
Student	0.143	175	0.139	180	0.915
Risk by being pregnant	0.057	175	0.033	180	0.522
Continuous Controls					
Overall self-efficacy	2.941	175	2.919	180	0.627
weight before pregnancy	64.925	175	67.046	180	0.284
Height	1.643	175	1.659	180	0.331
BMI	23.395	175	24.251	180	0.194
Attachment	3.475	175	3.340	180	0.038
Parental SWE	3.308	175	3.286	180	0.792
Household size	2.017	175	2.156	180	0.463
Risk factors Total	5.726	175	5.367	180	0.132
Social class index	4.411	175	4.372	180	0.840
Observations	355				

*Notes:* The table displays for treatment and control group means of the control variables we include in the PDSLASSO estimates. The sample corresponds to the sample for which we conduct the analysis when using mental health measures (clinical interviews) as outcomes.

Table 3: Attrition Table - Characteristics at Baseline:  
Stage II Sample: Mental health (clinical interviews)

	(1)	(2)	(3)	(4)	(5)
	Attrititors	Obs.	Non-Attrititors	Obs.	P
Strata					
Site Wolfsburg	0.040	405	0.028	355	0.392
Site Braunschweig	0.086	405	0.062	355	0.202
Site Goettingen	0.022	405	0.048	355	0.052
Site Celle	0.044	405	0.062	355	0.281
Site Bremen	0.205	405	0.228	355	0.438
Site Dresden (urban)	0.101	405	0.099	355	0.904
Site Leipzig (urban)	0.094	405	0.087	355	0.756
Site Plauen	0.052	405	0.031	355	0.153
Site Vogtlandkreis	0.027	405	0.028	355	0.933
Site Leipzig (rural)	0.069	405	0.037	355	0.048
Site Dresden (rural)	0.022	405	0.008	355	0.129
Site Bremerhaven	0.081	405	0.073	355	0.672
Under age	0.244	405	0.144	355	0.000
Mother non-German nationality	0.079	405	0.082	355	0.892
Missing					
Risk factor Loss of significant other during childhood	0.507	406	0.518	355	0.766
Continuous Controls					
Overall self-efficacy	2.830	406	2.930	355	0.016
Boy	0.365	406	0.459	355	0.025
weight before pregnancy	60.475	406	66.001	355	0.000
Height	1.609	406	1.651	355	0.040
BMI	22.061	406	23.829	355	0.000
Severe Obesity	0.052	406	0.127	355	0.002
Severe Low Weight	0.020	406	0.028	355	0.627
Lives alone	0.217	406	0.293	355	0.038
Lives with partner or husband	0.293	406	0.355	355	0.116
married	0.047	406	0.107	355	0.004
First pregnancy	0.756	406	0.806	355	0.116
Smokes	0.823	406	0.755	355	0.314
Smokes daily	0.340	406	0.315	355	0.490
Student	0.195	406	0.141	355	0.068
Risk by being pregnant	0.081	406	0.045	355	0.210
Attachment	3.339	406	3.407	355	0.167
Parental SWE	3.269	406	3.297	355	0.648
Household size	2.207	406	2.087	355	0.370
Binary controls					
Risk of Under age	0.244	405	0.138	355	0.000
Risk factor Low income	0.840	405	0.786	355	0.058
Risk factor unwanted pregnancy	0.175	405	0.175	355	0.981
Risk factor Social isolation	0.062	405	0.079	355	0.355
Risk factor Experience of custodial care	0.262	405	0.163	355	0.001
Missing					
Risk factor Loss of significant other during childhood	0.507	406	0.518	355	0.766
Risk factor Violence during pregnancy	0.084	405	0.085	355	0.978
Risk factor Psychiatric disorder	0.148	405	0.146	355	0.948
Risk factor Potential for aggression	0.183	405	0.149	355	0.218
Risk factor Depression (DASS)	0.123	405	0.110	355	0.561
Risk factor Anxiety (DASS)	0.183	405	0.163	355	0.483
Risk factor Stress (DASS)	0.319	405	0.285	355	0.309
Teenager (below 20 years)	0.501	405	0.400	355	0.005
Risk factor Low education status	0.820	405	0.704	355	0.000
Risk factor No partnership at baseline	0.279	405	0.299	355	0.553
Number of week in pregnancy	1.980	405	1.972	355	0.767
Severe Obesity	0.052	406	0.127	355	0.002
Severe Low Weight	0.020	406	0.028	355	0.627
Lives alone	0.217	406	0.293	355	0.038
Lives with partner or husband	0.293	406	0.355	355	0.116
married	0.047	406	0.107	355	0.004
First pregnancy	0.756	406	0.806	355	0.116
Smokes daily	0.340	406	0.315	355	0.490
Student	0.195	406	0.141	355	0.068
Risk by being pregnant	0.081	406	0.045	355	0.210
Continuous Controls					
Overall self-efficacy	2.830	406	2.930	355	0.016
weight before pregnancy	60.475	406	66.001	355	0.000
Height	1.609	406	1.651	355	0.040
BMI	22.061	406	23.829	355	0.000
Attachment	3.339	406	3.407	355	0.167
Parental SWE	3.269	406	3.297	355	0.648
Household size	2.207	406	2.087	355	0.370
Risk factors Total	6.027	405	5.544	355	0.006
Social class index	3.904	405	4.392	355	0.000
Observations	761				

*Notes:* The table displays for attrititors and non-attrititors means of the control variables we include in the PDSLASSO estimates. The sample of non-attrititors to the sample for which we conduct the analysis when using mental health measures (clinical interviews) as outcomes.

Table 4: Treatment Effects (Lasso) - Stage I (Whole Sample)

(1)	(2)	(3)	(4)	(5)
Outcome	Sample	Effect size	P-value (PDSLASSO)	P-value (OLS)
Child Cognitive Development	6 months Bayley (standardised)	0,09	0,37	0,33
	12 months Bayley (standardised)	0,18	0,09	0,09
	24 months Bayley (standardised)	0,09	0,51	0,72
	6 months Bayley below 86	0,00	0,99	0,80
	12 months Bayley below 86	-0,27	0,00	0,00
	24 months Bayley below 86	-0,03	0,82	0,83
	6 months Stimulating	-0,07	0,70	0,54
	12 months Stimulating	0,05	0,80	0,48
	24 months Stimulating	-0,11	0,26	0,01
	6 months Music	0,04	0,70	0,27
Maternal investment (PCA)	12 months Music	-0,05	0,75	0,80
	24 months Music	0,03	0,74	0,61
	6 months TV	-0,27	0,13	0,21
	12 months TV	-0,15	0,00	0,30
Language Use	24 months TV	-0,29	0,00	0,26
	24m Understanding Words Sentences	0,05	0,62	0,49
	24m Production Words Sentences	0,14	0,40	0,93
	24m Number of Words per Answer	0,00	0,98	0,79
	24 months CBCL total	-0,06	0,66	0,81
	24 months CBCL internal	-0,12	0,40	0,83
Child Behaviour	24 months CBCL external	0,01	0,92	0,05
	6 months DASS depression	-0,01	0,81	0,33
Maternal Mental Health	24 months DASS depression	0,29	0,00	0,03

Notes: The table displays, for the whole sample of children, treatment effects, effect sizes as well as PDSLASSO and OLS p-values on various *Stage I* outcomes. The results are in line with the previous findings on Pro Kind we discussed in section 2.2.

Table 5: Treatment Effects (Lasso) - Stage I (Sample Split by gender)

(1)	Outcome	Girls				Boys			
		(1) Treatment effect	(2) Effect size	(3) P-value (PDSLASSO)	(4) P-value (OLS)	(5) Treatment effect	(6) Effect size	(7) P-value (PDSLASSO)	(8) P-value (OLS)
	6 months Bayley (standardised)	0,24	0,26	0,09	0,01	-0,12	-0,11	0,48	0,44
	12 months Bayley (standardised)	0,3	0,3	0,16	0,03	-0,05	-0,05	0,5	1
Child Cognitive Development	24 months Bayley (standardised)	1,4	1,42	0,03	0	-0,09	-0,09	0,76	0,68
	6 months Bayley below 86	-0,05	-0,18	0,18	0,09	0,01	0,01	0,89	0,65
	12 months Bayley below 86	-0,11	-0,25	0,08	0,04	-0,05	-0,12	0,37	0,37
	24 months Bayley below 86	-0,14	-0,27	0,54	0	0,15	0,3	0,23	0,23
	6 months Stimulating	0,06	0,05	0,78	0,7	-0,34	-0,34	0,24	0,06
	12 months Stimulating	0,19	0,16	0,1	0,33	0,04	0,03	0,91	0,94
	24 months Stimulating	-0,19	-0,14	0,32	0,37	-0,55	-0,39	0,01	0,01
Maternal investment (PCA)	6 months Music	0,1	0,09	0,31	0,38	0,38	0,33	0,22	0,49
	12 months Music	0,02	0,02	0,85	0,85	-0,16	-0,13	0,36	0,21
	24 months Music	0,14	0,14	0,44	0,93	-0,09	-0,08	0,65	0,35
	6 months TV	-0,46	-0,46	0,01	0,02	-0,31	-0,27	0,24	0,08
	12 months TV	-0,25	-0,23	0,27	0,3	-0,07	-0,06	0,82	0,98
	24 months TV	-0,33	-0,3	0,06	0,04	-0,18	-0,17	0,39	0,83
Language use	24m Understanding Words Sentences	-0,91	-0,11	0,64	0,34	-1,39	-0,15	0,63	0,66
	24m Production Words Sentences	2,63	0,35	0,2	0,11	-2,19	-0,27	0,39	0,49
	24m Number of Words per Answer	0,05	0,09	0,6	0,38	-0,16	-0,24	0,27	0,53
Child Development	24 months CBCL total	-0,54	-0,03	0,89	0,67	-6,54	-0,34	0,04	0,09
	24 months CBCL internal	-1,07	-0,19	0,68	0,35	-0,07	-0,01	0,96	0,98
	24 months CBCL external	-0,68	-0,1	0,42	0,99	-0,69	-0,09	0,43	0,79
Maternal mental health	6 months DASS depression	-1,14	-0,11	0,2	0,02	0,3	0,03	0,67	0,2
	24 months DASS depression	3,11	-0,42	0	0,22	1,16	0,14	0,28	0,65

Notes: The table displays, separately by gender of the child, treatment effects, effect sizes as well as PDSLASSO and OLS p-values on various *Stage I* outcomes. The results are in line with the previous findings on Pro Kind we discussed in section 2.2.



Table 6: Treatment Effects (Lasso) - Stage II -  
Mental Health, measured by clinical interviews (Whole Sample)

(1) Outcome	(2) Treatment effect	(3) Effect size	(4) P-value (PDSLASSO)	(5) P-value (OLS)
Panel A. Children				
ICD 10 - 40 Children	0,01	0,06	0,49	0,59
ICD 10 - 90 Children	-0,06	-0,15	0,01	0,07
Panel B. Mothers				
ICD 10 - 10 Mother	-0,01	-0,07	0,31	0,42
ICD 10 - 30 Mother	-0,04	-0,10	0,20	0,26
ICD 10 - 40 Mother	0,02	0,03	0,67	0,95

*Notes:* The table displays, for the whole sample of children, treatment effects on maternal and childrens mental health, assess via clinical interviews. We report treatment effects, effect sizes as well as PDSLASSO and OLS p-values. Panel A.) consists of outcomes for children, namely: ICD 10-40 Children and ICD 10 -90 Children, which are binary indicators that take the value 1 if the child had a diagnosis in the following categories and zero otherwise: D 40-48: Neurotic, stress-related and somatoform disorders and F90-F98 Behavioural and emotional disorders with onset usually occurring in childhood and adolescence. F99 Unspecified mental disorder. Panel B.) covers mental health disorders of mothers, respectively: ICD 10-10, ICD 10- 30 and ICD 10 - 40 are binary indicators that take the value 1 if the mother had a diagnose in the following categories and zero otherwise: ICD10 - F: Mental and behavioural disorders, F 30-39: Mood [affective] disorders (Depression), F 40-48: Neurotic, stress-related and somatoform disorders. The table shows our main finding: Less behavior problems of children of treated mothers (ICD 10 - 90)

Table 7: Treatment Effects (Lasso) - Stage II -  
Mental Health, measured by clinical interviews ( Sample Split by gender)

(1) Outcome	Girls				Boys			
	(2) Treatment effect	(3) Effect size	(4) P-value (PDSLASSO)	(5) P-value (OLS)	(6) Treatment effect	(7) Effect size	(8) P-value (PDSLASSO)	(9) P-value (OLS)
			Panel A. Children					
ICD 10 - 40 Children	-0,01	-0,04	0,78	0,84	0,03	0,12	0,47	0,62
ICD 10 - 90 Children	-0,07	-0,18	0,10	0,09	-0,02	-0,05	0,83	0,50
			Panel B. Mothers					
ICD 10 - 10 Mother	0,01	0,07	0,58	0,64	-0,05	-0,25	0,04	0,05
ICD 10 - 30 Mother	-0,07	-0,18	0,30	0,70	-0,02	-0,05	0,72	0,12
ICD 10 - 40 Mother	0,10	0,21	0,01	0,32	-0,06	-0,12	0,55	0,53

*Notes:* The table displays, separately by gender of the child, treatment effects on maternal and childrens mental health, assess via clinical interviews. We report treatment effects, effect sizes as well as PDFLASSO and OLS p-values. Panel A.) consists of outcomes for children, namely: ICD 10-40 Children and ICD 10 -90 Children, which are binary indicators that take the value 1 if the child had a diagnosis in the following categories and zero otherwise: D 40-48: Neurotic, stress-related and somatoform disorders and F90-F98 Behavioural and emotional disorders with onset usually occurring in childhood and adolescence. F99 Unspecified mental disorder. Panel B.) covers mental health disorders of mothers, respectively: ICD 10- 10, ICD 10- 30 and ICD 10 - 40 are binary indicators that take the value 1 if the mother had a diagnose in the following categories and zero otherwise: ICD10 - F: Mental and behavioural disorders, F 30-39: Mood [affective] disorders (Depression), F 40-48: Neurotic, stress-related and somatoform disorders. It shows that our main finding - less behavior problems of children of treated mothers (ICD 10 - 90) - of Table 6 concentrates on girls.

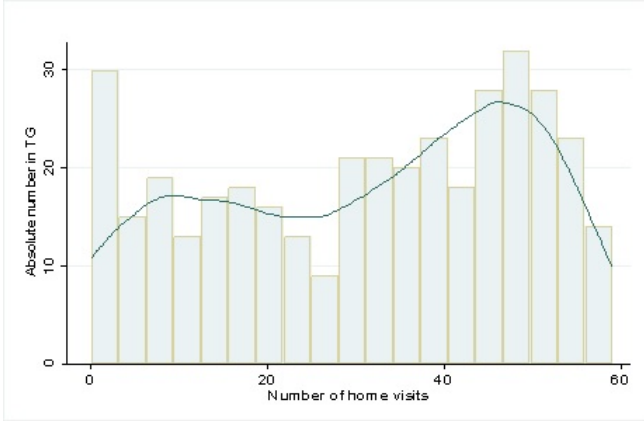
# Figures

Figure 1: Map of Germany with project sites of the Pro Kind intervention



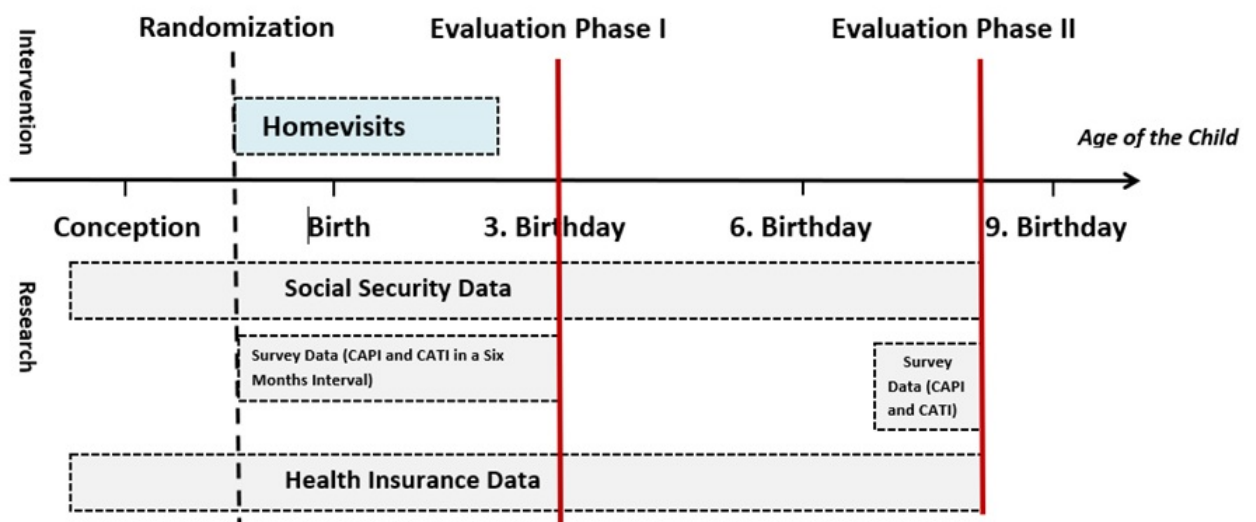
Source: Own illustration. The figure maps Germany and highlight the 13 different sites, where Pro Kind was implemented.

Figure 2: Distribution of home visits (Treatment Intensity)



Source: Own illustration. The figure shows the distribution of the treatment (home visits).

Figure 3: Data collection process of Pro Kind - Stage I and Stage II



Source: Own illustration. The figure illustrates the data collection progress over time (by age of the children) by surveys and assessments, social security data and health insurance data.

# Appendix

Table A1: Affiliation Period and Participants - At Baseline

Federal State	Treatment Group	Control Group	Enrollment Period
Lower Saxony	153	133	01.11.2006 - 30.04.2009
Bremen	112	107	15.04.2007 - 15.03.2009
Saxony	129	121	01.01.2008 - 31.12.2009
Total	394	361	

Notes: The table shows, by the three different states Pro Kind has been implemented, the number of individuals in treatment and control group and the enrollment period.

Table A2: Measurements of mothers and children’s mental health, life satisfaction and well-being

Scale	Focus person	Outcomes	Measurement
<i>Diagnostic Interviews</i>			
DIPS	Child	ICD 10 - 40 ICD 10 - 90	The outcomes ICD 10 -40 Children and ICD 10 -90 Children are binary indicators that take the value 1 if the child had a diagnose in the following categories and zero otherwise: D 40-48: Neurotic, stress-related and somatoform disorders and F90-F98 Behavioural and emotional disorders with onset usually occurring in childhood and adolescence. F99 Unspecified mental disorder.
DIAX	Mother	ICD 10 - 10 ICD 10 - 30 ICD 10 - 40	The outcomes ICD 10 -10, ICD 10 -30 and ICD 10 -40 are binary indicators that take the value 1 if the mother had a diagnose in the following categories and zero otherwise: ICD10 -10 : Mental and behavioural disorders, ICD 10 - 30-39: Mood [affective] disorders (Depression), ICD- 10: F 40-48: Neurotic, stress-related and somatoform disorders.
<i>Questionnaires</i>			
CBCL	Child	CBCL total, external, internal	Child’s behavioral problems and emotional disorders
ILK	Child	ILK scale	Child’s general life satisfaction
DASS	Mother	DASS scale	Mother’s mental health
LS 11	Mother	LS scale	Life satisfaction in general. Short Form (12) Health Questionnaire (Andersen et al. 2007).
EBI	Mother	EBI scale	Parenting Stress Index
SF12	Mother	SF12 scale	Mother’s general life satisfaction FLZ Fragebogen zur Lebenszufriedenheit (Fahrenberg et al., 2010)

*Notes: Own illustration.* The table displays several measures for mothers’ and children’s mental health and related outcomes, based on clinical assessments and surveys.

Table A3: Descriptive statistics -  
 Preferences and behavior of children at Stage II

	All		Treatment Group		Control Group	
	(1) Mean	(2) SD	(3) Mean	(4) SD	(5) Mean	(6) SD
Children Preferences						
Prosocial Game	0.60	0.49	0.60	0.49	0.61	0.49
Sharing Game	0.29	0.45	0.33	0.47	0.25	0.43
Envy Game	0.58	0.49	0.59	0.49	0.57	0.50
Costly Envy Game	0.40	0.49	0.36	0.48	0.44	0.50
Risk preference	0.01	0.99	-0.04	0.96	0.07	1.03
Time preference	0.00	1.00	-0.02	0.98	0.03	1.02
Children Behavior						
Strongly Altruistic	0.08	0.27	0.10	0.30	0.06	0.23
Weakly Altruistic	0.11	0.32	0.10	0.30	0.12	0.33
Strongly Inaverse	0.06	0.24	0.05	0.23	0.07	0.26
Weakly Inaverse	0.13	0.33	0.13	0.34	0.12	0.33
Strongly Spiteful	0.11	0.31	0.09	0.29	0.13	0.33
Weakly Spiteful	0.11	0.31	0.14	0.35	0.08	0.27
Selfish	0.43	0.50	0.44	0.50	0.41	0.49
Observations	350		177		173	

*Notes:* The table displays descriptive statistics (mean and standard deviation) for the whole sample as well as treatment and control group for the different outcomes in the domains of preferences and behavior of children.

Table A4: Descriptives statistics -  
 Child development, Maternal Mental Health (Questionnaires) and Parenting at  
 Stage II

	All		Treatment Group		Control Group	
	(1) Mean	(2) SD	(3) Mean	(4) SD	(5) Mean	(6) SD
Children development						
BUEGA	44.20	11.11	43.58	11.37	44.85	10.82
CBCL total	-34.80	20.71	-32.73	19.27	-37.00	21.96
CBCL internalizing	-7.55	6.10	-6.80	5.66	-8.36	6.45
CBCL externalizing	-11.48	7.57	-10.87	7.18	-12.13	7.93
Childs life satisfaction parent	4.22	0.50	4.21	0.52	4.23	0.48
Childs life satisfaction child	2.00	0.62	2.00	0.66	2.01	0.59
Maternal Mental Health (Survey)						
DASS Mothers mental health	-15.55	11.01	-14.23	10.70	-16.93	11.17
FLZ mothers life satisfaction	3.46	0.73	3.55	0.69	3.37	0.76
Parenting						
abusive parenting parent	-24.17	12.20	-23.05	11.46	-25.36	12.86
abusive parenting child	-0.18	0.16	-0.19	0.16	-0.18	0.15
neglectful parenting parent	-25.55	9.11	-24.98	8.70	-26.13	9.50
neglectful parenting child	-0.87	0.11	-0.86	0.12	-0.88	0.10
Observations	531		273		258	

*Notes:* The table displays descriptive statistics (mean and standard deviation) for the whole sample as well as treatment and control group for the different outcomes in the domains of child development, maternal mental health and parenting.



Table A5: Descriptives statistics -  
Maternal Fertility and Labor Market Outcomes at Stage II

	All		Treatment Group		Control Group	
	(1) Mean	(2) SD	(3) Mean	(4) SD	(5) Mean	(6) SD
Fertility						
Number of siblings until Month 36	0.25	0.47	0.28	0.48	0.21	0.46
Number of siblings until Month 48	0.36	0.59	0.40	0.57	0.32	0.60
Number of siblings until Month 60	0.47	0.66	0.51	0.64	0.43	0.67
Number of siblings until Month 72	0.58	0.73	0.62	0.70	0.54	0.77
Number of siblings until Month 84	0.70	0.81	0.74	0.82	0.65	0.80
Any second child	0.52	0.50	0.56	0.50	0.48	0.50
Labor Market and Welfare receipt						
Any marginal employment	0.53	0.50	0.52	0.50	0.55	0.50
Months of marginal employment	9.95	19.62	10.29	21.26	9.59	17.72
Any vocational training	0.27	0.45	0.28	0.45	0.26	0.44
Months in vocational training	12.91	27.86	13.76	28.75	12.00	26.89
Any regular employment	0.43	0.50	0.40	0.49	0.46	0.50
Months of regular employment	7.26	13.63	5.84	11.54	8.78	15.43
Any welfare receipt	0.98	0.13	0.99	0.11	0.98	0.15
Months of welfare receipt	61.91	23.20	63.63	21.68	60.05	24.63
Any employment	0.76	0.43	0.73	0.44	0.78	0.42
Months of employment	18.79	19.89	16.89	19.15	20.84	20.49
Observations	679		351		327	

*Notes:* The table displays descriptive statistics (mean and standard deviation) for the whole sample as well as treatment and control group for the different outcomes in the domains of fertility, labor market outcomes and welfare receipt of mothers.

Table A6: Balance Table - Characteristics at Baseline:  
Stage II Sample: Child Development

	(1)	(2)	(3)	(4)	(5)
	Control	Obs.	Treatment	Obs.	P
Strata					
Site Wolfsburg	0.016	190	0.025	199	0.518
Site Braunschweig	0.068	190	0.060	199	0.745
Site Goettingen	0.037	190	0.055	199	0.388
Site Celle	0.047	190	0.070	199	0.338
Site Bremen	0.189	190	0.221	199	0.442
Site Dresden (urban)	0.126	190	0.101	199	0.423
Site Leipzig (urban)	0.074	190	0.106	199	0.274
Site Plauen	0.032	190	0.035	199	0.844
Site Vogtlandkreis	0.021	190	0.030	199	0.572
Site Leipzig (rural)	0.053	190	0.020	199	0.086
Site Dresden (rural)	0.021	190	0.015	199	0.659
Site Bremerhaven	0.100	190	0.060	199	0.149
Under age	0.137	190	0.156	199	0.599
Mother non-German nationality	0.095	190	0.065	199	0.286
Missing					
Risk factor Loss of significant other during childhood	0.547	190	0.457	199	0.079
Continuous Controls					
Overall self-efficacy	2.905	190	2.892	199	0.783
Boy	0.442	190	0.513	199	0.165
weight before pregnancy	63.189	190	65.650	199	0.176
Height	1.626	190	1.655	199	0.156
BMI	22.883	190	23.894	199	0.099
Severe Obesity	0.084	190	0.146	199	0.077
Severe Low Weight	0.032	190	0.040	199	0.705
Lives alone	0.305	190	0.261	199	0.382
Lives with partner or husband	0.311	190	0.392	199	0.130
married	0.068	190	0.136	199	0.034
First pregnancy	0.805	190	0.809	199	0.926
Smokes	0.784	190	0.774	199	0.911
Smokes daily	0.326	190	0.317	199	0.840
Student	0.147	190	0.141	199	0.855
Risk by being pregnant	0.047	190	0.040	199	0.845
Attachment	3.440	190	3.345	199	0.143
Parental SWE	3.294	190	3.289	199	0.950
Household size	2.011	190	2.226	199	0.248
Binary controls					
Risk of Under age	0.132	190	0.151	199	0.589
Risk factor Low income	0.805	190	0.789	199	0.690
Risk factor unwanted pregnancy	0.195	190	0.151	199	0.252
Risk factor Social isolation	0.084	190	0.080	199	0.892
Risk factor Experience of custodial care	0.184	190	0.186	199	0.965
Missing					
Risk factor Loss of significant other during childhood	0.547	190	0.457	199	0.079
Risk factor Violence during pregnancy	0.089	190	0.080	199	0.749
Risk factor Psychiatric disorder	0.211	190	0.095	199	0.002
Risk factor Potential for aggression	0.216	190	0.116	199	0.008
Risk factor Depression (DASS)	0.126	190	0.101	199	0.423
Risk factor Anxiety (DASS)	0.163	190	0.131	199	0.366
Risk factor Stress (DASS)	0.300	190	0.271	199	0.533
Teenager (below 20 years)	0.411	190	0.387	199	0.636
Risk factor Low education status	0.684	190	0.724	199	0.396
Risk factor No partnership at baseline	0.300	190	0.332	199	0.503
Number of week in pregnancy	1.947	190	1.985	199	0.365
Severe Obesity	0.084	190	0.146	199	0.077
Severe Low Weight	0.032	190	0.040	199	0.705
Lives alone	0.305	190	0.261	199	0.382
Lives with partner or husband	0.311	190	0.392	199	0.130
married	0.068	190	0.136	199	0.034
First pregnancy	0.805	190	0.809	199	0.926
Smokes daily	0.326	190	0.317	199	0.840
Student	0.147	190	0.141	199	0.855
Risk by being pregnant	0.047	190	0.040	199	0.845
Continuous Controls					
Overall self-efficacy	2.905	190	2.892	199	0.783
weight before pregnancy	63.189	190	65.650	199	0.176
Height	1.626	190	1.655	199	0.156
BMI	22.883	190	23.894	199	0.099
Attachment	3.440	190	3.345	199	0.143
Parental SWE	3.294	190	3.289	199	0.950
Household size	2.011	190	2.226	199	0.248
Risk factors Total	5.863	190	5.367	199	0.038
Social class index	4.368	190	4.407	199	0.834
Observations	389				

*Notes:* The table displays for treatment and control group means of the control variables we include in the PDSLASSO estimates. Sample as indicated.

Table A7: Attrition Table - Characteristics at Baseline:  
Stage II Sample: Child Development

(1)	(2)	(3)	(4)	(5)	
Attrititors	Obs.	Non-Attrititors	Obs.	P	
Strata					
Site Wolfsburg	0.049	371	0.021	389	0.034
Site Braunschweig	0.086	371	0.064	389	0.251
Site Goettingen	0.022	371	0.046	389	0.061
Site Celle	0.046	371	0.059	389	0.412
Site Bremen	0.226	371	0.206	389	0.487
Site Dresden (urban)	0.086	371	0.113	389	0.218
Site Leipzig (urban)	0.092	371	0.090	389	0.936
Site Plauen	0.051	371	0.033	389	0.223
Site Vogtlandkreis	0.030	371	0.026	389	0.741
Site Leipzig (rural)	0.073	371	0.036	389	0.025
Site Dresden (rural)	0.013	371	0.018	389	0.618
Site Bremerhaven	0.075	371	0.080	389	0.828
Under age	0.251	371	0.147	389	0.000
Mother non-German nationality	0.081	371	0.080	389	0.953
Missing					
Risk factor Loss of significant other during childhood	0.524	372	0.501	389	0.532
Continious Controls					
Overall self-efficacy	2.854	372	2.898	389	0.284
Boy	0.336	372	0.478	389	0.001
weight before pregnancy	61.594	372	64.448	389	0.028
Height	1.616	372	1.641	389	0.218
BMI	22.348	372	23.400	389	0.019
Severe Obesity	0.056	372	0.116	389	0.015
Severe Low Weight	0.011	372	0.036	389	0.146
Lives alone	0.220	372	0.283	389	0.088
Lives with partner or housband	0.290	372	0.352	389	0.115
married	0.046	372	0.103	389	0.007
First pregnancy	0.750	372	0.807	389	0.069
Smokes	0.804	372	0.779	389	0.711
Smokes daily	0.336	372	0.321	389	0.678
Student	0.196	372	0.144	389	0.076
Risk by being pregnant	0.086	372	0.044	389	0.142
Attachment	3.348	372	3.392	389	0.381
Parental SWE	3.272	372	3.292	389	0.749
Household size	2.183	372	2.121	389	0.641
Binary controls					
Risk of Under age	0.251	371	0.141	389	0.000
Risk factor Low income	0.833	371	0.797	389	0.203
Risk factor unwanted pregnancy	0.178	371	0.172	389	0.838
Risk factor Social isolation	0.057	371	0.082	389	0.166
Risk factor Experience of custodial care	0.248	371	0.185	389	0.035
Missing					
Risk factor Loss of significant other during childhood	0.524	372	0.501	389	0.532
Risk factor Violence during pregnancy	0.084	371	0.085	389	0.950
Risk factor Psychiatric disorder	0.143	371	0.152	389	0.732
Risk factor Potential for aggression	0.170	371	0.165	389	0.845
Risk factor Depression (DASS)	0.121	371	0.113	389	0.726
Risk factor Anxiety (DASS)	0.202	371	0.147	389	0.043
Risk factor Stress (DASS)	0.321	371	0.285	389	0.289
Teenager (below 20 years)	0.512	371	0.398	389	0.002
Risk factor Low education status	0.830	371	0.704	389	0.000
Risk factor No partnership at baseline	0.259	371	0.316	389	0.081
Number of week in pregnancy	1.987	371	1.967	389	0.482
Severe Obesity	0.056	372	0.116	389	0.015
Severe Low Weight	0.011	372	0.036	389	0.146
Lives alone	0.220	372	0.283	389	0.088
Lives with partner or housband	0.290	372	0.352	389	0.115
married	0.046	372	0.103	389	0.007
First pregnancy	0.750	372	0.807	389	0.069
Smokes daily	0.336	372	0.321	389	0.678
Student	0.196	372	0.144	389	0.076
Risk by being pregnant	0.086	372	0.044	389	0.142
Continious Controls					
Overall self-efficacy	2.854	372	2.898	389	0.284
weight before pregnancy	61.594	372	64.448	389	0.028
Height	1.616	372	1.641	389	0.218
BMI	22.348	372	23.400	389	0.019
Attachment	3.348	372	3.392	389	0.381
Parental SWE	3.272	372	3.292	389	0.749
Household size	2.183	372	2.121	389	0.641
Risk factors Total	6.003	371	5.609	389	0.026
Social class index	3.863	371	4.388	389	0.000
Observations	761				

*Notes:* The table displays for treatment and control group means of the control variables we include in the PDSLASSO estimates. Sample as indicated.

Table A8: Treatment Effects on Child Cognitive Development, Behaviour and Well-Being as well as Maternal Well-Being and Parenting (Lasso) - Stage II (Whole Sample)

	(1)	(2)	(3)	(4)	(5)	(6)
	Outcome	Sample	Treatment effect	Effect size	P-value (PDSLASSO)	P-value (OLS)
Child Cognitive Development	BUEGA	389	-1,06	-0,10	0,35	0,71
Child Behaviour	CBCL total	508	3,18	0,14	0,17	0,29
	CBCL internalizing	495	1,40	0,22	0,09	0,03
	CBCL externalizing	508	1,38	0,17	0,07	0,26
Child Well-Being	Childs life satisfaction parent	451	-0,12	-0,24	0,01	0,07
	Childs life satisfaction child	416	0,07	0,11	0,37	0,49
Maternal Well-Being	DASS Mothers mental health	517	2,44	0,22	0,01	0,05
	FLZ mothers life satisfaction	492	0,16	0,21	0,00	0,05
	Abusive parenting parent	469	2,53	0,20	0,05	0,04
Parenting	Abusive parenting child	414	-0,01	-0,06	0,63	0,74
	Neglectful parenting parent	447	0,62	0,06	0,47	0,50
	Neglectful parenting child	415	0,02	0,19	0,14	0,09

*Notes:* The table displays, for the whole sample of children, treatment effects, effect sizes as well as PDSLASSO and OLS p-values on various outcomes child cognitive development, behavior and well-being, as well as maternal well-being and parenting.

Table A9: Treatment Effects on Child Cognitive Development, Behaviour and Well-Being as well as Maternal Well-Being and Parenting (Lasso) - Stage II (Sample Split by gender)

(1)	Outcome	Girls				Boys			
		(1) Treatment effect	(2) Effect size	(3) P-value (PDSLASSO)	(4) P-value (OLS)	(5) Treatment effect	(6) Effect size	(7) P-value (PDSLASSO)	(8) P-value (OLS)
Child Cognitive Development	BUEGA	-0,60	-0,05	0,71	0,53	-0,19	-0,02	0,95	0,38
	CBCL total	-3,92	-0,21	0,27	0,43	6,23	0,25	0,10	0,16
Child Behavior	CBCL internalizing	0,45	0,07	0,69	0,41	2,11	0,31	0,04	0,02
	CBCL externalizing	-0,37	-0,06	0,77	0,95	3,03	0,34	0,02	0,06
Child Well-Being	Childs life satisfaction parent	0,03	0,06	0,66	0,43	-0,02	-0,05	0,81	0,92
	Childs life satisfaction child	-0,05	-0,09	0,31	0,58	0,09	0,14	0,39	0,25
Maternal well-being	DASS Mothers mental health	1,39	0,13	0,11	0,12	3,61	0,32	0,00	0,04
	FLZ mothers life satisfaction	0,21	0,29	0,12	0,09	0,16	0,20	0,06	0,21
	Abusive parenting parent	-0,90	-0,08	0,76	0,69	5,24	0,37	0,00	0,00
	Abusive parenting child	-0,05	-0,33	0,14	0,42	0,01	0,09	0,63	0,69
Parenting	Neglectful parenting parent	-1,23	-0,13	0,49	0,02	5,04	0,52	0,00	0,00
	Neglectful parenting child	0,01	0,08	0,70	0,52	0,02	0,15	0,33	0,51

Notes: The table displays, separately by gender of the child, treatment effects, effect sizes as well as PDSLASSO and OLS p-values on various outcomes child cognitive development, behavior and well-being, as well as maternal well-being and parenting.

Table A10: Balance Table - Characteristics at Baseline:  
Stage II Sample: Preferences and Child Behavior

	(1)	(2)	(3)	(4)	(5)
	Control	Obs.	Treatment	Obs.	P
Strata					
Site Wolfsburg	0.012	170	0.023	173	0.424
Site Braunschweig	0.076	170	0.058	173	0.491
Site Goettingen	0.035	170	0.064	173	0.229
Site Celle	0.053	170	0.075	173	0.403
Site Bremen	0.188	170	0.249	173	0.178
Site Dresden (urban)	0.118	170	0.069	173	0.125
Site Leipzig (urban)	0.076	170	0.092	173	0.595
Site Plauen	0.029	170	0.040	173	0.579
Site Vogtlandkreis	0.024	170	0.029	173	0.756
Site Leipzig (rural)	0.041	170	0.017	173	0.191
Site Dresden (rural)	0.018	170	0.012	173	0.639
Site Bremerhaven	0.112	170	0.052	173	0.043
Under age	0.141	170	0.162	173	0.595
Mother non-German nationality	0.088	170	0.064	173	0.390
Missing					
Risk factor Loss of significant other during childhood	0.553	170	0.491	173	0.255
Continuous Controls					
Overall self-efficacy	2.928	170	2.901	173	0.590
Boy	0.435	170	0.503	173	0.211
weight before pregnancy	62.292	170	65.403	173	0.098
Height	1.624	170	1.657	173	0.155
BMI	22.504	170	23.763	173	0.049
Severe Obesity	0.076	170	0.139	173	0.088
Severe Low Weight	0.035	170	0.040	173	0.837
Lives alone	0.312	170	0.277	173	0.520
Lives with partner or husband	0.300	170	0.393	173	0.100
married	0.053	170	0.139	173	0.009
First pregnancy	0.812	170	0.821	173	0.833
Smokes	0.782	170	0.798	173	0.876
Smokes daily	0.318	170	0.329	173	0.818
Student	0.153	170	0.139	173	0.716
Risk by being pregnant	0.059	170	0.046	173	0.754
Attachment	3.449	170	3.362	173	0.193
Parental SWE	3.285	170	3.308	173	0.786
Household size	1.918	170	2.231	173	0.107
Binary controls					
Risk of Under age	0.135	170	0.156	173	0.587
Risk factor Low income	0.812	170	0.780	173	0.472
Risk factor unwanted pregnancy	0.206	170	0.156	173	0.232
Risk factor Social isolation	0.082	170	0.075	173	0.805
Risk factor Experience of custodial care	0.194	170	0.191	173	0.937
Missing					
Risk factor Loss of significant other during childhood	0.553	170	0.491	173	0.255
Risk factor Violence during pregnancy	0.094	170	0.081	173	0.667
Risk factor Psychiatric disorder	0.200	170	0.092	173	0.005
Risk factor Potential for aggression	0.224	170	0.116	173	0.008
Risk factor Depression (DASS)	0.118	170	0.092	173	0.449
Risk factor Anxiety (DASS)	0.159	170	0.133	173	0.499
Risk factor Stress (DASS)	0.306	170	0.260	173	0.348
Teenager (below 20 years)	0.429	170	0.405	173	0.643
Risk factor Low education status	0.688	170	0.723	173	0.487
Risk factor No partnership at baseline	0.312	170	0.341	173	0.565
Number of week in pregnancy	1.947	170	2.000	173	0.229
Severe Obesity	0.076	170	0.139	173	0.088
Severe Low Weight	0.035	170	0.040	173	0.837
Lives alone	0.312	170	0.277	173	0.520
Lives with partner or husband	0.300	170	0.393	173	0.100
married	0.053	170	0.139	173	0.009
First pregnancy	0.812	170	0.821	173	0.833
Smokes daily	0.318	170	0.329	173	0.818
Student	0.153	170	0.139	173	0.716
Risk by being pregnant	0.059	170	0.046	173	0.754
Continuous Controls					
Overall self-efficacy	2.928	170	2.901	173	0.590
weight before pregnancy	62.292	170	65.403	173	0.098
Height	1.624	170	1.657	173	0.155
BMI	22.504	170	23.763	173	0.049
Attachment	3.449	170	3.362	173	0.193
Parental SWE	3.285	170	3.308	173	0.786
Household size	1.918	170	2.231	173	0.107
Risk factors Total	5.918	170	5.347	173	0.024
Social class index	4.341	170	4.445	173	0.598
Observations	343				

*Notes:* The table displays for treatment and control group means of the control variables we include in the PDSLASSO estimates. Sample as indicated.

Table A11: Attrition Table - Characteristics at Baseline:  
Stage II Sample: Preferences and Child Behavior

	(1)	(2)	(3)	(4)	(5)
	Attrititors	Obs.	Non-Attrititors	Obs.	P
Strata					
Site Wolfsburg	0.048	417	0.017	343	0.021
Site Braunschweig	0.082	417	0.067	343	0.451
Site Goettingen	0.022	417	0.050	343	0.035
Site Celle	0.043	417	0.064	343	0.198
Site Bremen	0.213	417	0.219	343	0.862
Site Dresden (urban)	0.106	417	0.093	343	0.577
Site Leipzig (urban)	0.096	417	0.085	343	0.588
Site Plauen	0.048	417	0.035	343	0.376
Site Vogtlandkreis	0.029	417	0.026	343	0.832
Site Leipzig (rural)	0.074	417	0.029	343	0.006
Site Dresden (rural)	0.017	417	0.015	343	0.808
Site Bremerhaven	0.074	417	0.082	343	0.709
Under age	0.235	417	0.152	343	0.004
Mother non-German nationality	0.084	417	0.076	343	0.682
Missing					
Risk factor Loss of significant other during childhood	0.505	418	0.522	343	0.643
Continuous Controls					
Overall self-efficacy	2.846	418	2.915	343	0.098
Boy	0.359	418	0.469	343	0.009
weight before pregnancy	62.389	418	63.862	343	0.261
Height	1.619	418	1.641	343	0.286
BMI	22.678	418	23.139	343	0.306
Severe Obesity	0.069	418	0.108	343	0.117
Severe Low Weight	0.012	418	0.038	343	0.137
Lives alone	0.218	418	0.294	343	0.037
Lives with partner or husband	0.301	418	0.347	343	0.248
married	0.057	418	0.096	343	0.068
First pregnancy	0.749	418	0.816	343	0.032
Smokes	0.792	418	0.790	343	0.979
Smokes daily	0.333	418	0.324	343	0.801
Student	0.189	418	0.146	343	0.144
Risk by being pregnant	0.074	418	0.052	343	0.454
Attachment	3.342	418	3.405	343	0.204
Parental SWE	3.270	418	3.296	343	0.666
Household size	2.213	418	2.076	343	0.305
Binary controls					
Risk of Under age	0.235	417	0.146	343	0.002
Risk factor Low income	0.830	417	0.796	343	0.233
Risk factor unwanted pregnancy	0.170	417	0.181	343	0.705
Risk factor Social isolation	0.062	417	0.079	343	0.379
Risk factor Experience of custodial care	0.235	417	0.192	343	0.156
Missing					
Risk factor Loss of significant other during childhood	0.505	418	0.522	343	0.643
Risk factor Violence during pregnancy	0.082	417	0.087	343	0.770
Risk factor Psychiatric disorder	0.149	417	0.146	343	0.911
Risk factor Potential for aggression	0.165	417	0.169	343	0.894
Risk factor Depression (DASS)	0.127	417	0.105	343	0.345
Risk factor Anxiety (DASS)	0.197	417	0.146	343	0.066
Risk factor Stress (DASS)	0.319	417	0.283	343	0.281
Teenager (below 20 years)	0.484	417	0.417	343	0.063
Risk factor Low education status	0.815	417	0.706	343	0.000
Risk factor No partnership at baseline	0.257	417	0.327	343	0.034
Number of week in pregnancy	1.978	417	1.974	343	0.870
Severe Obesity	0.069	418	0.108	343	0.117
Severe Low Weight	0.012	418	0.038	343	0.137
Lives alone	0.218	418	0.294	343	0.037
Lives with partner or husband	0.301	418	0.347	343	0.248
married	0.057	418	0.096	343	0.068
First pregnancy	0.749	418	0.816	343	0.032
Smokes daily	0.333	418	0.324	343	0.801
Student	0.189	418	0.146	343	0.144
Risk by being pregnant	0.074	418	0.052	343	0.454
Continuous Controls					
Overall self-efficacy	2.846	418	2.915	343	0.098
weight before pregnancy	62.389	418	63.862	343	0.261
Height	1.619	418	1.641	343	0.286
BMI	22.678	418	23.139	343	0.306
Attachment	3.342	418	3.405	343	0.204
Parental SWE	3.270	418	3.296	343	0.666
Household size	2.213	418	2.076	343	0.305
Risk factors Total	5.942	417	5.630	343	0.078
Social class index	3.916	417	4.394	343	0.000
Observations	761				

*Notes:* The table displays for treatment and control group means of the control variables we include in the PDSLASSO estimates. Sample as indicated.

Table A12: Treatment Effects on Children's Preferences (Lasso) -  
Stage II (Whole Sample)

(1) Outcome	(2) Treatment effect	(3) Effect size	(4) P-value (PDSLASSO)	(5) P-value (OLS)
Prosocial Game	-0,01	-0,01	0,88	0,57
Sharing Game	0,07	0,15	0,08	0,00
Envy Game	0,00	0,00	0,99	0,81
Costly Envy Game	-0,07	-0,15	0,03	0,11
Risk preference	-0,08	-0,08	0,29	0,25
Time preference	-0,10	-0,10	0,24	0,22
Strongly Altruistic	0,03	0,14	0,14	0,09
Weakly Altruistic	-0,02	-0,07	0,56	0,37
Strongly Inaverse	0,00	-0,02	0,86	0,69
Weakly Inaverse	-0,02	-0,05	0,66	0,98
Strongly Spiteful	-0,04	-0,12	0,09	0,06
Weakly Spiteful	0,08	0,29	0,00	0,00
Selfish	0,00	0,00	1,00	0,86

*Notes:* The table displays, for the whole sample of children, treatment effects, effect sizes as well as PDSLASSO and OLS p-values on various outcomes for social preference, time and risk preferences of the child and related behavior outcomes for children.



Table A13: Treatment Effects on Children's Preferences (Lasso) -  
Stage II (Sample Split by gender)

(	1)	Girls			Boys			(9)
		(2)	(3)	(4)	(5)	(6)	(7)	
Outcome	Treatment effect	Effect size	P-value (PDSLASSO)	P-value (OLS)	Treatment effect	Effect size	P-value (PDSLASSO)	P-value (OLS)
Prosocial Game	0,02	0,05	0,61	0,34	-0,03	-0,07	0,58	0,12
Sharing Game	0,14	0,31	0,01	0,03	0,09	0,21	0,20	0,01
Envy Game	0,00	0,00	0,99	0,64	0,12	0,25	0,13	0,43
Costly Envy Game	-0,05	-0,11	0,48	0,39	-0,05	-0,10	0,48	0,49
Risk preference	0,00	0,00	1,00	0,85	-0,14	-0,12	0,47	0,19
Time preference	-0,01	-0,01	0,93	0,58	-0,36	-0,33	0,02	0,00
Strongly Altruistic	0,06	0,28	0,16	0,51	-0,03	-0,13	0,56	0,60
Weakly Altruistic	0,00	0,01	0,97	0,36	-0,01	-0,06	0,54	0,48
Strongly Inavarse	-0,02	-0,09	0,60	0,28	0,02	0,07	0,78	0,42
Weakly Inavarse	-0,05	-0,12	0,33	0,10	0,08	0,29	0,00	0,00
Strongly Spiteful	-0,07	-0,26	0,10	0,21	-0,04	-0,10	0,47	0,34
Weakly Spiteful	0,18	1,23	0,00	0,00	0,01	0,03	0,86	0,91
Selfish	0,03	0,06	0,76	0,54	0,10	0,20	0,05	0,04

*Notes:* The table displays, separately by gender of the child, treatment effects, effect sizes as well as PDSLASSO and OLS p-values on various outcomes for social preference, time and risk preferences of the child and related behavior outcomes for children.

Table A14: Balance Table - Characteristics at Baseline:  
Stage II Sample: Labour market outcomes  
(Administrative Data)

	(1)	(2)	(3)	(4)	(5)
	Control	Obs.	Treatment	Obs.	P
Strata					
Site Wolfsburg	0.024	327	0.040	351	0.258
Site Braunschweig	0.070	327	0.071	351	0.964
Site Goettingen	0.028	327	0.031	351	0.770
Site Celle	0.046	327	0.063	351	0.336
Site Bremen	0.229	327	0.205	351	0.445
Site Dresden (urban)	0.107	327	0.097	351	0.662
Site Leipzig (urban)	0.086	327	0.103	351	0.452
Site Plauen	0.037	327	0.046	351	0.562
Site Vogtlandkreis	0.028	327	0.034	351	0.617
Site Leipzig (rural)	0.061	327	0.046	351	0.367
Site Dresden (rural)	0.018	327	0.014	351	0.673
Site Bremerhaven	0.086	327	0.074	351	0.579
Under age	0.171	327	0.211	351	0.191
Mother non-German nationality	0.070	327	0.060	351	0.580
Missing					
Risk factor Loss of significant other during childhood	0.538	327	0.493	351	0.241
Continuous Controls					
Overall self-efficacy	2.904	327	2.907	351	0.939
Boy	0.459	327	0.456	351	0.944
weight before pregnancy	63.301	327	63.793	351	0.710
Height	1.639	327	1.657	351	0.145
BMI	22.977	327	23.192	351	0.633
Severe Obesity	0.076	327	0.111	351	0.161
Severe Low Weight	0.024	327	0.037	351	0.455
Lives alone	0.300	327	0.248	351	0.174
Lives with partner or housband married	0.312	327	0.345	351	0.418
First pregnancy	0.061	327	0.091	351	0.143
Smokes	0.807	327	0.766	351	0.194
Smokes daily	0.807	327	0.826	351	0.789
Student	0.343	327	0.348	351	0.890
Risk by being pregnant	0.180	327	0.182	351	0.949
Attachment	0.086	327	0.068	351	0.556
Parental SWE	3.442	327	3.374	351	0.110
Household size	3.300	327	3.316	351	0.784
	2.046	327	2.239	351	0.167
Binary controls					
Risk of Under age	0.168	327	0.208	351	0.186
Risk factor Low income	0.807	327	0.832	351	0.406
Risk factor unwanted pregnancy	0.171	327	0.177	351	0.854
Risk factor Social isolation	0.073	327	0.060	351	0.479
Risk factor Experience of custodial care	0.196	327	0.236	351	0.199
Missing					
Risk factor Loss of significant other during childhood	0.538	327	0.493	351	0.241
Risk factor Violence during pregnancy	0.092	327	0.080	351	0.578
Risk factor Psychiatric disorder	0.193	327	0.120	351	0.009
Risk factor Potential for aggression	0.183	327	0.157	351	0.354
Risk factor Depression (DASS)	0.125	327	0.111	351	0.566
Risk factor Anxiety (DASS)	0.183	327	0.168	351	0.599
Risk factor Stress (DASS)	0.291	327	0.322	351	0.376
Teenager (below 20 years)	0.422	327	0.467	351	0.237
Risk factor Low education status	0.752	327	0.781	351	0.384
Risk factor No partnership at baseline	0.300	327	0.305	351	0.884
Number of week in pregnancy	1.963	327	1.983	351	0.511
Severe Obesity	0.076	327	0.111	351	0.161
Severe Low Weight	0.024	327	0.037	351	0.455
Lives alone	0.300	327	0.248	351	0.174
Lives with partner or housband married	0.312	327	0.345	351	0.418
First pregnancy	0.061	327	0.091	351	0.143
Smokes	0.807	327	0.766	351	0.194
Smokes daily	0.343	327	0.348	351	0.890
Student	0.180	327	0.182	351	0.949
Risk by being pregnant	0.086	327	0.068	351	0.556
Continuous Controls					
Overall self-efficacy	2.904	327	2.907	351	0.939
weight before pregnancy	63.301	327	63.793	351	0.710
Height	1.639	327	1.657	351	0.145
BMI	22.977	327	23.192	351	0.633
Attachment	3.442	327	3.374	351	0.110
Parental SWE	3.300	327	3.316	351	0.784
Household size	2.046	327	2.239	351	0.167
Risk factors Total	5.899	327	5.823	351	0.685
Social class index	4.153	327	4.043	351	0.379
Observations	678				

*Notes:* The table displays for treatment and control group means of the control variables we include in the PDSLASSO estimates. Sample as indicated.

Table A15: Attrition Table - Characteristics at Baseline:  
Stage II Sample: Fertility (Administrative Data)

	(1)	(2)	(3)	(4)	(5)
	Attrititors	Obs.	Non-Attrititors	Obs.	P
Strata					
Site Wolfsburg	0.049	82	0.032	678	0.443
Site Braunschweig	0.110	82	0.071	678	0.206
Site Goettingen	0.073	82	0.029	678	0.040
Site Celle	0.037	82	0.055	678	0.491
Site Bremen	0.207	82	0.217	678	0.844
Site Dresden (urban)	0.085	82	0.102	678	0.641
Site Leipzig (urban)	0.061	82	0.094	678	0.320
Site Plauen	0.049	82	0.041	678	0.750
Site Vogtlandkreis	0.000	82	0.031	678	0.106
Site Leipzig (rural)	0.061	82	0.053	678	0.766
Site Dresden (rural)	0.012	82	0.016	678	0.783
Site Bremerhaven	0.061	82	0.080	678	0.551
Under age	0.244	82	0.192	678	0.263
Mother non-German nationality	0.207	82	0.065	678	0.000
Missing					
Risk factor Loss of significant other during childhood	0.494	83	0.515	678	0.724
Continuous Controls					
Overall self-efficacy	2.642	83	2.905	678	0.000
Boy	0.012	83	0.457	678	0.000
weight before pregnancy	58.945	83	63.556	678	0.027
Height	1.470	83	1.648	678	0.000
BMI	21.226	83	23.089	678	0.010
Severe Obesity	0.024	83	0.094	678	0.073
Severe Low Weight	-0.036	83	0.031	678	0.016
Lives alone	0.084	83	0.273	678	0.001
Lives with partner or husband	0.265	83	0.329	678	0.310
married	0.060	83	0.077	678	0.628
First pregnancy	0.723	83	0.786	678	0.210
Smokes	0.578	83	0.817	678	0.026
Smokes daily	0.193	83	0.345	678	0.007
Student	0.072	83	0.181	678	0.021
Risk by being pregnant	-0.036	83	0.077	678	0.014
Attachment	3.076	83	3.407	678	0.000
Parental SWE	3.065	83	3.309	678	0.012
Household size	2.193	83	2.146	678	0.827
Binary controls					
Risk of Under age	0.244	82	0.189	678	0.234
Risk factor Low income	0.768	82	0.820	678	0.255
Risk factor unwanted pregnancy	0.183	82	0.174	678	0.842
Risk factor Social isolation	0.098	82	0.066	678	0.296
Risk factor Experience of custodial care	0.207	82	0.217	678	0.844
Missing					
Risk factor Loss of significant other during childhood	0.494	83	0.515	678	0.724
Risk factor Violence during pregnancy	0.073	82	0.086	678	0.704
Risk factor Psychiatric disorder	0.085	82	0.155	678	0.094
Risk factor Potential for aggression	0.146	82	0.170	678	0.594
Risk factor Depression (DASS)	0.110	82	0.118	678	0.827
Risk factor Anxiety (DASS)	0.159	82	0.176	678	0.702
Risk factor Stress (DASS)	0.268	82	0.307	678	0.474
Teenager (below 20 years)	0.524	82	0.445	678	0.175
Risk factor Low education status	0.756	82	0.767	678	0.827
Risk factor No partnership at baseline	0.171	82	0.302	678	0.013
Number of week in pregnancy	2.000	82	1.973	678	0.561
Severe Obesity	0.024	83	0.094	678	0.073
Severe Low Weight	-0.036	83	0.031	678	0.016
Lives alone	0.084	83	0.273	678	0.001
Lives with partner or husband	0.265	83	0.329	678	0.310
married	0.060	83	0.077	678	0.628
First pregnancy	0.723	83	0.786	678	0.210
Smokes daily	0.193	83	0.345	678	0.007
Student	0.072	83	0.181	678	0.021
Risk by being pregnant	-0.036	83	0.077	678	0.014
Continuous Controls					
Overall self-efficacy	2.642	83	2.905	678	0.000
weight before pregnancy	58.945	83	63.556	678	0.027
Height	1.470	83	1.648	678	0.000
BMI	21.226	83	23.089	678	0.010
Attachment	3.076	83	3.407	678	0.000
Parental SWE	3.065	83	3.309	678	0.012
Household size	2.193	83	2.146	678	0.827
Risk factors Total	5.317	82	5.860	678	0.056
Social class index	4.427	82	4.096	678	0.092
Observations	761				

*Notes:* The table displays for treatment and control group means of the control variables we include in the PDSLASSO estimates. Sample as indicated.

Table A16: Treatment effects on fertility and labor market outcomes (Lasso) -  
Stage II (Whole Sample)

Outcome	(1) Sample	(2) Control mean	(3) Treatment effect	(4) Effect size	(5) P-value (PDSLASSO)	(6) P-value (OLS)
Any second child	654	0,48	0,07	0,14	0,01	0,04
Any marginal employment	678	0,55	-0,04	-0,08	0,27	0,37
Months of marginal employment	678	9,58	0,60	0,03	0,67	0,75
Any vocational training	678	0,26	0,01	0,02	0,74	0,69
Months in vocational training	678	12,00	1,27	0,04	0,58	0,56
Any regular employment	678	0,46	-0,05	-0,11	0,05	0,09
Months of regular employment	678	8,78	-2,60	-0,16	0,00	0,01
Any welfare receipt	678	0,97	0,01	0,08	0,27	0,34
Months of welfare receipt	678	60,05	3,82	0,15	0,00	0,00
Any employment	678	0,78	-0,05	-0,12	0,00	0,00
Months of employment	678	20,84	-3,64	-0,17	0,02	0,01

*Notes:* The table displays, for the whole sample of children, treatment effects, effect sizes as well as PDSLASSO and OLS p-values on fertility, labor market and welfare receipt outcomes of treated mother.

Table A17: Balance Table - Characteristics at Baseline:  
Stage II Sample: Fertility (Administrative Data)

	(1)	(2)	(3)	(4)	(5)
	Control	Obs.	Treatment	Obs.	P
Strata					
Site Wolfsburg	0.023	311	0.041	342	0.183
Site Braunschweig	0.071	311	0.067	342	0.861
Site Goettingen	0.019	311	0.032	342	0.303
Site Celle	0.048	311	0.061	342	0.462
Site Bremen	0.228	311	0.202	342	0.410
Site Dresden (urban)	0.113	311	0.096	342	0.503
Site Leipzig (urban)	0.087	311	0.105	342	0.426
Site Plauen	0.032	311	0.044	342	0.437
Site Vogtlandkreis	0.026	311	0.035	342	0.489
Site Leipzig (rural)	0.064	311	0.047	342	0.328
Site Dresden (rural)	0.019	311	0.015	342	0.644
Site Bremerhaven	0.084	311	0.076	342	0.721
Under age	0.164	311	0.205	342	0.182
Mother non-German nationality	0.071	311	0.058	342	0.524
Missing					
Risk factor Loss of significant other during childhood	0.527	311	0.494	342	0.401
Continuous Controls					
Overall self-efficacy	2.923	311	2.905	342	0.624
Boy	0.479	311	0.477	342	0.950
weight before pregnancy	62.991	311	63.802	342	0.549
Height	1.636	311	1.656	342	0.109
BMI	22.920	311	23.199	342	0.545
Severe Obesity	0.077	311	0.111	342	0.180
Severe Low Weight	0.026	311	0.032	342	0.704
Lives alone	0.305	311	0.249	342	0.141
Lives with partner or husband	0.318	311	0.354	342	0.389
married	0.058	311	0.091	342	0.113
First pregnancy	0.804	311	0.766	342	0.242
Smokes	0.810	311	0.813	342	0.971
Smokes daily	0.341	311	0.339	342	0.965
Student	0.174	311	0.178	342	0.876
Risk by being pregnant	0.084	311	0.073	342	0.720
Attachment	3.447	311	3.386	342	0.143
Parental SWE	3.317	311	3.326	342	0.866
Household size	2.048	311	2.237	342	0.180
Binary controls					
Risk of Under age	0.161	311	0.202	342	0.176
Risk factor Low income	0.804	311	0.827	342	0.437
Risk factor unwanted pregnancy	0.174	311	0.181	342	0.799
Risk factor Social isolation	0.071	311	0.058	342	0.524
Risk factor Experience of custodial care	0.190	311	0.231	342	0.197
Missing					
Risk factor Loss of significant other during childhood	0.527	311	0.494	342	0.401
Risk factor Violence during pregnancy	0.084	311	0.079	342	0.828
Risk factor Psychiatric disorder	0.183	311	0.120	342	0.023
Risk factor Potential for aggression	0.183	311	0.155	342	0.335
Risk factor Depression (DASS)	0.119	311	0.108	342	0.665
Risk factor Anxiety (DASS)	0.180	311	0.164	342	0.581
Risk factor Stress (DASS)	0.286	311	0.319	342	0.367
Teenager (below 20 years)	0.418	311	0.468	342	0.201
Risk factor Low education status	0.749	311	0.784	342	0.299
Risk factor No partnership at baseline	0.299	311	0.307	342	0.825
Number of week in pregnancy	1.958	311	1.980	342	0.472
Severe Obesity	0.077	311	0.111	342	0.180
Severe Low Weight	0.026	311	0.032	342	0.704
Lives alone	0.305	311	0.249	342	0.141
Lives with partner or husband	0.318	311	0.354	342	0.389
married	0.058	311	0.091	342	0.113
First pregnancy	0.804	311	0.766	342	0.242
Smokes daily	0.341	311	0.339	342	0.965
Student	0.174	311	0.178	342	0.876
Risk by being pregnant	0.084	311	0.073	342	0.720
Continuous Controls					
Overall self-efficacy	2.923	311	2.905	342	0.624
weight before pregnancy	62.991	311	63.802	342	0.549
Height	1.636	311	1.656	342	0.109
BMI	22.920	311	23.199	342	0.545
Attachment	3.447	311	3.386	342	0.143
Parental SWE	3.317	311	3.326	342	0.866
Household size	2.048	311	2.237	342	0.180
Risk factors Total	5.820	311	5.807	342	0.946
Social class index	4.154	311	4.038	342	0.354
Observations	653				

*Notes:* The table displays for treatment and control group means of the control variables we include in the PDSLASSO estimates. Sample as indicated.

Table A18: Attrition Table - Characteristics at Baseline:  
Stage II Sample: Fertility (Administrative Data)

	(1)	(2)	(3)	(4)	(5)
	Attrititors	Obs.	Non-Attrititors	Obs.	P
Strata					
Site Wolfsburg	0.047	107	0.032	653	0.443
Site Braunschweig	0.112	107	0.069	653	0.116
Site Goettingen	0.084	107	0.026	653	0.002
Site Celle	0.037	107	0.055	653	0.447
Site Bremen	0.224	107	0.214	653	0.818
Site Dresden (urban)	0.075	107	0.104	653	0.349
Site Leipzig (urban)	0.056	107	0.096	653	0.178
Site Plauen	0.065	107	0.038	653	0.196
Site Vogtlandkreis	0.009	107	0.031	653	0.214
Site Leipzig (rural)	0.047	107	0.055	653	0.722
Site Dresden (rural)	0.009	107	0.017	653	0.565
Site Bremerhaven	0.065	107	0.080	653	0.611
Under age	0.271	107	0.185	653	0.039
Mother non-German nationality	0.178	107	0.064	653	0.000
Missing					
Risk factor Loss of significant other during childhood	0.542	107	0.508	654	0.514
Continuous Controls					
Overall self-efficacy	2.687	107	2.908	654	0.000
Boy	0.000	107	0.476	654	0.000
weight before pregnancy	61.436	107	63.317	654	0.316
Height	1.543	107	1.643	654	0.001
BMI	22.006	107	23.030	654	0.113
Severe Obesity	0.047	107	0.093	654	0.185
Severe Low Weight	0.000	107	0.028	654	0.271
Lives alone	0.121	107	0.274	654	0.004
Lives with partner or husband	0.243	107	0.335	654	0.103
married	0.084	107	0.073	654	0.725
First pregnancy	0.766	107	0.781	654	0.741
Smokes	0.682	107	0.809	654	0.189
Smokes daily	0.271	107	0.338	654	0.188
Student	0.140	107	0.174	654	0.420
Risk by being pregnant	-0.009	107	0.076	654	0.038
Attachment	3.137	107	3.409	654	0.000
Parental SWE	3.080	107	3.315	654	0.007
Household size	2.206	107	2.142	654	0.740
Binary controls					
Risk of Under age	0.271	107	0.182	653	0.032
Risk factor Low income	0.804	107	0.816	653	0.758
Risk factor unwanted pregnancy	0.159	107	0.178	653	0.636
Risk factor Social isolation	0.103	107	0.064	653	0.148
Risk factor Experience of custodial care	0.243	107	0.211	653	0.461
Missing					
Risk factor Loss of significant other during childhood	0.542	107	0.508	654	0.514
Risk factor Violence during pregnancy	0.103	107	0.081	653	0.456
Risk factor Psychiatric disorder	0.131	107	0.150	653	0.603
Risk factor Potential for aggression	0.159	107	0.168	653	0.806
Risk factor Depression (DASS)	0.140	107	0.113	653	0.424
Risk factor Anxiety (DASS)	0.187	107	0.172	653	0.697
Risk factor Stress (DASS)	0.299	107	0.303	653	0.931
Teenager (below 20 years)	0.514	107	0.444	653	0.179
Risk factor Low education status	0.757	107	0.767	653	0.817
Risk factor No partnership at baseline	0.196	107	0.303	653	0.024
Number of week in pregnancy	2.019	107	1.969	653	0.226
Severe Obesity	0.047	107	0.093	654	0.185
Severe Low Weight	0.000	107	0.028	654	0.271
Lives alone	0.121	107	0.274	654	0.004
Lives with partner or husband	0.243	107	0.335	654	0.103
married	0.084	107	0.073	654	0.725
First pregnancy	0.766	107	0.781	654	0.741
Smokes daily	0.271	107	0.338	654	0.188
Student	0.140	107	0.174	654	0.420
Risk by being pregnant	-0.009	107	0.076	654	0.038
Continuous Controls					
Overall self-efficacy	2.687	107	2.908	654	0.000
weight before pregnancy	61.436	107	63.317	654	0.316
Height	1.543	107	1.643	654	0.001
BMI	22.006	107	23.030	654	0.113
Attachment	3.137	107	3.409	654	0.000
Parental SWE	3.080	107	3.315	654	0.007
Household size	2.206	107	2.142	654	0.740
Risk factors Total	5.729	107	5.813	653	0.740
Social class index	4.364	107	4.093	653	0.122
Observations	761				

*Notes:* The table displays for treatment and control group means of the control variables we include in the PDSLASSO estimates. Sample as indicated.

Table A19: Treatment effects on fertility and labor market outcomes Stage II (Lasso) -  
Stage II (Sample Split by gender)

Outcome	Boys										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Sample	Control mean	Treatment effect	Effect size	P-value (PDSLASSO)	Sample	Control mean	Treatment effect	Effect size	P-value (PDSLASSO)	P-value (OLS)
Any second child	339	0,47	0,05	0,10	0,11	313	0,50	0,07	0,15	0,21	0,13
Any marginal employment	348	0,59	-0,06	-0,12	0,15	320	0,52	0,00	-0,01	0,94	0,86
Months of marginal employment	348	10,40	0,85	0,05	0,76	320	8,85	0,57	0,03	0,71	0,53
Any vocational training	348	0,26	-0,01	-0,03	0,81	320	0,27	0,04	0,10	0,32	0,47
Months in vocational training	348	12,49	-0,08	0,00	0,98	320	11,86	1,82	0,07	0,59	0,60
Any regular employment	348	0,47	-0,03	-0,05	0,65	320	0,45	-0,05	-0,11	0,30	0,45
Months of regular employment	348	8,61	-2,11	-0,15	0,06	320	8,79	-2,83	-0,17	0,07	0,15
Any welfare receipt	348	0,98	0,01	0,04	0,69	320	0,97	0,03	0,17	0,05	0,08
Months of welfare receipt	348	59,34	4,99	0,20	0,00	320	60,65	2,15	0,09	0,38	0,29
Any employment	348	0,80	-0,06	-0,15	0,17	320	0,76	-0,03	-0,08	0,35	0,54
Months of employment	348	20,88	-3,47	-0,17	0,04	320	20,72	-3,15	-0,15	0,24	0,20

Notes: The table displays, separately by gender of the child, treatment effects, effect sizes as well as PDSLASSO and OLS p-values on fertility, labor market and welfare receipt outcomes of treated mother.