Parenting Styles and Children's Skill Development[*]

Jacek Barszczewski[†]   Katherina Thomas[‡]

August 31, 2024

Abstract

This paper studies how parental behaviors, specifically warmth, inconsistency, reasoning, and hostility, influence the development of cognitive and non-cognitive skills during middle childhood and adolescence. Using rich Australian panel data, we present novel evidence that reporting bias in parent-reported measures of children's skills is driven by parenting style. To address this bias and consistently estimate the impact of parenting style on skill development, we employ fixed effects and use past investments as instruments for current investments. To demonstrate that our approach mitigates the bias, we also present results using teacher-reported measures. We find that parental hostility, lack of praise and anger during punishments, negatively impacts non-cognitive skills, decreasing them by 0.12 to 0.23 SD depending on age. Inconsistency in enforcing rules negatively impacts skills in middle childhood but not adolescence, decreasing skills by 0.08-0.10 SD. While parental warmth and reasoning do not influence emotional or behavioral problems, warmth does have a positive impact on prosocial behaviors of children. Cognitive skills are less affected by parenting behavior variations, parental warmth reduces skills by 0.03 SD and inconsistency by 0.07 SD for vocabulary and matrix reasoning tests. In contrast, we find impacts for hostility on school performance, similar in direction as for non-cognitive skills suggesting that non-cognitive skills influence performance. These results highlight the potential effectiveness of interventions focused on reducing parental hostility and enhancing consistency in boosting skill development, thereby contributing to children's human capital formation.

Keywords: Parenting, parenting style, human capital, skill development

JEL Codes: D10, J13, J24

[†]Organisation for Economic Co-operation and Development, Email: `jacek.barszczewski@oecd.org`.

[‡]Universitat de Barcelona, Email: `katherina.thomas@ub.edu`.

1 Introduction

Parenting decisions shape children's skills early in life and influence their long-run accumulation of human capital, thereby affecting well-being, wages, and health (Hanushek and Woessmann (2008), Conti, Mason and Poupakis (2019)). While the impact of investment decisions is well-documented, little is known about the impact of parenting style choices (see Heckman and Mosso (2014), Almond, Currie and Duque (2018) and Doepke and Zilibotti (2019) for an overview). How parents establish rules, offer guidance, and respond to their children's needs, behaviors, and emotions is linked to children's cognitive and non-cognitive skill development, and these practices can vary by socio-economic status (Cunha et al. (2006), Spera (2005), Fletcher et al. (2008), García and Gracia (2009), Luyckx et al. (2011), Heckman and Mosso (2014), Attanasio et al. (2020a), Doepke and Zilibotti (2017)). Therefore, understanding how these practices impact skill development can help to shape policies to increase skills and inter-generational mobility. To design these interventions more effectively, decision-makers need to know which parenting behaviors impact skill development to target them, and at which stages of childhood they are most important.

In this paper, we investigate how parenting practices influence human capital development in middle childhood and adolescence. Exploiting rich panel data from Australia, we estimate the impact of different parenting behaviors, such as warmth and hostility, on cognitive and non-cognitive skill development and provide a detailed analysis of this determinant of skill development. We also present novel evidence of significant respondent bias in parent-reported measures of non-cognitive skills and demonstrate how our methodological approach addresses this bias.

The focus of existing literature on skill development has been on time and monetary investments as main determinants of skills in models of human capital formation (Cunha and Heckman (2008) and Cunha, Heckman and Schennach (2010), Attanasio, Meghir and Nix (2020), Attanasio et al. (2020b) and Wiswall and Agostinelli (2020)). Caucutt et al. (2020) identify time and monetary investments to be complementary, while Del Boca, Flinn and Wiswall (2014) document an increasing influence for monetary investments in later childhood. However, none of these papers takes into account parenting style as investment, a gap closed by theoretical models of parenting style and skill development as in Lizzeri and Siniscalchi (2008), Doepke and Zilibotti (2017, 2019), Cobb-Clark, Salamanca and Zhu (2019). These extensions are supported by associations between parenting and skills documented in the literature (Dooley and Stewart (2007), Fiorini and Keane (2014), Del Bono et al. (2016), Le Forner (2021)). However identifying the impact of parental behaviors remains challenging due to data constraints and estimation challenges.

Estimating the impact of parenting behaviors on skills is empirically challenging for three reasons. First, parenting style is an endogenous choice and can depend on initial skills or other investments impacting skills, which leads to endogeneity and selection bias. Second, measuring parenting style and skills at the same time can introduce simultaneity bias. Third, parent-reported skill measures may be influenced by parenting choices. In this paper, we provide novel empirical evidence that parent-reported non-cognitive skill measures indeed suffer from reporting bias, with parents with more hostile behavior and less consistent punishment strategies under-reporting their children's skills compared to teacher reports.[1] Our main contribution is to address these identification challenges with our estimation strategy and provide a detailed analysis of the multi-dimensional impact of parenting behaviors on cognitive and non-cognitive skills.[2]

In order to accomplish this, we exploit rich panel data from Australia, the Longitudinal Study of Australian Children (LSAC). The survey offers rich information on parenting styles and other relevant factors such as time investments and measures of children's skills. Given data availability, we focus on the age range of 8-15. To assess parental behavior's multi-dimensionality, we investigate five dimensions of parenting behavior, which summarize the variation of survey instruments according to a factor analysis. Firstly, parental warmth captures how much affection parents express to their children. Secondly, parental reasoning assesses how parents explain rules and consequences to their children. The third dimension, parental hostility, captures how often parents praise the child for positive behavior or react angrily in response to negative behavior. The fourth dimension, attempted consistency, evaluates how often parents attempt to reinforce the completion of requests and punishments for non-compliance. The fifth dimension, inconsistency, measures how often the child gets out of such punishment.[3]

To address identification challenges like respondent bias, as well as endogeneity and

---

[1] Del Bono, Kinsler and Pavan (2020) also show reporting bias in parental-reported non-cognitive skill measures of children, but by parents' non-cognitive skills.

[2] Kim (2019) and Agostinelli et al. (2023) develop and estimate models for parenting style choices to address these selection and endogeneity issues; however, focus on one particular dimension of parenting style, such as punishment or interfering with the choice of friends. Falk et al. (2021) include broader definitions of parenting style, but group dimensions not allowing to identify which behavior influences skills in particular.

[3] We link to the literature on parenting style in economics and developmental psychology. In economics, the literature has focused on the impact of different parenting styles following the psychology literature as Baumrind (1967) and Maccoby and Martin (1983) like permissive, neglecting, authoritarian, and authoritative style on skill development (see Doepke, Sorrenti and Zilibotti (2019) for an overview). The styles summarize the extent to which parents choose to intervene in their children's behavior. For instance, see Doepke and Zilibotti (2017) who define the following: parents exert a permissive style when they leave children their independence and are supportive but not strict. This is contrasted by an authoritarian style, where parents impose their will through coercion strictly and are not supportive. Parents can instead also be authoritative; which is when they aim to affect the child's choice using persuasion and are strict but supportive. Another category are neglectful parents who are neither strict nor supportive.

simultaneity, we propose and employ a Blundell-Bover estimator. We use past parenting style as instrument for current parenting style to address reporting and simultaneity bias. Additionally, we include time-invariant child fixed effects and lagged outcomes to control for initial skills and past inputs. We also report results for teacher-reported measures and use them to demonstrate that our estimation strategy corrects for respondent bias and employ several robustness checks.

We find that parental hostility decreases non-cognitive skills by 0.12 to 0.23 standard deviations (SD) for 1 SD increase depending on age. At younger ages (8-9 and 10-11), also inconsistency decreases skills significantly by 0.09-0.10 SD, while all other parenting behaviors do not influence skills. However, regarding sub-categories of non-cognitive skills, we find a positive impact of parenting warmth on prosocial skills (helping others, kindness) but not on externalizing skills (conduct and hyperactivity) and internalizing skills (emotional and peer behaviors). These findings indicate that the association between authoritative parenting (low hostility, high warmth, consistency, and reasoning) and non-cognitive skill development, as documented in previous research (see Spera (2005) and Doepke and Zilibotti (2019) for an overview), is primarily influenced by low levels of hostility and inconsistency. Parenting warmth and reasoning play a limited role, except for the development of prosocial skills. In contrast, for authoritarian parents, the beneficial effect of consistency is outweighed by the negative impact of higher levels of hostility.

We find cognitive skills less affected by variation in parenting behaviors. For vocabulary and matrix reasoning tests, parental warmth reduces scores by 0.03 SD and inconsistency by 0.07 SD per 1 SD increase in the parenting behavior. In contrast, regarding hostility, we find effects on school performance in similar direction as for non-cognitive skills, which suggests that performance is indirectly influenced by non-cognitive skills. For both, school performance and non-cognitive skills, negative effects of hostility and inconsistency are slightly bigger for boys. We additionally document, that parents with lower income display higher levels of hostile and inconsistent parenting, which may contribute to the skills gap between children from different socioeconomic backgrounds in the case of non-cognitive skills and school performance. For example, hostile and inconsistent parenting can arise from stress (Sanders and Woolley (2005), Bloomfield and Kendall (2012), Hutchison et al. (2016) and Cobb-Clark, Salamanca and Zhu (2019)), which parents with lower income experience at a higher level.

Our findings show that parental training programs aimed at reducing hostility and inconsistency might be more effective than programs targeting other dimensions of parenting, assuming that parental behavior is equally amenable across dimensions. Therefore, focusing on households where hostile and inconsistent parenting is prevalent may be the more effi-

cient approach to increasing skills and school performance. As impacts on cognitive skills are smaller, these findings suggest that policy interventions should target other factors beyond parenting if the goal is to increase cognitive skills substantially as well.

The remainder of the paper is organized as follows. In Section 2, we describe the data used and present relevant empirical facts on parenting skills and skill development in Australia as well as evidence for potential respondent bias in parent-reported skill measures. Next, we introduce the empirical framework in Section 3. In Section 4, we discuss results, followed by concluding remarks and ideas for future research in Section 5.

2 Data

2.1 Data sources and construction

To estimate the impact of parenting style on children's skill, we use data from the Longitudinal Study of Australian Children (LSAC). The survey collects information about the children and their parents, including measures of child development such as cognitive and non-cognitive skills. A key advantage of the LSAC data is its detailed information on parenting styles, time-use diaries and children's skills, along with demographics. This feature allows a rigorous analysis of the impact of parental styles on children's skill outcomes taking into account other parental investments like time spent with the child. Additionally, the data is detailed enough for comparison of impacts on various types of non-cognitive skills different ages.

In particular, the richness of the parenting style questions allows us to explore different dimensions of parenting style and their impact. Another advantage is that assessments of child skills are reported by different respondents like teacher and parents. The availability of the same measure by different respondents allows us to address potential respondent reporting bias. This is particularly useful while evaluating non-cognitive skills as these measures often suffer from reporting bias depending on the characteristics of the respondent (Del Bono, Kinsler and Pavan (2020)).

The LSAC survey follows two cohorts of Australian children. The older cohort, born 1999-2000 (4,983 children) is followed from age 4-5, while the younger cohort, born 2003-2004 (5,107 children) is followed from age 0-1 onwards. Due to the availability of measures and biannual panel construction, our observation unit is a child in age group: 4-5, 6-7, 8-9, 10-11, 12-13, and 14-15. This allows us to study the impact of parenting style on child development from early childhood to early adolescence.

In this section, we first describe in detail the variables we use in the estimation. Then

we present descriptive statistics of our sample and discuss potential sample selection.

Non-cognitive skills

The LSAC measures non-cognitive skills using the Strength and Difficulties Questionnaire (SDQ), which is completed by parents and teachers for children aged 4-15. The SDQ consists of 25 items that cover five areas of non-cognitive skills: emotional difficulties, behavioral problems (conduct), hyperactivity issues, peer problems, and pro-social behavior (see Table 1 for details). Each item is scored on a scale from 0 to 2, and the scores are summed to create an index for each of the five areas. These area scores are further summed to obtain three broader indexes, as described by Goodman, Lamping and Ploubidis (2010) and Le Forner (2021).

The indexes are emotional skills (internalizing SDQ), behavioral skills (externalizing SDQ) and pro-social skills (social SDQ). Emotional skills entail questions about emotional health and peer problems as for example if the child often worries, is unhappy, rather plays alone or gets along with other children. In contrast, behavioral skills capture behavioral problems and hyperactivity issues, describing the child to be restless, easily distracted, not obedient or often cheating. Finally, pro-social skills are the index for pro-social behavior like being kind, volunteering to help or being considerate of other's feelings. Internalizing and externalizing SDQ scores are conventionally summarized to the total SDQ score, which is the measure we use in our main analysis. Later, we also present results for externalizing, internalizing and social skills separately.

To facilitate the interpretation of results, we reverse all measures to represent skill levels (high value relates to few problems in the respective area and high non-cognitive skills, while low value relates to more problems and low non-cognitive skills). We standardize all indexes by age group. This allows us to focus on changes of relative skills compared to other children and not on overall skill levels.

Cognitive skills

We use two types of measures to quantify children's cognitive skills. The first group of measures comprises written or oral cognitive tests administered by enumerators. The first measure we use is the Peabody Picture Vocabulary Test (PPVT). The PPVT is an age-adjusted test which captures children's knowledge of the meaning of spoken words and their receptive vocabulary. In the LSAC, it is administered to children aged 4-5 years, 6-7 years, and 8-9 years. Secondly, we use the Matrix Reasoning Test (MRT), a nonverbal intelligence test measuring children's ability to fulfil patterns of diagrams to test their logic skills. This

test is administered to children at ages 6-7 years, 8-9 years and 10-11 years.

Since the first group of measures is only available for younger children and does not cover the entire childhood, we also use a second group of measures. This second group comprises subjective reports of the child's school performance by parents and teachers. These measures are informative not only because they capture cognitive abilities and hence serve as a proxy for these skills, but also because school performance is associated with skills such as memory, problem-solving, and critical thinking. Moreover, this performance measure might capture to some extend non-cognitive skills as e.g. easily being distracted or nervousness might impact your grades compared to your peers. These combined abilities are essential for academic success and impact future labor market prospects. Nonetheless, performance is a less objective measure, and might be a subject to reporting bias similar to the one discussed on the case of non-cognitive skills.

In our estimation, we use measures of school performance in three areas: total performance, reading, and math. Parents and teachers were asked to compare the child's performance in each area to that of other children in their class. Responses were coded on a 5-point scale ranging from 'much better' to 'much worse'. Measures of total school performance are available for children aged 6 to 15. For reading and math performance, the upper age limit is 13. Similarly like in the case of non-cognitive skills, all the measures of cognitive skills are standardize by age in order to focus on changes in relative skills, not on the accumulated stock of human capital.

Parenting style dimensions

We use parent-reported information on their behavior towards the child to get a measure of parenting style. In the LSAC, parenting questions are consistently asked across waves in four different areas: hostile parenting, parental warmth, consistent parenting and inductive reasoning (see Table 2 for a more detailed description of each subgroup). We abstract from using other available information on parenting styles as it is not consistently available across waves and use the information available for the primary caregiver. To pool question items, we follow Fiorini and Keane (2014), Del Bono et al. (2016) and Le Forner (2021) using factor analysis to derive dimensions of parenting style. In contrast to Fiorini and Keane (2014) and Le Forner (2021), we do not pool all parenting questions together to get as least factors as possible. As our paper focuses on the impact of parenting style dimensions on skill development, we investigate how the different components influence skill development. Therefore, we conduct a separate factor analysis by age-group for each of the four parenting areas available across waves to be able to measure their impact separately: hostile parenting, parental warmth, consistent parenting and inductive reasoning. We conduct the factor analysis in age

groups. We perform the factor analysis by age groups, as certain parental behaviors may occur with different frequencies at different child ages, thereby impacting parenting styles differently. For details on the procedure, please see Appendix A.

The factor analysis results in five dimensions of parenting style (see Table 3). The first dimension is parental warmth, describing how often the parent expresses affection, hugs the child and enjoys spending time with it. Secondly, parental hostility captures the absence of praise and level of disapproval or displaying negative emotions when punishing the child. Thirdly, attempted consistency indicates how often the parent attempts to punish the child or ensures requests are completed. Closely linked, the fourth factor, inconsistency, describes how often the child escapes punishment or ignores it. The fifth dimension, reasoning describes how often parents explain rules or corrections to the child.

Time investments

In the LSAC dataset, time-use diaries are used to gather data on children's activities. These are collected over two 24-hour periods, typically one on a weekday and another on a weekend day and filled out by the parents to age 10 and after age 10 by the children. We aggregate the recorded activities into five main groups following Fiorini and Keane (2014) and Le Forner (2021): educational activities with parents, educational activities with adults other than parents, general care time with parents, general care time with adults other than parents and other time.

2.2   Sample selection

We pool both birth cohorts together and compare their outcomes at the same ages to increase sample size and hence, power. The original sample for the younger cohort (B - baby) is 5107 children and for the older cohort (K - kindergarten) 4983 children (10,090 in total). Due to the panel attrition, the sample at age 4-5 counts 9,369 children, and its size decreases to 6,664 at the age of 14-15. We further drop observations with missing information in any of the explanatory variables used in our analyses. As a result, our sample reduces to 7,355 children at age 4-5 and 20,368 observations over the whole observation period. The main reduction (around one third of the original sample) results from missing information in time-use diaries used to construct time investments.

To assess the representativeness of the estimation sample, we compare it to the original sample based on key demographic characteristics (see Table 4). Children in the estimation sample are less likely to be from indigenous groups and more likely to live with both parents. Additionally, their parents are, on average, slightly older (by less than one year) and more

educated (by 2.5 percentage points). Households in the estimation sample tend to have fewer children and higher incomes. Consequently, our estimates should be interpreted with the understanding to not fully represent the Australian population.

2.3   Demographics

Table 5 presents descriptive statistics for the estimation sample across age groups, ranging from 8-9 years to 14-15 years.[4] The statistics indicates that roughly half of the children are female. The proportion of indigenous children remains relatively low (3%-4%) and constant across all age groups. The percentage of children living with both parents declines with age, likely due to parental separation or divorce as the child grows older, resulting in children living with a single parent or alternating between households. Due to data limitations, only children from cohort K are included in the 8-9 years age group, whereas in the older age groups, the sample is approximately evenly split between cohort K and cohort B.

The primary caregivers in the estimation sample are predominantly women (over 97%), with an average age of 39 years in the first estimation wave. Approximately 30% of these primary caregivers have college education. On average, households have 1.5 children, indicating that most children are only children. The majority of households reside in urban areas.

2.4   Descriptive evidence on parenting styles, skills and income

Association between parenting style and skills

How parents raise their children can significantly impact their human capital development. To explore the relationship between human capital and parenting style dimensions, we present the associations of different styles with non-cognitive skills (total SDQ, see Figure 1) and cognitive skills (matrix reasoning test, see Figure 2)[5]. Non-cognitive skills are positively correlated with parental warmth and negatively correlated with hostility and inconsistency. For cognitive skills, there is a weak negative correlation with inconsistency. These patterns suggest which parenting style dimensions might influence skills and could be targeted by parental training interventions.

However, as we plot correlations, other factors may drive the association between parenting styles and skills. Therefore, our empirical strategy aims to establish a more structured

---

[4] Data for the age groups 4-5 and 6-7 years are only used as instruments in the estimation - see Section 3 for details.

[5] We also conduct a correlation analysis to examine how different parenting style dimensions correlate with each other and relate to the four parenting styles commonly used in the literature (authoritative, authoritarian, neglectful, and permissive). For details, see Appendix A.1

and informative relationship. For instance, parental income and education levels could influence parenting styles. Financial stress, for example, may lead to increased hostility or inconsistency, as parents may face scarcity of time, reduced mental bandwidth and patience to enforce rules calmly or consistently (Haushofer and Salicath, 2023). Additionally, the number of siblings or gender of the child could act as confounding factors. Respondent bias might also affect the association, with more hostile parents potentially misreporting their children's skills more than others. By accounting for these potential confounders and employing a rigorous empirical approach, we present more structural evidence on the nuanced relationship between parenting style dimensions and skill outcomes. Before doing so, we present descriptive evidence on two potential confounders to motivate our empirical approach: variation in parenting styles by socioeconomic status and differences in reported skills by teachers and parents.

Parenting styles and income

Children from socioeconomically disadvantaged backgrounds display lower skill levels than their peers on average (Cunha et al. (2006), Heckman and Mosso (2014), Attanasio et al. (2020a)). The skill gap by socio-economic background is well-documented across various contexts and applies to both cognitive and non-cognitive skills. While factors as lower investments, initial skills and peer influence are well documented drivers of this gap, the impact of parenting style is less explored (see Heckman and Mosso (2014) and Almond, Currie and Duque (2018) for an overview of the literature). Cobb-Clark, Salamanca and Zhu (2019) show that a monitoring parenting style - knowing where the child goes after school - is negatively correlated with socioeconomic disadvantage. If parenting styles vary systematically by income or education, this variation might contribute to the skill gap and drive inequality in children's skills. Hostile and inconsistent parenting can arise from stress, which parents with lower income experience at higher levels (Sanders and Woolley (2005), Bloomfield and Kendall (2012) and Hutchison et al. (2016), Haushofer and Salicath (2023)). Consequently, these parents might score higher on hostility, which is negatively associated with non-cognitive skills.

We examine whether the distribution of parenting styles in Australia varies by income and education. We estimate the kernel density of parenting dimensions for different household income groups (the 1st, 3rd, and 5th quintiles, see Figure 3) and the primary caregiver's education level (college and non-college, see Figure 4). The plotted distributions reveal notable differences in parenting styles across income quintiles. Parents in the lower part of the income distribution (1st quintile) are more likely to exhibit high hostility and inconsistency compared to those in higher income quintiles. Conversely, parents with lower incomes

generally show lower levels of attempted consistency, warmth and reasoning.

Regarding parental education, we observe less variation in parenting styles. The primary differences are in the levels of attempted consistency and inconsistent parenting. College-educated parents exhibit higher levels of attempted consistency and lower levels of inconsistent parenting compared to those without a college degree (see Figure 4). Additionally, college-educated parents displays lower levels of warmth. Differences in reasoning and hostility are minimal.

Generally, household income and parental education are associated with different parenting styles and might contribute to children from lower socioeconomic backgrounds lagging behind their peers, particularly in non-cognitive skills. Therefore, we will examine how these different style dimensions influence skills during childhood, considering socio-economic background as a confounder.

Non-cognitive skills and respondent bias

Respondent bias is another potential factor influencing the association between children's skills and parenting styles. Existing research documents differences in the reporting of children's skills between teachers and parents, particularly concerning non-cognitive skills (Kraemer et al. (2003), De Los Reyes et al. (2015)). These differences depend on parents' characteristics, such as their education, as well as their own non-cognitive skills (Del Bono, Kinsler and Pavan (2020)).

Using Australian data, we find differences in reporting children's skills between teachers and parents varying with parenting styles. Figure 5 illustrates the distribution of differences in reported children's non-cognitive skills for parents exhibiting high and low levels of different parenting styles. Visibly, parents with higher levels of hostility and inconsistency tend to report their children's skills significantly lower than teachers do, while parents with high warmth tend to report higher children's non-cognitive skills.

Time-invariant differences in reporting children's skills can be addressed by child fixed-effects in the estimation process, while time-variant differences pose a threat to a credible identification strategy. For example, if parents become more hostile over time, they might report lower children's skills because they focus more on misbehavior. Similarly, if parents become more warm, they might tolerate more misbehavior from their children as they prioritize maintaining a positive and supportive relationship. This situation would lead to overestimating the effect of hostility on skills using the parent-reported measures or underestimate the effect of parental warmth.[6]

---

[6] Generally, teacher-reported measures can also be biased, although their bias is less likely to be influenced by parenting styles. Alternatively, children can display different non-cognitive skills at home than at school.

Controlling for child fixed effects, we find that parental hostility and inconsistency influence parent-reported measures of non-cognitive skills, while it seems to have no effect in the case of cognitive skills. We regress the difference (both nominal and absolute value) in reported measures of children's skills on parenting styles and parents' demographic characteristics while controlling for child fixed effects (see Table 6). Increasing levels of parental hostility and inconsistency seem to widen the gap in reported measures of non-cognitive skills (total SDQ score) between parents and teachers, with parents generally reporting lower skills than teachers. Conversely, parental warmth appears to have the opposite effect, decreasing the gap in reported measures of non-cognitive skills and leading parents to report higher skills on average. In the case of parent-reported cognitive skills (total school performance), none of the parenting styles seems to the significant effect. However, these might be driven by the sample size that is significantly smaller in the case of cognitive skills, and does not provide enough variation to detect the effect.

Given these findings, we outline a comprehensive estimation strategy that addresses the issue of respondent bias in Section 3. As the respondent bias is not constant over time, and its changes are correlated with parenting styles, not addressing it would lead to biased and inconsistent estimates of the impact of parenting style on children's skills. To mitigate this bias, we employ an instrumental variable approach, exploring the panel dimension of the data.

3   Empirical framework

In this section, we outline the empirical strategy employed to estimate the causal impact of parenting styles on cognitive and non-cognitive skills. We assume the production function of children's skills to take the following form:

$$y_{ia} = F_a(Z_{ia}, y_{i0}) + \epsilon_{ia} \tag{1}$$

where y_{ia} represents skills of child i at age a, and F_a is an age-specific function transforming a vector of production inputs Z_{ia} and the the child's initial skill endowment Y_{i0} into the skills level at age a. Production inputs Z_{ia} entail vectors of parenting style measures PS_{ia} (parental warmth, reasoning, hostility, inconsistency and attempted consistency), time investments TI_{ia} (education and care time spent with parents and other adults) and primary caregiver's and household characteristics X_{ia} at age a which influence skill development.

In the estimation, we apply different measures of cognitive and non-cognitive skills (as

---

To address this, we look at both parent- and teacher-reported measures.

described in the data section). For non-cognitive skills, we use the total SDQ score to measure main dimension of non-cognitive skills as well as SDQ subscores. This approach allows us to assess weather the impact of parenting styles is heterogeneous across different dimensions of non-cognitive skills: externalizing (hyperactivity and conduct problems), internalizing (emotional and peer problems) and prosocial skills (antisocial behavior). For cognitive skills use math and reasoning test scores as well as parent-reported overall performance at school and specific performance in math and reading.

There are three potential sources for bias related to estimating the parameters of the production function described in Equation 1. Firstly, omitted variables can bias estimates if correlated with independent variables (parenting styles in our case). For example, omitting parental time investments which can be correlated with parenting styles (i.e. warm parents spend more time with their children) could bias results if both matter for skill development. Additionally, parents might select into certain parenting styles based on demographic characteristics (e.g., education), which also directly influence children's skills. Secondly, parenting styles and children's skills could simultaneously influence each other. Parents might adjust their parenting styles to current changes in children's skills not only past ones, i.e. compensating lower skill levels with higher investments. Thirdly, most skills measures are based on parent-reported indicators. As shown in Section 2.4, these indicators are not free of measurement error and reporting bias that can be correlated with production inputs. This might lead to over- or underestimation of the impact of investments on children's skills depending on the relationship between the reporting bias and production input.

To consistently estimate the impact of parenting styles on children's skills, we assume a linear form of the production function. The main specification takes the following form:

$$y_{ia} = \alpha_i + PS'_{ia}\delta_a + TI'_{ia}\gamma_a + X'_{ia}\beta + Y_{ia-1}\lambda + \epsilon_{ia} \tag{2}$$

With this model specification, we reduce potential omitted variable bias by including child-specific time-invariant fixed effect. This startegy controls for all time-invariant factors which could influence children's current skills but also parental style, as for example initial skills, caregivers' education or unobserved permanent parental ability. We also include a vector of lagged skill outcomes (Y_{ia-1}) to control for past investments and past influence factors, assuming they do not contribute to current skills other than via their impact on past skills. Additionally, we include vector of time-varying controls (X_{ia}) which could influence both parenting styles and children's skills, such as age and mental health status of the primary caregiver, presence of both biological parents in the household, number of siblings, log of caregivers' income, and a neighbourhood quality measure. We also use time-variant

coefficients for parenting style and time investment inputs to measure the age-specific impact of these investments on children's skills.

We estimate Equation 2 using the method proposed by Blundell and Bond (1998). This method, compared to the Arellano-Bond and Arellano-Bover estimators, uses both level and first-difference equations, thereby extracting more information from the data and enhancing the efficiency of the estimates. It also allows us to relax the strict exogeneity assumption, which states that none of the dependent variables can be correlated with any past, current, or future shock. This assumption is violated in the case of first-difference and within-group estimators used in fixed effects models. By employing the Blundell-Bond method, we obtain unbiased estimates of the parameters associated with the past levels of skills. This is achieved by instrumenting the past values of children's skills with their first and higher lags.

To address the potential simultaneity bias between children's skills and parental investments, we employ an instrumental variable (IV) approach. We instrument parental styles and time investments with their second and higher lags (if available). In the level equations, we use the second lag of the first difference in parental investments as an instrument for current parental investments. This assumes that current children's skills are influenced by past changes in parental investments only through the current level of skills. Similarly, we instrument the current first difference in parental investments with the second lag of parental investments, assuming that past levels of investments impact current changes in children's skills only through current changes in parental investments. Both sets of instruments ensure consistent estimates, assuming that shocks are serially uncorrelated.

Using instruments to address simultaneity issues might also eliminate potential biases arising from the use of parent-reported measures (see Section 2.4). The respondent bias is correlated with the current changes and levels of parenting styles, leading to biased estimates. However, it is unlikely that the bias or its change is correlated with past changes or levels of parental investments. By employing the IV approach with fixed effects, we can mitigate the impact of using parent-reported measures on the causal estimates of parental investments on children's skills.

To assess presence of respondent bias in each specification, we explore the richness of our data by comparing estimates obtained using both parent- and teacher-reported measures. In theory, teacher-reported measures should be free from respondent bias correlated with parenting styles. Therefore, significant differences between the estimates derived from parent-reported and teacher-reported measures would indicate the presence of respondent bias in the specifications using parent-reported measures.

For each regression, we assess with a Hausman test if using instrumental variables is necessary to avoid efficiency losses. To assess the presence of simultaneity or reporting bias,

we compare the results obtained with and without instrumenting for parenting styles and time investments. With the Hausman test, we test the null hypothesis if only the IV results are consistent, indicating the presence of bias. In case that yes, we present IV results as main results. Conversely, if the test does not reject the null hypothesis, both results are consistent, suggesting that bias is not present in our data and we report the OLS results. In Section 4.3 we discuss details and the magnitude of the potential bias.

4   Results and Discussion

We now discuss the estimation results obtained following the strategy discussed in Section 3. We start with the main findings for non-cognitive skills, followed by those for cognitive skills. Then we explore the heterogeneity of impacts and briefly discuss the outcomes of the conducted robustness checks.

4.1   Main findings

Relationship of parenting style with non-cognitive skills

We first describe results for non-cognitive skills using total SDQ as outcome and parent-reported measures. Table 7 presents results for the main specification in Equation 2, estimating the impact of parenting style dimensions on non-cognitive skills at different ages. Across different age-groups, only parental hostility has a consistent significant negative impact on non-cognitive skills ranging from 0.12 to 0.23 standard deviations (SD) for 1 SD increase of hostility depending on age. At younger ages (8-9 and 10-11), inconsistency decreases skills significantly by 0.09-0.10 SD. Reasoning has a negative impact of 0.07 SD at age 8-9, however only at 10% level of significance. Warmth and attempted consistency do not influence total SDQ. Given that the impact of parental education (post-compulsory schooling) is estimated to be around 0.1 SD, these effect sizes for the impact of parental hostility and inconsistency are non-negligible (see Attanasio et al. (2020a) for estimates for the UK).

   Given the significant relationship of parenting style with non-cognitive skills measured by total SDQ, we explore further how this relationship looks like for different dimensions of non-cognitive skills. To do so we use externalising, internalising and prosocial skills as dependent variables and compare them to our main findings for total SDQ (pooling internalizing and externalizing skills). Externalising skills describe behavioral problems like hyperactivity, while internalizing skills rather capture emotional difficulties like anxiety. Prosocial skills capture how social the child is, e.g. the degree of empathy. Figure 6 illustrates this comparison. We plot the estimated coefficient for the impact of each parenting style dimension

14

at different ages on categories of non-cognitive skills (for estimation results see Tables 8-10). Mostly impact sizes and directions on the sub-categories are similar to the ones described for total SDQ. Generally, in terms of magnitudes, hostility and inconsistency seem to influence internalizing skills to a lesser extend than externalizing skills. However, for prosocial skills, parental warmth emerges as an significant impact factor, which is not the case for other non-cognitive skills. One SD increase in warmth results in 0.10-0.14 SD increase in prosocial skills, increasing with age.

These findings link to the literature on different parenting styles (authoritative, authoritarian, neglectful and permissive styles). Previous research suggest that children of authoritative parents tend to have higher non-cognitive skills (Spera (2005), Luyckx et al. (2011), Delvecchio et al. (2020), McWhirter et al. (2023)). Authoritative parenting style is characterized by high warmth, reasoning, and consistency, and low hostility. Our results support these findings, highlighting that hostility and inconsistency could drive these impacts. In contrast, we do not find an impact of warmth on total SDQ, so this dimension of authoritative parenting is not associated with higher non-cognitive skills. Instead, our findings suggest that low hostility is the primary driver of the positive impact of this style, followed by high consistency. In contrast, warmth appears to play a limited role, while reasoning may have a negative effect. The negative impact of hostility might also explain the negative associations between non-cognitive skills and authoritarian and neglectful parenting styles found in the literature (Fiorini and Keane (2014), Le Forner (2021), Spera (2005), Fletcher et al. (2008), Heberle, Briggs-Gowan and Carter (2015), McWhirter et al. (2023)). The negative impact of high hostility levels seems to offset the positive impact of consistency for authoritarian parenting. Given we find hostility to have a nearly twice as big negative impact on non-cognitive skills compared to inconsistency, this conclusion seems reasonable. Permissive parenting (high warmth, high inconsistency and low hostility) is associated with more externalizing problems and antisocial behavior (see McWhirter et al. (2023) for an overview). In this case, the negative impact of inconsistency might offset the positive effects higher warmth for prosocial skills, and decrease skills generally.

Our results suggest to target reducing parental behaviors that lead to hostility and inconsistency in parenting training to increase the effectiveness of these interventions. Particularly, to increase social skills, targeting parental warmth in interventions might also matter, indicating that the process of building internalizing and externalizing skills varies from prosocial ones to some extend. Additionally, to design effective interventions, the age at which parenting style impacts skills is important. Then, interventions can be targeted at the age group where they would be most beneficial. Following our findings, targeting hostility at all ages might have promising effects, while inconsistency might be more effectively targeted at

earlier ages (before age 12).

Relationship of parenting style with cognitive skills

Tables 11 presents the estimation results for the cognitive skills measured by MRT and PPVT score. The first column displays the results for MRT scores at age 6-7, while the second columns shows the results for PPVT scores at age 8-9. All coefficients for parenting dimensions are insignificant, except for warmth and inconsistency. Warmth has negative coefficients, suggesting they are associated with a decrease in cognitive skills by around 0.03 SD by 1 SD increase. Inconsistency increases cognitive skills by around 0.07 SD.

Given we do not have these cognitive assessments for all ages, we also present results for another, less objective measure: parent-reported school performance. Estimation results are presented in the Table 12 for overall school performance, 13 for math and 14 for reading. Hostile and inconsistent parenting negatively impact overall school performance, with around 0.1 SD in magnitude. For math performance hostile parenting and warmth have negative effects, while for reading mostly inconsistency decreases performance.

In contrast to Fiorini and Keane (2014) and Le Forner (2021), we find evidence for the impact of parenting style on cognitive skills (MRT and PPVT scores). This could be steam from our estimation strategy to estimate impacts of particular parenting behaviors. Fiorini and Keane (2014) and Le Forner (2021) pool behaviors and look at authoritarian or authoritative parenting styles and grouping them could mask the impact of particular behaviors. We also find significant impacts for parenting behaviors regarding school performance, where in contrast to more objective measures, hostility plays a role. One potential explanation could be that performance is also influenced by non-cognitive skills and therefore we find similar results for these measures with the ones for non-cognitive skills.

These results indicate that parenting training targeting parenting style might be particularly effective in increasing non-cognitive skills but less so cognitive ones directly. Depending on which improvements policymakers aim for, different intervention designs are needed. However, it is important to keep in mind that severe behavioral problems can impact grade progression and school outcomes which in return might affect cognitive skill development in the long run and that there are increasing returns from non-cognitive skills for wages later in life (see Carneiro, Crawford and Goodman (2007), Deming (2017) and Edin et al. (2022)). This relationship is highlighted by our findings for school performance.

4.2 Heterogeneous effects by gender

Tables 15 and 16 present estimates of the main specification separately for male and female children for non-cognitive skills. We split the sample to see if there are differential effects of parenting dimensions by gender of the child. Differences in estimated coefficients are marginal. The effects of hostility are slightly bigger for boys, which also seem to be more affected by inconsistency. However, magnitude differences are small. For cognitive tests as MRT and PPVT we do not find any gender differences (see Table 17 and 18). Similar to non-cognitive skills, for school performance, we find stronger effects for boys for inconsistency for overall school performance and hostility for math and reading (see Tables 19 - 24). On average boys seem to be more impacted by these parenting behaviors.

4.3 Sensitivity analysis and robustness checks

In this section we assess the robustness of our main results, for the outcomes total SDQ for non-cognitive skills, MRT and PPVT scores as well as school performance for cognitive skills (equation 2). First, we discuss how our empirical approach corrects for measurement error, respondent bias and simultaneity and assess the magnitude of these biases if not controlling for them. Then we employ checks for omitted variable bias and a sensitivity analysis to assess the robustness of our findings.

Assessing measurement error, respondent bias and simultaneity

If our estimation strategy is successful in mitigating measurement error, respondent, and simultaneity bias the following statement should be true: corrected estimates for parent-reported measures should lead to similar results as teacher-reported measures. To assess the validity of this statement, we employ our main specification in equation 2 to teacher-reports of skills as outcomes (for results see Table 25).[7] We unfortunately cannot do this test for school performance as it is only parent-reported. However, here also reporting bias related to parenting behaviors did not seem to be an issue after controlling for fixed effects (see Section 2.4). Regarding non-cognitive skills, we plot in Figure 7 the coefficients estimates for teacher and parent-reported skill measures to compare them directly. We display estimates for parenting styles and their confidence intervals estimated using the main specification for total SDQ. Coefficients are similar in magnitude and significance for parental warmth,

---

[7] We have less observations for teacher-reported measures, which is why we report parent-reported outcome results as main specification. Teacher and parent sample are similar, slightly more children live with both their parents, parents are slightly more educated and live in more rural areas and children tend to be more from the older cohort (see Table 26).

reasoning and attempted consistency. For hostility, a similar picture emerges, however for teacher reports, hostility at age 14-15 is not significant and the magnitude negative but smaller. For inconsistency, in particular teacher-reports reveal a relevance at later ages, however magnitudes are similar at younger ages. Overall, the results hold, and our estimation approach our estimation approach seems to reasonably address the biases.

Consequently, how big the bias would be without employing this approach? First, we assess reporting bias. To test this, we estimate the main specification for non-cognitive skills without using instrumental variables for parent-reported measures (see Table 7 for IV and 27 for results without IV). If reporting bias is not influencing results, adding the instruments should not change estimates significantly. Additionally, simultaneity can play a role here, therefore we will employ a second test for the presence of this bias later. First, let's compare our estimates for parent-reported measures. Compared to the main results, reasoning consistently negatively impacts skills in the non-IV results. Further, the negative impact of hostility at younger ages is overestimated, whereas inconsistency seems to be underestimated. Employing a Hausman test confirms that only IV estimates are consistent, as we reject the null hypothesis of equal estimates (chi2(48) = 83.58, p-value = 0.0011). Thus, the IV is needed to control for parent-reported measurement error.

These magnitudes could also be driven by the presence of simultaneity, so parents reacting to skill changes with adjusting their parenting. To test for this bias, we compare IV results and non-IV results for teacher-reported measures (see Table 25 for IV results vs 28 for non-IV results). If parents adjust their parenting to current skill changes, this should also be reflected in the teacher-reported measures as they react to real skill changes. The advantage of looking at the teacher reports is that we can exclude parental respondent bias as a driver. There are differences in magnitudes of coefficients for inconsistency and reasoning varies in significance. However, employing a Hausmann test to compare estimates, reveals we cannot reject the null hypothesis, that estimates are equivalent and hence, non-IV estimates seem to be consistent (chi2(48) = 22.50, p-value = 0.9994). For non-cognitive skills, we conclude that respondent bias seems to be a bigger concern than simultaneity. Comparing estimates with teacher-reported results, our estimation strategy seems to be successful at mitigating this concern.

Regarding the total bias, we also test the bias magnitude for cognitive skills, using school performance (see Table 12 for IV and Table 29 for non-IV results). Here, we cannot disentangle reporting versus simultaneity bias, as we do not have teacher reports. Coefficients for hostility are similar in magnitude to IV results. In contrast, warmth and reasoning is significant at some ages and inconsistency smaller in magnitude. Similarly to non-cognitive skills, we cannot reject the null hypothesis of the Hausman test result that estimates are

comparable (chi2(38) = 53.11, p-value = 0.0526). Therefore, bias seems to be present and without an adapted empirical strategy one would overestimate the impact of warmth and underestimate the impact of inconsistency for school performance.

For the cognition measures as MRT and PPVT scores directly executed by the child in the survey, we are not worried about respondent-bias but about simultaneity. However, we do not find evidence that the use of instruments is necessary (see 11 for without IV and Table 30 for IV results). According to the Hausman test, we cannot reject the null hypothesis of comparable estimates in both cases, which is why we present the OLS estimates (chi(18) = 10.35 p-value =0.9199 for MRT and chi(17) = 5.59 p-value = 0.9955 for PPVT).

Omitted variable bias

To avoid the influence of omitted variable bias, we have included factors in the regressions which are known in the literature to be associated with skill development and and could be potentially linked to parenting style. These are for example: time investments, the age, education and mental health status of the primary caregiver, presence of both biological parents in the household, the number of siblings, family income, and neighbourhood quality measure. (Doepke, Sorrenti and Zilibotti (2019), Cobb-Clark, Salamanca and Zhu (2019) and Heckman and Mosso (2014)). Nonetheless, there could be other factors which influence skill development and parenting style and hence induce omitted variable bias.

Firstly, we assess if adding these controls significantly changes our estimates, by first excluding time investments from the regressions (see Table 31 for non-cognitive, Table 32 for MRT and PPVT and Table 33 for school performance). We find similar effects as in the main specification, reducing the concern that our estimates are driven by a certain specification.

To further assess robustness, we include an extended set of controls in the main model specification. We add type of school, number of books at home, family financial shocks, child health shocks and other stressful events. Type of school indicates if the child goes to private or catholic school versus public school, as this might influence parenting and skills (e.g. different approaches for PTA meetings and information on children's behavior at school). We also include number of books at home as a potential other investment input. A dummy for financial shocks indicates if the family could not pay bills on time or their mortgage, has gone without meals, been unable to heat/cool home or got assistance from welfare. Financial shocks can be stressful, and could therefore influence parenting and children's skills. Similarly, health shocks of the child could affect both factors. We control for child health shocks using information if the child has any impairment in its body parts. We also control for other stressful events in the household as death, imprisonment, alcohol abuse of a household member. All of the shocks has a negative impact on skills, but estimated

parameters of parenting style do not change (see Table 34, Table 35 for MRT and PPVT and Table 36 for school performance). Therefore, it is likely that these shocks are not correlated across time, as after controlling for these variables, our main results still hold. Generally adding these controls does not impact results. This indicates that the omitted controls in the main specification are uncorrelated with the parenting style inputs and do not represent a source of endogeneity bias.

Sensitivity analysis

First, we examine how our results are affected by the way we define parenting styles. In the main specification, we conducted a factor analysis on selected subgroups of questions related to parental behavior, resulting in five different dimensions of parenting styles. Alternatively, we can pool all the questions together and obtain four factors in a joint factor analysis. Based on the reported loadings (see Tables 37 - 42), we labeled the factors as warm style, reasoning style, hostile and inconsistent style, and consistent style. Depending on wave, the described factors load differently, so we assign the factors produced to the fitting variable (see table notes for details and Appendix A for details on the procedure). We run the main specification with these new parenting style variables. For non-cognitive skills, the results are mostly consistent with the main results. However, warmth has a positive influence now (see Table 43). This could be driven by the fact, that praise, originally loading on hostility is now in the warmth part. Additionally reasoning emerges as negative, however not consistent over time, similar to some other results. As the effect is not consistent, we abstract from interpreting it too much. For cognition and school performance our main results also hold (see Table 44 for cognition and Table 45 for school performance). Generally reasoning emerges as negative, and as the factor score also loads on warmth, this might be related to our finding that these are negatively impacting skills.

Despite these robustness checks, certain limitations of our approach remain. Firstly given that we use time-invariant fixed effects, we do not control for time-varying selection. Therefore, estimates could be biased if, for example, financial shocks influence skills directly and indirectly via increasing parenting hostility due to stress. We add controls as proxies for stress, as separation of parents and stress to mitigate these concerns. However, any remaining time-varying influences might still bias results and not having exogenous variation in parenting style is a limitation.

5   Summary and Concluding Remarks

In this paper, we investigate the impact of different parenting behaviors on cognitive and non-cognitive skill development. We use the Longitudinal Survey of Australian Children to estimate the impact of parental warmth, reasoning, hostility, and consistency on skill development. Additionally, we provide novel empirical facts demonstrating respondent bias in parent-reported measures of non-cognitive skills for parental hostility and inconsistency and the association between socio-economic background and parenting behaviors. We exploit the panel structure of the data and the availability of rich demographic and investment variables to control for potential endogeneity issues and respondent bias. Doing so, we enrich the existing literature by providing a structured analysis of the impact of parenting behaviors.

We find that higher levels of parental hostility and inconsistency decrease non-cognitive skills and no impacts for other parenting behaviors. In contrast, prosocial skills are additionally positively impacted by parental warmth, which is not the case for externalizing and internalizing skills. We show that the positive association between authoritative parenting and skill development found in the literature seems to be driven by low levels of hostility and inconsistency. Parenting warmth and reasoning play a limited role. In contrast, for authoritarian parents, higher levels of hostility seem to offset the positive effect of consistency. We find hostility impacts skill development in higher magnitudes than inconsistency. Cognitive skills measured via matrix reasoning and vocabulary tests are impacted by parental warmth and inconsistency. In contrast to non-cognitive skills, cognition is negatively influenced by warmth, although the magnitude is small. For school performance we find similar influence factors as for non-cognitive skills, indicating it is likely influenced by these skills. Our findings highlight the importance of modeling non-cognitive and cognitive skill development with different inputs as impact factors. As parents from the bottom of the income distribution tend to have higher levels of hostile and inconsistent parenting, these factors might be an additional driver for the skill gap between children from different socioeconomic backgrounds.

Our findings suggest that parenting behaviors with low levels of hostility and inconsistency positively influence skill development. Thus, this finding is informative for the design of child development policies. For instance, targeting these two parenting behaviors might be particularly efficient regarding parenting training. Additionally, targeting parental warmth might be beneficial for the development of prosocial skills. As cognitive skills are less affected by parenting style, interventions might have to include other components to increase these skills except indirectly via non-cognitive skills. As hostile and inconsistent parenting

is often associated with increased stress levels in parents, another promising approach might be to combine parenting training with stress management training to maximize impact. Nonetheless, more research is needed on the amenability of these behaviors to determine the efficiency of this approach. Our results indicate that focusing, in particular, on hostility and inconsistency in doing so is promising.

References

Agostinelli, Francesco, Matthias Doepke, Giuseppe Sorrenti, and Fabrizio Zilibotti. 2023. "It Takes a Village: The Economics of Parenting with Neighborhood and Peer Effects." *SSRN Electronic Journal.*

Almond, Douglas, Janet Currie, and Valentina Duque. 2018. "Childhood Circumstances and Adult Outcomes: Act II." *Journal of Economic Literature*, 56: 1360–1446.

Attanasio, Orazio, Costas Meghir, and Emily Nix. 2020. "Human Capital Development and Parental Investment in India." *The Review of Economic Studies*, 87(6): 2511–2541.

Attanasio, Orazio, Richard Blundell, Gabriella Conti, and Giacomo Mason. 2020*a*. "Inequality in Socio-Emotional Skills: A Cross-Cohort Comparison." *Journal of Public Economics*, 191: 104171.

Attanasio, Orazio, Sarah Cattan, Emla Fitzsimons, Costas Meghir, and Marta Rubio-Codina. 2020*b*. "Estimating the Production Function for Human Capital: Results from a Randomized Controlled Trial in Colombia." *American Economic Review*, 110(1): 48–85.

Baumrind, Diana. 1967. "Child Care Practices Anteceding Three Patterns of Preschool Behavior." *Genetic Psychology Monographs*, 75: 43–88.

Bloomfield, Linda, and Sally Kendall. 2012. "Parenting Self-Efficacy, Parenting Stress and Child Behaviour before and after a Parenting Programme." *Primary Health Care Research & Development*, 13(04): 364–372.

Blundell, Richard, and Stephen Bond. 1998. "Initial conditions and moment restrictions in dynamic panel data models." *Journal of Econometrics*, 87(1): 115–143.

Carneiro, Pedro, Claire Crawford, and Alissa Goodman. 2007. "The Impact of Early Cognitive and Non-Cognitive Skills on Later Outcomes."

Caucutt, Elizabeth, Lance Lochner, Joseph Mullins, and Youngmin Park. 2020. "Child Skill Production: Accounting for Parental and Market-Based Time and Goods Investments." National Bureau of Economic Research, Cambridge, MA.

Cobb-Clark, Deborah A., Nicolás Salamanca, and Anna Zhu. 2019. "Parenting Style as an Investment in Human Development." *Journal of Population Economics*, 32(4): 1315–1352.

Conti, Gabriella, Giacomo Mason, and Stavros Poupakis. 2019. "Developmental Origins of Health Inequality."

Cunha, Flavio, and James J. Heckman. 2008. "Formulating, Identifying and Estimating the Technology of Cognitive and Noncognitive Skill Formation." *Journal of Human Resources*, 43(4): 738–782.

Cunha, Flavio, James Heckman, Lance Lochner, and Dimitriy V. Masterov. 2006. "Interpreting the Evidence on Life Cycle Skill Formation." In *Handbook of the Economics of Education*. 697–812. Elsevier.

Cunha, Flavio, James J. Heckman, and Susanne Schennach. 2010. "Estimating the Technology of Cognitive and Noncognitive Skill Formation." *Econometrica*, 78(3): 883–931.

Del Boca, Daniela, Christopher Flinn, and Matthew Wiswall. 2014. "Household Choices and Child Development." *The Review of Economic Studies*, 81(1): 137–185.

Del Bono, Emilia, Josh Kinsler, and Ronni Pavan. 2020. "Skill Formation and the Trouble with Child Non-Cognitive Skill Measures." *SSRN Electronic Journal*.

Del Bono, Emilia, Marco Francesconi, Yvonne Kelly, and Amanda Sacker. 2016. "Early Maternal Time Investment and Early Child Outcomes." *The Economic Journal*, 126(596): F96–F135.

De Los Reyes, Andres, Tara M Augenstein, Ming Wang, Sara A Thomas, Deborah A G Drabick, Danielle E Burgers, and Jill Rabinowitz. 2015. "The validity of the multi-informant approach to assessing child and adolescent mental health." *Psychological Bulletin*, 141(4): 858–900.

Delvecchio, Elisa, Alessandro Germani, Veronica Raspa, Adriana Lis, and Claudia Mazzeschi. 2020. "Parenting Styles and Child's Well-Being: The Mediating Role of the Perceived Parental Stress." *Europe's Journal of Psychology*, 16(3): 514–531.

Deming, David J. 2017. "The Growing Importance of Social Skills in the Labor Market*." *The Quarterly Journal of Economics*, 132(4): 1593–1640.

Doepke, Matthias, and Fabrizio Zilibotti. 2017. "Parenting With Style: Altruism and Paternalism in Intergenerational Preference Transmission." *Econometrica*, 85(5): 1331–1371.

Doepke, Matthias, and Fabrizio Zilibotti. 2019. "The Economics of Parenting Style." In *Love, Money, and Parenting*. 21–50. Princeton University Press.

24

Doepke, Matthias, Giuseppe Sorrenti, and Fabrizio Zilibotti. 2019. "The Economics of Parenting." *Annual Review of Economics*, 11: 55–84.

Dooley, Martin, and Jennifer Stewart. 2007. "Family Income, Parenting Styles and Child Behavioural-Emotional Outcomes." *Health Economics*, 16(2): 145–162.

Edin, Per-Anders, Peter Fredriksson, Martin Nybom, and Björn Öckert. 2022. "The Rising Return to Noncognitive Skill." *American Economic Journal: Applied Economics*, 14(2): 78–100.

Falk, Armin, Fabian Kosse, Pia Pinger, Hannah Schildberg-Hörisch, and Thomas Deckers. 2021. "Socioeconomic Status and Inequalities in Children's IQ and Economic Preferences." *Journal of Political Economy*, 129(9): 2504–2545.

Fiorini, Mario, and Michael P. Keane. 2014. "How the Allocation of Children's Time Affects Cognitive and Noncognitive Development." *Journal of Labor Economics*, 32(4): 787–836.

Fletcher, Anne C., Jill K. Walls, Emily C. Cook, Karis J. Madison, and Tracey H. Bridges. 2008. "Parenting Style as a Moderator of Associations Between Maternal Disciplinary Strategies and Child Well-Being." *Journal of Family Issues*, 29(12): 1724–1744.

García, Fernando, and Enrique Gracia. 2009. "Is Always Authoritative the Optimum Parenting Style? Evidence from Spanish Families." *Adolescence*, 44(173): 101–131.

Goodman, Anna, Donna L. Lamping, and George B. Ploubidis. 2010. "When to Use Broader Internalising and Externalising Subscales Instead of the Hypothesised Five Subscales on the Strengths and Difficulties Questionnaire (SDQ): Data from British Parents, Teachers and Children." *Journal of Abnormal Child Psychology*, 38(8): 1179–1191.

Hanushek, Eric A., and Ludger Woessmann. 2008. "The Role of Cognitive Skills in Economic Development." *Journal of Economic Literature*, 46(3): 607–668.

Haushofer, Johannes, and David Salicath. 2023. "The Psychology of Poverty: Where Do We Stand?" National Bureau of Economic Research Working Paper w31977.

Heberle, Amy E., Margaret J. Briggs-Gowan, and Alice S. Carter. 2015. "A Person-oriented Approach to Identifying Parenting Styles in Mothers of Early School-age Children: Person-oriented Approach to Parenting Styles." *Infant and Child Development*, 24(2): 130–156.

Heckman, James J., and Stefano Mosso. 2014. "The Economics of Human Development and Social Mobility." *Annual Review of Economics*, 6(1): 689–733.

Hutchison, Lindsey, Michael Feder, Beau Abar, and Adam Winsler. 2016. "Relations between Parenting Stress, Parenting Style, and Child Executive Functioning for Children with ADHD or Autism." *Journal of Child and Family Studies*, 25(12): 3644–3656.

Kim, Jun Hyung. 2019. "The Economics of Parenting Skill and Child Development."

Kraemer, Helena Chmura, Jeffrey R Measelle, Jennifer C Ablow, Marilyn J Essex, W Thomas Boyce, and David J Kupfer. 2003. "A new approach to integrating data from multiple informants in psychiatric assessment and research: mixing and matching contexts and perspectives." *American Journal of Psychiatry*, 160(9): 1566–1577.

Le Forner, Hélène. 2021. "Formation of Children's Cognitive and Socio-Emotional Skills: Is All Parental Time Equal?"

Lizzeri, Alessandro, and Marciano Siniscalchi. 2008. "Parental Guidance and Supervised Learning." *Quarterly Journal of Economics*, 123(3): 1161–1195.

Luyckx, Koen, Elizabeth A. Tildesley, Bart Soenens, Judy A. Andrews, Sarah E. Hampson, Missy Peterson, and Bart Duriez. 2011. "Parenting and Trajectories of Children's Maladaptive Behaviors: A 12-Year Prospective Community Study." *Journal of Clinical Child & Adolescent Psychology*, 40(3): 468–478.

Maccoby, E. E., and J. A. Martin. 1983. "Socialization in the Context of the Family: Parent-Child Interaction." In *In P. H. Mussen, & E. M. Hetherington (Eds.), Handbook of Child Psychology: Vol. 4. Socialization, Personality, and Social Development.* 1–101. New York:Wiley.

McWhirter, Anna Cecilia, Laura Lee McIntyre, Derek B. Kosty, and Elizabeth Stormshak. 2023. "Parenting Styles, Family Characteristics, and Teacher-Reported Behavioral Outcomes in Kindergarten." *Journal of Child and Family Studies*, 32(3): 678–690.

Sanders, M. R., and M. L. Woolley. 2005. "The Relationship between Maternal Self-Efficacy and Parenting Practices: Implications for Parent Training: Self-efficacy and Parenting Practices." *Child: Care, Health and Development*, 31(1): 65–73.

Spera, Christopher. 2005. "A Review of the Relationship Among Parenting Practices, Parenting Styles, and Adolescent School Achievement." *Educational Psychology Review*, 17(2): 125–146.

Wiswall, Francesco, and Matthew Agostinelli. 2020. "Estimating the Technology of Children's Skill Formation." *NBER Working Paper Series.*

A   Appendix

Data and descriptives

Parenting measures

We conduct a principal component analysis for each parenting measure (warmth, hostility, reasoning and consistency) by age group. To do so, we retain factors with eigenvalues larger than 1 and rotated them. In the survey, inductive reasoning at age 4-5 and age 6-7 includes only 2 and 3 of the 5 questions, respectively, asked at other ages. Therefore, we use only those available in those ages.

Table 3 shows the rotated factor loading coefficients of the principal component analysis for each measure and each age group. Factor loadings which are larger than 0.25 in absolute value are displayed in bold. The principal component analysis for each measure leads to one factor pooling all sub questions (eigenvalues>1) except for consistency. Here we identify two factors. The first factor can be described as inconsistent parenting style, the child gets out of punishment or ignores it. The second factor captures if parents attempt to make the child fulfill requests and attempt to punish it if not. We will call this factor: attempted consistency. Factor loadings are stable across waves, except for parental consistency in wave 3, here only one factor is needed to describe the variation (inconsistency).

For our sensitivity analysis, we test different ways to summarize the variation of parenting style in a joint factor analysis. To do so, we summarize the variation in dimensions of parenting style in additional factor analysis pulling all factors together. Tables 37 to 42 show the factor loadings for these. We get four factors, which mostly correspond to the factors used in the main specification, except for hostile and inconsistent parenting, which are now combined into one factor with high hostility and children getting out of punishment. An additional factor describes high levels of attempted consistency and low levels of implemented inconsistency. Factors are fairly consistent across waves, except that their order might be different or they are expressing the other direction. To make them comparable we assign them accordingly and reverse values if necessary.

Time investments

The data collection process involves two methods for measuring time spent with the child. For cohort K, spanning three waves (ages 4-9), and cohort B, also across three waves (ages 0-5), data is collected over two 24-hour periods, typically one on a weekday and another on a weekend day. The information is recorded on paper diaries, divided into 96 15-minute

intervals, which parents fill out. Parents select the activity, location, and individuals involved from a predefined set of options.

For cohort K, spanning three waves (ages 10-15), and cohort B, also across three waves (ages 10-15), children themselves become the informants (with support from the interviewer). Furthermore, the Time Use Diaries undergo significant changes. Instead of paper diaries, data is now collected using a computer instrument. Additionally, the time span of activities is not limited to 15-minute intervals. Moreover, activities are recorded only on a single day of the week, either a weekday or a weekend day. However, similar to the previous version, children complete the diary by selecting the activity, location, and individuals involved from a predetermined set of options.

To analyze the effect of parental time investment on children's cognitive and non-cognitive skills, we aggregate the recorded activities into five main groups:

1. Educational activities with parents
2. Educational activities with adults other than parents
3. General care with parents
4. General care with adults other than parents
5. Other time

Since time investments are not the focus of our analysis, we follow the aggregation rules established by Fiorini and Keane (2014) and Le Forner (2021) to group activities. It is important to note that the set of alternatives may change over time, but the primary divisions between educational, general care, and other activities remain consistent across different survey waves. In cases where multiple activities are reported simultaneously, we prioritize the primary activity. If information about the activity is missing, we assign it to the category other time. This ensures that the total time spent on activities always sums up to 24 hours. Regarding time spent with adults other than parents, we only consider it if the activity was conducted with adults while parents were not participating. If parents were involved in the activity, it is classified as time spent with parents.

Depending on wave, these diaries are collected on weekdays and weekends or only either of them. When data is collected on both weekdays and weekends, we calculate a weighted average for each time input. Weekdays are assigned a weight of 5, while weekend days are assigned a weight of 2. However, for the remaining waves, when data collection was conducted on a single day only we use only the available unit. To control for this variation, we include dummy variables to indicate whether the record was on a weekday, weekend day, or an average of both diaries.

A.1 Correlation of parenting styles

As the literature tends to summarize parenting behaviours into parenting styles (patterns occurring across parents), we look at their correlation in Table 46. Parental warmth and parental hostility are negatively correlated, while warmth positively correlates with reasoning. Attempted consistency is also positively correlated with reasoning, but the magnitude of the correlation coefficient is smaller. In contrast, hostility is positively correlated with inconsistency. Other correlation coefficients are relatively small. By construction, attempted consistency and inconsistency are not correlated, as they originate from the same factor analysis. Overall, the correlations are not very high, suggesting the multi-dimensional character of parenting styles.

To compare these dimensions and their correlations with the parenting styles in the literature, we classify the dimensions into styles following Baumrind (1967) and Maccoby and Martin (1983) (see Spera (2005) and McWhirter et al. (2023) for an overview). This classification encompasses four styles:

1. Authoritarian: low warmth and reasoning, high consistency and hostility

2. Authoritative: high warmth, reasoning, and consistency, low hostility

3. Permissive: high warmth, low consistency, and hostility

4. Neglecting: low warmth, reasoning, consistency, and hostility

Regarding the described correlations, the positive association of parental warmth and reasoning indicates patterns of an authoritative parenting style. High hostility would indicate an authoritarian parenting style; however, low consistency does not apply to that and could rather speak of a neglecting style. If we look at the factor analyisis summarizing behaviours into fewer factors, we find the variation to describe an authoritative parenting style for the first factor (see Table **??**). Values are high for parents loading on warmth, reasoning, and attempted consistency. Parents scoring low on this factor could be described as neglecting. In contrast, the second-factor loads on hostility and actual inconsistency, which could speak for an authoritarian style. Permissive would be described by loading on the first and second factors jointly, offsetting the hostility in the second factor.

B Figures
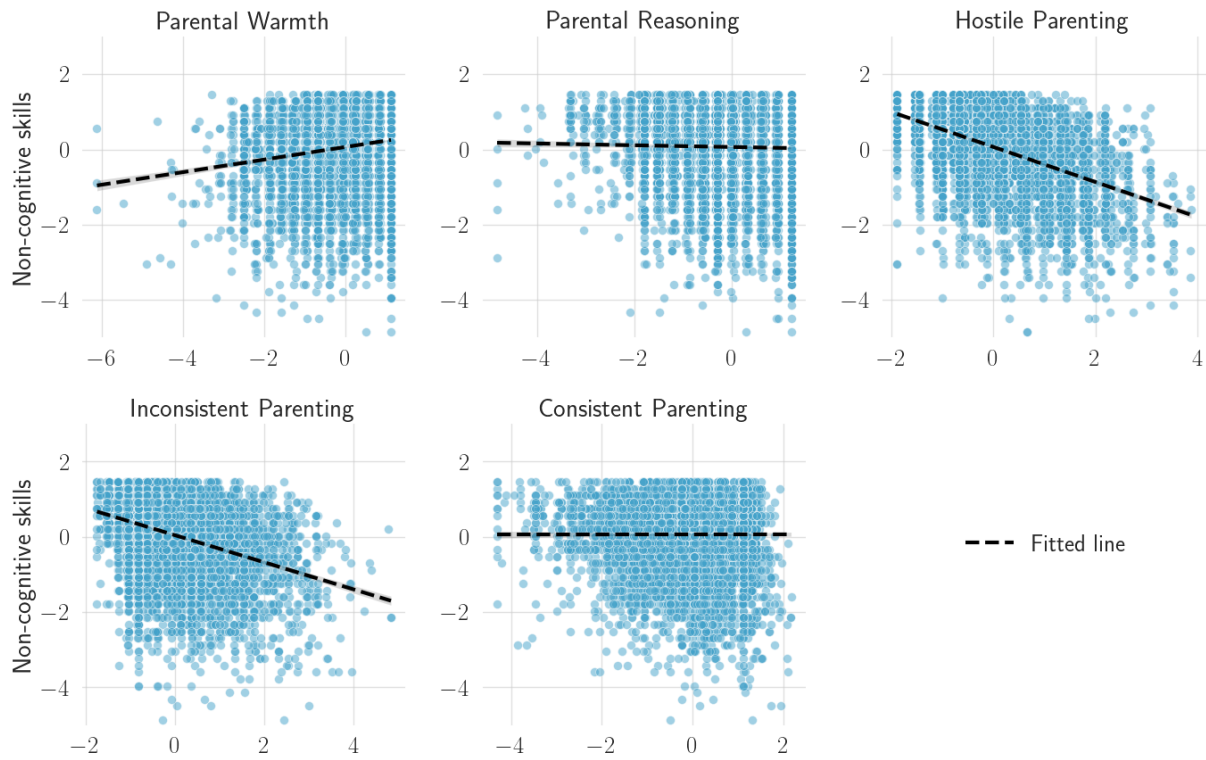
FIGURE 1: Correlation of parenting behaviours with non-cognitive skills

Note: The figure displays the relationship between non-cognitive skills (total SDQ score) and different parenting styles. Each data point represents a child from age group 8-9. In addition to the data points, a line is plotted on the graph, which represents the fitted values based on a linear regression. The slope is estimated using population weights.
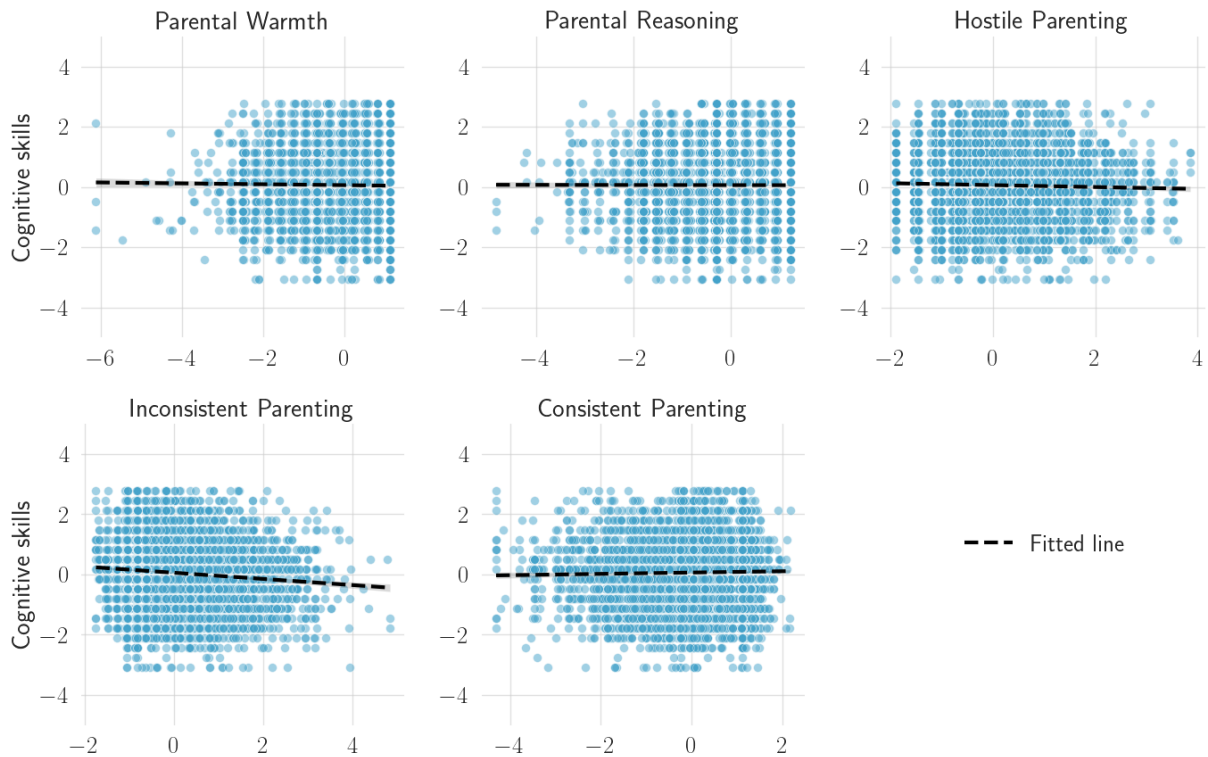
FIGURE 2: Correlation of parenting behaviours with cognitive skills

Note: The figure displays the relationship between cognitive skills (measured by the MRT) and different parenting styles. Each data point represents a child from age group 8-9. In addition to the data points, a line is plotted on the graph, which represents the fitted values based on a linear regression. The slope is estimated using population weights.
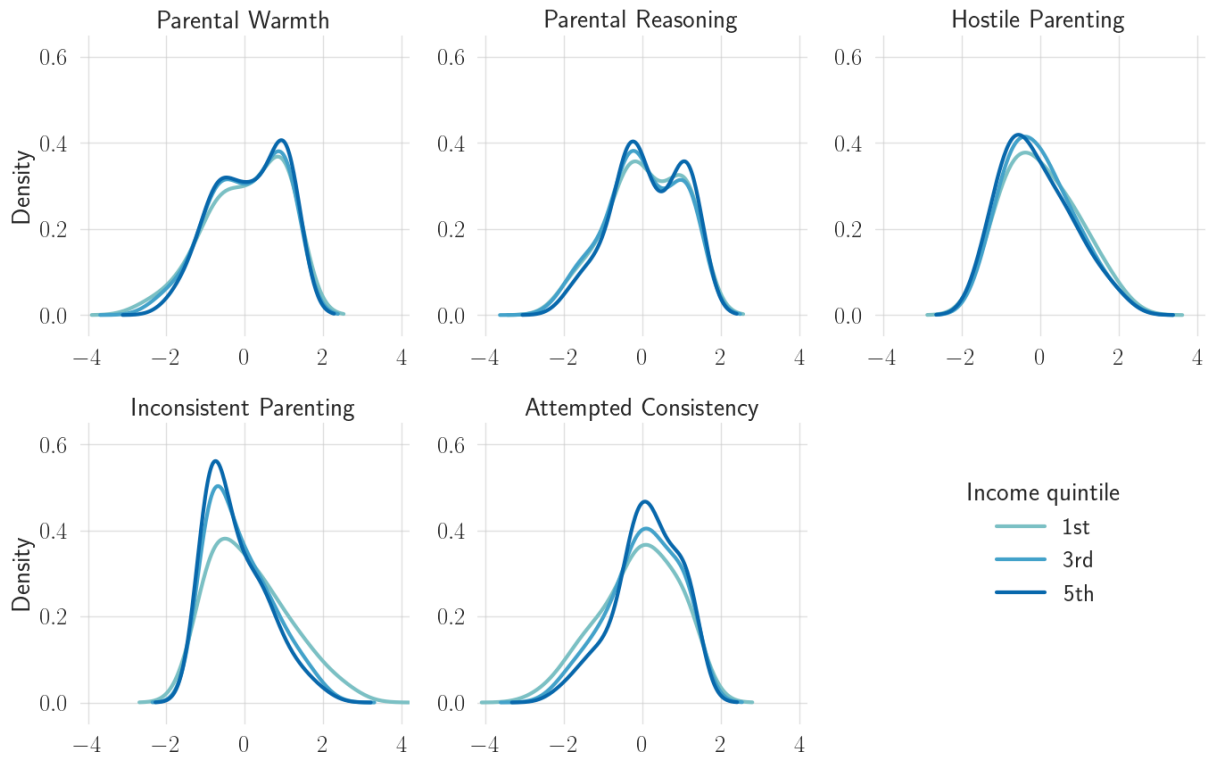
FIGURE 3: Distribution of parenting behaviours by household income

Note: The figure displays the empirical distribution (smoothed using the kernel function approach with population weights) of different parenting behaviours by income quintile for children aged 8-9.

33
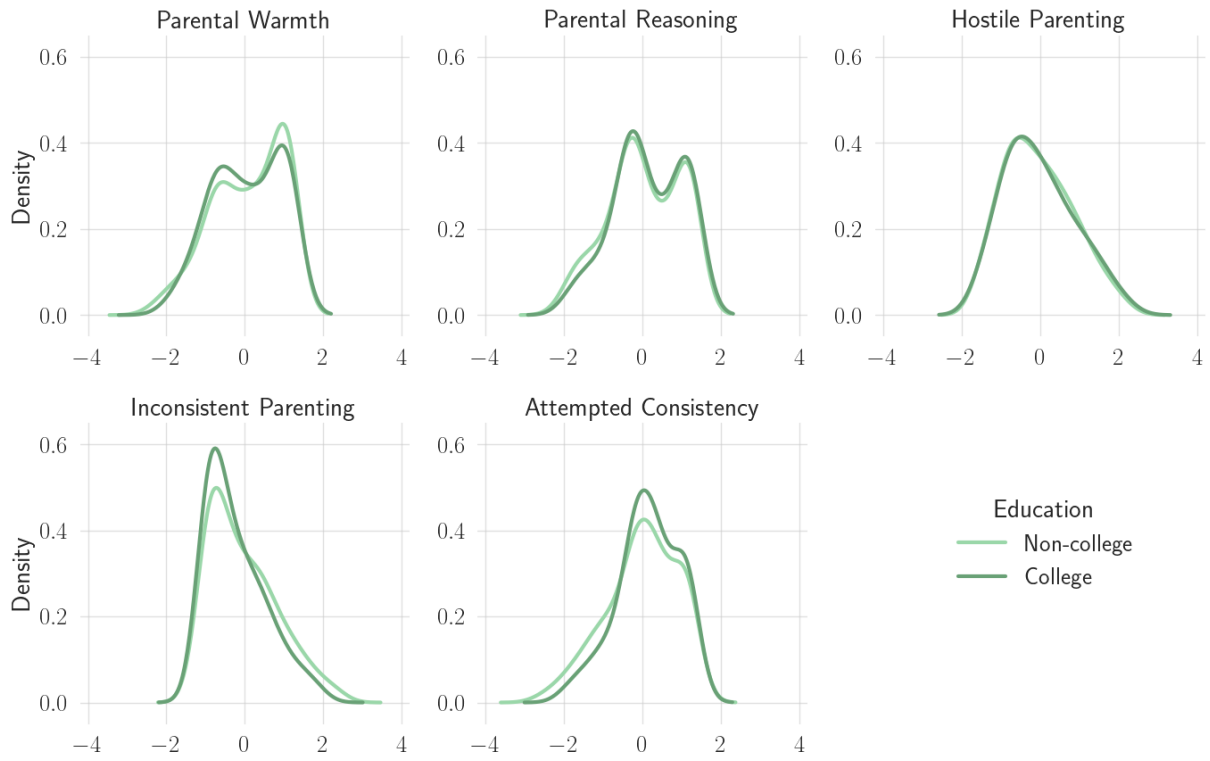
FIGURE 4: Distribution of parenting behaviours by primary caregiver's education

Note: The figure displays the empirical distribution (smoothed using the kernel function approach with population weights) of different parenting behaviours by primary caregiver's education for children aged 8-9.
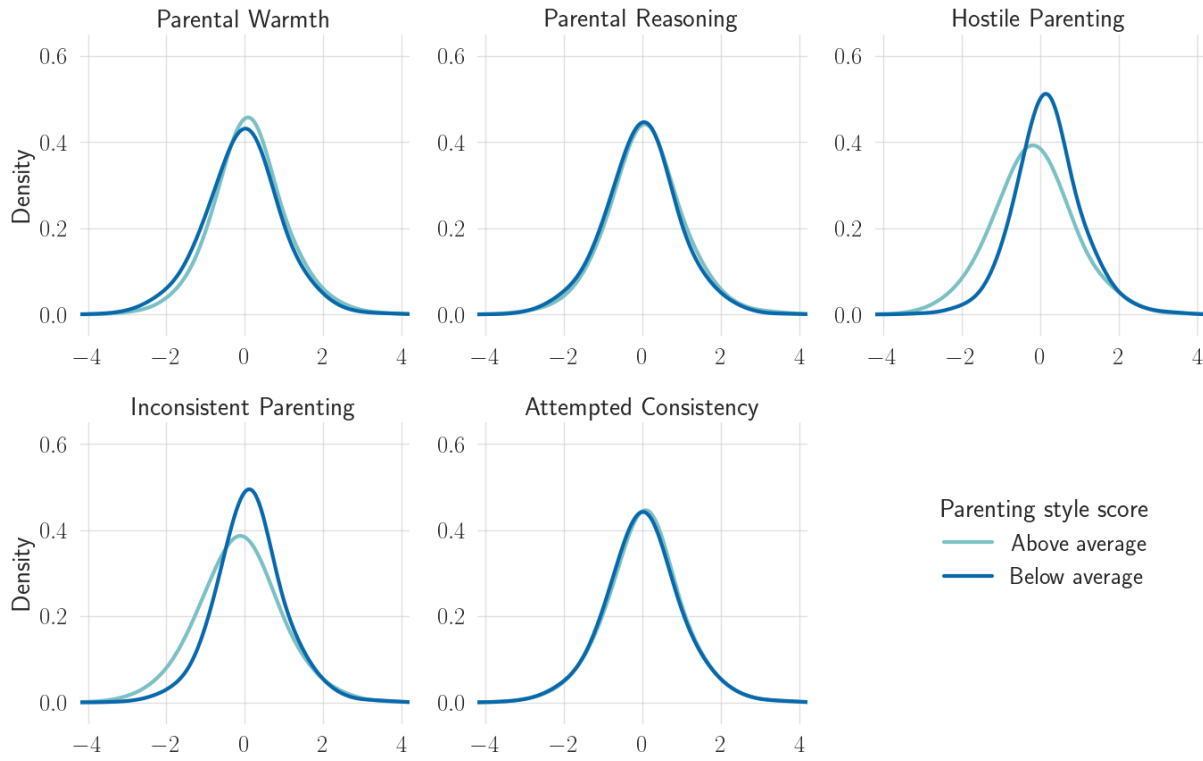
FIGURE 5: Distribution of teacher and parent-reported non-cognitive skills by parenting behaviour

Note: The figure displays the empirical distribution (smoothed using the kernel function approach with population weights) of reported non-cognitive skills by parenting behaviour for children aged 8-9.
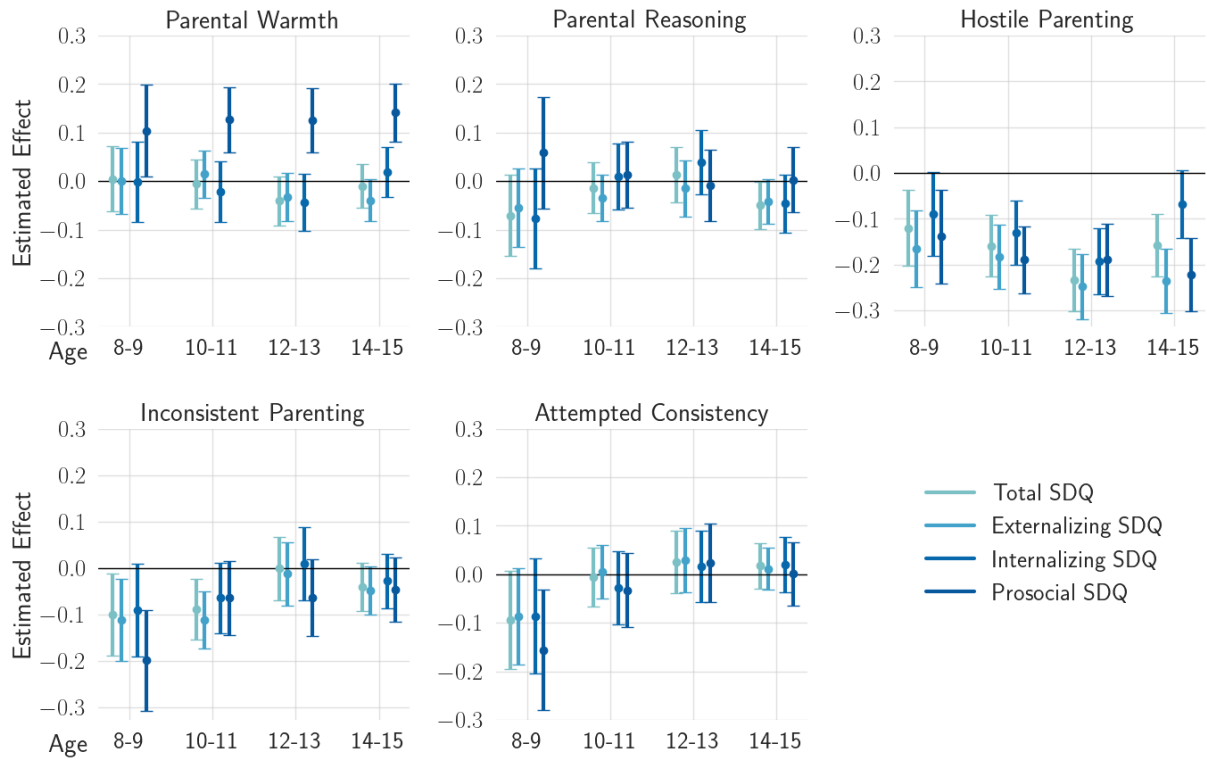
FIGURE 6: Impact of parenting style on total/external/internal/prosocial SDQ

Note: The figure presents estimated coefficients for the impact of five parenting styles on total, external, internal and prosocial skills measured by SDQ score using Blundel-Bond method. The range bars correspond to a 95% confidence interval for the estimated coefficients. The model specification for each of the four skill outcomes includes controls as the age of the primary caregiver, the number of siblings, the log of family income, and dummies for the college education of the primary caregiver, the presence of both biological parents at home, the gender of the study child, the indigenous status of the study child, the study child's cohort, and the day of data collection.
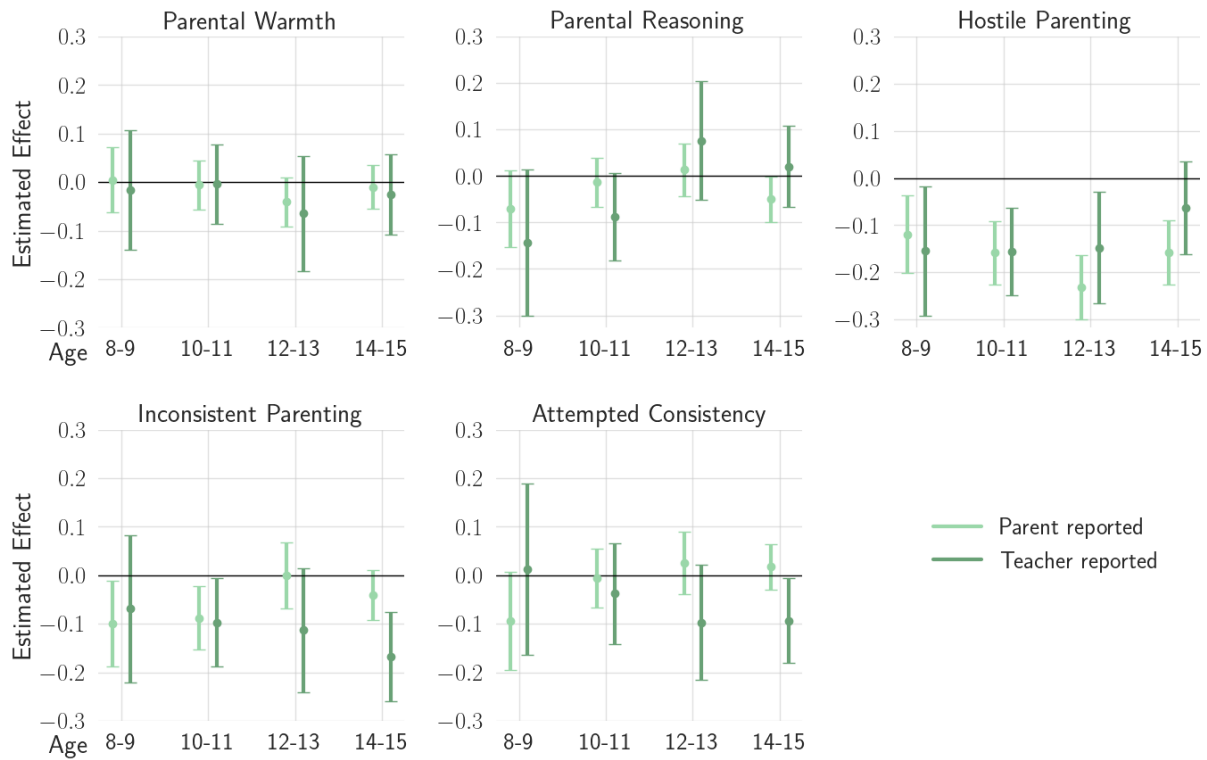
FIGURE 7: Impact of parenting style on total SDQ reported by parent vs teacher

Note: The figure presents estimated coefficients for the impact of five parenting behaviours on non-cognitive skills by parent and teacher reports using the Blundell-Bond method. The range bars correspond to a 95% confidence interval for the estimated coefficients. The model specification for the outcomes includes controls as the age of the primary caregiver, the number of siblings, the log of family income, and dummies for the college education of the primary caregiver, the presence of both biological parents at home, the gender of the study child, the indigenous status of the study child, the study child's cohort, and the day of data collection.

C Main Tables

TABLE 1: Description of non-cognitive skill dimensions in the LSAC

Dimension	Description
Externalizing skills:	
Conduct	Displays hot temper, fights, does not display obedience, lies or cheats, steals
Hyperactivity	Restless, overactive, constantly fidgeting, easily distracted, does not think before acting, low attention span
Internalizing skills:	
Peers	Plays alone, few good friends, not liked by other children, bullied, get better along with adults than children
Emotions	Complains about headaches or sickness, unhappy, worries a lot, nervous or clingy in new situations, fearful
Prosocial skills:	
Social	Kind to younger children, volunteers to help others, considerate of other people's feelings, shares with other children, helpful if someone is hurt/feeling ill or upset

TABLE 2: Description of parenting dimensions in the LSAC

Dimension	Description
Parental warmth	Parent shows affection with hugs, kisses and holds the child often, hugs the child without a reason, expresses happiness about child, has warm and close times with the child, enjoys listening to child and doing things with them, parent feels close to child when it is happy or upset
Parental hostility	Frequency with which parents react to child's behaviour with praise or disapproval, parents react with anger when punishing child, feel to have problems managing child
Parental consistency	Frequency of making sure child completes requests, punishment if child does not complete requests, how often child gets away with things which parents feel they should be punished for, child gets out of punishment or ignores it
Parental reasoning	Frequency with which parent explains why child gets corrected, reasons about misbehaviour and why rules should be obeyed, explains consequences of behaviour, emphasizes reasons for rules

TABLE 3: Rotated factor loadings for single factors

	Age:					
	4-5	6-7	8-9	10-11	12-13	14-15
Parental warmth:						
Expresses affection	**0.739**	**0.817**	**0.829**	**0.835**	**0.850**	**0.848**
Hugs child	**0.741**	**0.775**	**0.776**	**0.792**	**0.805**	**0.795**
Expresses happiness	**0.757**	**0.771**	**0.796**	**0.796**	**0.790**	**0.794**
Warm/close times together	**0.797**	**0.829**	**0.850**	**0.850**	**0.847**	**0.843**
Enjoy time together	**0.747**	**0.786**	**0.812**	**0.795**	**0.792**	**0.801**
Feels close to child	**0.753**	**0.796**	**0.796**	**0.803**	**0.800**	**0.793**
Parental hostility:						
Praise child	**-0.550**	**-0.555**	**-0.641**	**-0.649**	**-0.688**	**-0.711**
Disapproval	**0.731**	**0.754**	**0.763**	**0.780**	**0.805**	**0.804**
Angry when punishing	**0.673**	**0.678**	**0.659**	**0.692**	**0.676**	**0.682**
Having problems managing	**0.743**	**0.744**	**0.733**	**0.752**	**0.760**	**0.756**
Parental consistency: Factor 1						
Ensures requests complete	-0.053	-0.055	-0.035	-0.043	-0.031	-0.050
Punishes child	-0.245	-0.223	**-0.279**	**-0.263**	-0.232	-0.188
Child gets away	**0.779**	**0.771**	**0.774**	**0.802**	**0.805**	**0.828**
Child gets out of punishment	**0.804**	**0.800**	**0.815**	**0.809**	**0.816**	**0.824**
Child ignores punishment	**0.793**	**0.812**	**0.800**	**0.808**	**0.818**	**0.842**
Parental consistency: Factor 2						
Ensures requests complete		**0.847**	**0.860**	**0.864**	**0.853**	**0.838**
Punishes child		**0.779**	**0.750**	**0.771**	**0.778**	**0.787**
Child gets away		**-0.259**	**-0.259**	-0.204	-0.202	-0.166
Child gets out of punishment		-0.147	-0.124	-0.144	-0.123	-0.131
Child ignores punishment		-0.021	-0.038	-0.060	-0.035	-0.039
Parental inductive reasoning:						
Explains corrections	**0.870**	**0.887**	**0.881**	**0.887**	**0.897**	**0.904**
Reasons when misbehaves	**0.870**	**0.819**	**0.751**	**0.738**	**0.756**	**0.746**
Reasons for rules		**0.882**	**0.867**	**0.864**	**0.882**	**0.887**
Explains consequences			**0.892**	**0.896**	**0.913**	**0.906**
Emphasizes reasons			**0.888**	**0.894**	**0.905**	**0.907**

Note: Factor loadings larger than 0.25 in absolute value printed in bold. To summarize the variation of all measures, one factor was sufficient expect for parental consistency from age 6-7 onward. Eigenvalues of bigger than 1 indicated which factors to include in the analysis.

TABLE 4: Sample selection for the estimation

Characteristic	Full sample	Estimation sample	P-value
Child:			
Gender	0.487	0.489	0.533
Indigenous	0.035	0.026	0.000
Living with both parents	0.725	0.750	0.000
Born early	0.070	0.070	0.806
Older cohort (K)	0.510	0.547	0.000
Primary caregiver:			
Age	42.177	43.003	0.000
College education	0.280	0.305	0.000
Household:			
Number of children	1.625	1.561	0.000
Weekly income (in AUD)	2255.783	2386.055	0.000
Urban	0.861	0.859	0.311
Observations	30,350	20,368	

Note: For each characteristic, means of in-estimation and out-of-estimation samples are reported. The last column is the result of a non-parametric test for significance of difference between in-estimation and out-of-estimation samples for each characteristic.

TABLE 5: Demographic characteristics of the sample

	Age			
	8-9	10-11	12-13	14-15
Child:				
Gender	0.488	0.487	0.486	0.486
Age	8.339	10.385	12.459	14.385
Indigenous	0.040	0.038	0.032	0.032
Living with both parents	0.759	0.729	0.723	0.691
Born early	0.072	0.073	0.069	0.068
Older cohort (K)	0.510	0.510	0.510	0.510
Primary caregiver:				
Gender	0.979	0.979	0.979	0.979
Age	39.036	41.100	43.281	45.306
College education	0.274	0.273	0.285	0.287
Household:				
Number of children	1.660	1.655	1.632	1.555
Weekly income (in AUD)	1,917	2,028	2,212	2,257
Urban	0.860	0.861	0.858	0.866
Observations	8,416	7,933	7,337	6,664

Note: All means calculated using population weights.

TABLE 6: Estimated parameters of the nominal and absolute difference between parent- and teacher-reported measures

| | Total SDQ | | Total school performance | |
	Nominal diff.	Absolute diff.	Nominal diff.	Absolute diff.
Parental warmth	0.015	-0.021**	0.001	0.013
	(0.012)	(0.009)	(0.036)	(0.020)
Parental reasoning	-0.006	0.015**	0.031	0.018
	(0.010)	(0.007)	(0.029)	(0.016)
Hostile parenting	-0.118***	0.038***	-0.052	-0.015
	(0.012)	(0.009)	(0.033)	(0.018)
Inconsistent parenting	-0.060***	0.026***	0.048	-0.011
	(0.011)	(0.008)	(0.034)	(0.018)
Attempted consistency	0.017*	-0.001	-0.044	-0.012
	(0.009)	(0.007)	(0.027)	(0.014)
Educational time parents	0.004	0.002	0.010	-0.008
	(0.007)	(0.005)	(0.019)	(0.010)
Educational time others	0.000	0.000	-0.000	-0.019*
	(0.007)	(0.005)	(0.020)	(0.011)
Care time parents	-0.005	-0.006	-0.004	-0.014
	(0.007)	(0.005)	(0.020)	(0.011)
Care time others	0.012*	0.001	0.006	-0.009
	(0.007)	(0.005)	(0.020)	(0.011)
Observations	20460	20460	8184	8184

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 7: Estimated parameters of production function for non-cognitive skills

	Effect at age			
	8-9	10-11	12-13	14-15
Parental warmth	0.004	-0.006	-0.041	-0.010
	(0.034)	(0.026)	(0.026)	(0.023)
Parental reasoning	-0.071*	-0.014	0.013	-0.050**
	(0.042)	(0.027)	(0.029)	(0.025)
Hostile parenting	-0.120***	-0.159***	-0.233***	-0.158***
	(0.042)	(0.034)	(0.035)	(0.035)
Inconsistent parenting	-0.100**	-0.088***	-0.001	-0.041
	(0.045)	(0.033)	(0.035)	(0.027)
Attempted consistency	-0.095*	-0.006	0.026	0.017
	(0.052)	(0.031)	(0.033)	(0.024)
Observations	2635	6469	5879	5385

Note: All parameters are obtained from a single regression. Standard errors are shown in parentheses. The employed specification includes various controls: time investments, such as educational time spent with parents and others, care time spent with parents and others, the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test). For remaining list of estimates check Table 47.

TABLE 8: Estimated parameters of production function for externalizing skills

	Effect at age			
	8-9	10-11	12-13	14-15
Parental warmth	-0.000	0.014	-0.032	-0.040*
	(0.035)	(0.025)	(0.025)	(0.022)
Parental reasoning	-0.055	-0.035	-0.015	-0.042*
	(0.042)	(0.024)	(0.029)	(0.023)
Hostile parenting	-0.166***	-0.182***	-0.248***	-0.235***
	(0.043)	(0.036)	(0.036)	(0.035)
Inconsistent parenting	-0.111**	-0.111***	-0.012	-0.049*
	(0.045)	(0.031)	(0.035)	(0.026)
Attempted consistency	-0.087*	0.005	0.029	0.011
	(0.051)	(0.028)	(0.033)	(0.022)
Educational time parents	0.069	-0.067	0.096	-0.019
	(0.049)	(0.122)	(0.132)	(0.074)
Educational time others	0.012	0.129	0.195	0.038
	(0.100)	(0.200)	(0.169)	(0.202)
Care time parents	-0.019	-0.005	0.077	0.141*
	(0.051)	(0.212)	(0.087)	(0.072)
Care time others	-0.048	-0.070	-0.012	-0.205
	(0.134)	(0.126)	(0.162)	(0.130)
Observations	2637	6473	5880	5385

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 9: Estimated parameters of production function for internalizing skills

	Effect at age			
	8-9	10-11	12-13	14-15
Parental warmth	-0.002	-0.022	-0.044	0.019
	(0.042)	(0.032)	(0.030)	(0.027)
Parental reasoning	-0.076	0.010	0.039	-0.046
	(0.053)	(0.035)	(0.034)	(0.030)
Hostile parenting	-0.090*	-0.130***	-0.193***	-0.068*
	(0.047)	(0.036)	(0.037)	(0.037)
Inconsistent parenting	-0.090*	-0.064*	0.010	-0.028
	(0.051)	(0.039)	(0.040)	(0.030)
Attempted consistency	-0.087	-0.028	0.017	0.019
	(0.061)	(0.039)	(0.038)	(0.029)
Educational time parents	0.048	-0.135	0.012	0.046
	(0.063)	(0.169)	(0.145)	(0.098)
Educational time others	-0.080	0.229	0.191	0.217
	(0.143)	(0.243)	(0.200)	(0.295)
Care time parents	-0.026	-0.275	0.127	0.194**
	(0.065)	(0.271)	(0.096)	(0.083)
Care time others	0.064	-0.307*	0.225	-0.107
	(0.170)	(0.184)	(0.184)	(0.169)
Observations	2636	6471	5880	5386

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 10: Estimated parameters of production function for prosocial skills

	Effect at age			
	8-9	10-11	12-13	14-15
Parental warmth	0.104**	0.127***	0.125***	0.141***
	(0.048)	(0.034)	(0.034)	(0.031)
Parental reasoning	0.058	0.013	-0.010	0.003
	(0.059)	(0.035)	(0.038)	(0.034)
Hostile parenting	-0.139***	-0.189***	-0.190***	-0.222***
	(0.052)	(0.037)	(0.040)	(0.041)
Inconsistent parenting	-0.199***	-0.064	-0.064	-0.046
	(0.055)	(0.041)	(0.042)	(0.035)
Attempted consistency	-0.156**	-0.033	0.023	0.001
	(0.063)	(0.039)	(0.041)	(0.033)
Educational time parents	-0.031	-0.184	0.109	0.006
	(0.057)	(0.156)	(0.165)	(0.108)
Educational time others	0.133***	0.126	-0.177	0.469
	(0.040)	(0.205)	(0.247)	(0.299)
Care time parents	0.065	-0.201	-0.036	-0.107
	(0.070)	(0.309)	(0.105)	(0.100)
Care time others	-0.064	0.032	-0.202	-0.101
	(0.141)	(0.196)	(0.217)	(0.169)
Observations	2638	6475	5881	5386

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 11: Estimated parameters of production function for cognitive skills (matrix reasoning and vocabulary tests)

	Matrix reasoning	Vocabulary test
Parental warmth	-0.034***	-0.033**
	(0.012)	(0.015)
Parental reasoning	0.009	0.013
	(0.011)	(0.014)
Hostile parenting	-0.006	0.009
	(0.012)	(0.015)
Inconsistent parenting	-0.069***	-0.067***
	(0.012)	(0.015)
Attempted consistency	-0.003	0.011
	(0.010)	(0.013)
Educational time parents	0.009	0.054***
	(0.009)	(0.013)
Educational time others	0.005	-0.001
	(0.007)	(0.014)
Care time parents	0.016*	-0.001
	(0.009)	(0.013)
Care time others	0.027***	-0.004
	(0.009)	(0.014)
Observations	9714	2607

Note: All parameters are obtained from a single regression. Estimation for matrix reasoning uses sample of children 8-9 and 10-11, while estimation for vocabulary tests uses sample of children aged 6-7 and 8-9. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 12: Estimated parameters of production function for cognitive skills (reported school performance)

	Effect at age		
	10-11	12-13	14-15
Parental warmth	-0.050	-0.051	-0.010
	(0.033)	(0.038)	(0.031)
Parental reasoning	0.034	0.008	-0.033
	(0.040)	(0.045)	(0.038)
Hostile parenting	-0.089**	-0.102**	-0.072
	(0.039)	(0.046)	(0.044)
Inconsistent parenting	-0.090**	-0.136***	-0.136***
	(0.043)	(0.053)	(0.038)
Attempted consistency	-0.016	-0.034	-0.060*
	(0.042)	(0.053)	(0.035)
Educational time parents	0.058	0.352	0.145
	(0.178)	(0.256)	(0.141)
Educational time others	-0.109	0.414	0.302
	(0.300)	(0.283)	(0.374)
Care time parents	0.293	0.216*	0.307***
	(0.269)	(0.128)	(0.118)
Care time others	-0.092	-0.394	-0.295
	(0.187)	(0.319)	(0.248)
Observations	6872	6160	5346

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 13: Estimated parameters of production function for cognitive skills (reported math performance)

	Effect at age	
	10-11	12-13
Parental warmth	-0.077**	-0.103***
	(0.034)	(0.034)
Parental reasoning	0.006	0.011
	(0.040)	(0.039)
Hostile parenting	-0.122***	-0.128***
	(0.039)	(0.040)
Inconsistent parenting	-0.008	-0.039
	(0.044)	(0.052)
Attempted consistency	0.028	0.051
	(0.045)	(0.051)
Educational time parents	-0.044	0.045
	(0.161)	(0.256)
Educational time others	-0.235	0.260
	(0.276)	(0.378)
Care time parents	0.144	0.305
	(0.271)	(0.217)
Care time others	0.091	-0.415
	(0.172)	(0.279)
Observations	6741	6022

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 14: Estimated parameters of production function for cognitive skills (reported reading performance)

	Effect at age	
	10-11	12-13
Parental warmth	-0.035	-0.058
	(0.049)	(0.040)
Parental reasoning	0.066	0.128***
	(0.050)	(0.044)
Hostile parenting	-0.049	-0.124***
	(0.053)	(0.045)
Inconsistent parenting	-0.128**	-0.169***
	(0.057)	(0.059)
Attempted consistency	-0.079	-0.128**
	(0.057)	(0.059)
Educational time parents	0.103	-0.286
	(0.213)	(0.309)
Educational time others	-0.572	-0.040
	(0.378)	(0.483)
Care time parents	-0.474	-0.045
	(0.411)	(0.255)
Care time others	-0.010	-0.442
	(0.218)	(0.304)
Observations	6778	5986

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 15: Estimated parameters of production function for non-cognitive skills among boys

	Effect at age			
	8-9	10-11	12-13	14-15
Parental warmth	0.040	-0.007	-0.020	0.010
	(0.048)	(0.033)	(0.041)	(0.031)
Parental reasoning	-0.153**	-0.010	0.032	-0.080**
	(0.065)	(0.044)	(0.042)	(0.037)
Hostile parenting	-0.116**	-0.166***	-0.245***	-0.171***
	(0.058)	(0.043)	(0.048)	(0.046)
Inconsistent parenting	-0.110*	-0.071	0.012	-0.008
	(0.065)	(0.049)	(0.049)	(0.039)
Attempted consistency	-0.057	-0.026	-0.011	0.039
	(0.084)	(0.049)	(0.052)	(0.035)
Educational time parents	0.107	-0.112	0.045	-0.031
	(0.075)	(0.198)	(0.154)	(0.077)
Educational time others	0.067	0.220	0.393	-0.127
	(0.100)	(0.224)	(0.386)	(0.188)
Care time parents	-0.027	0.138	0.038	0.145*
	(0.065)	(0.353)	(0.122)	(0.078)
Care time others	-0.057	0.105	-0.045	-0.090
	(0.155)	(0.175)	(0.157)	(0.235)
Observations	1343	3298	2980	2725

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 16: Estimated parameters of production function for non-cognitive skills among girls

	Effect at age			
	8-9	10-11	12-13	14-15
Parental warmth	-0.028	0.024	-0.030	-0.025
	(0.055)	(0.039)	(0.038)	(0.035)
Parental reasoning	0.007	-0.018	0.006	-0.043
	(0.064)	(0.037)	(0.041)	(0.036)
Hostile parenting	-0.103	-0.103*	-0.193***	-0.140***
	(0.065)	(0.059)	(0.052)	(0.048)
Inconsistent parenting	-0.073	-0.081	-0.020	-0.063
	(0.067)	(0.050)	(0.051)	(0.040)
Attempted consistency	-0.093	0.023	0.037	0.017
	(0.067)	(0.040)	(0.048)	(0.033)
Educational time parents	0.056	0.081	0.011	0.024
	(0.083)	(0.203)	(0.194)	(0.118)
Educational time others	-0.239	0.020	0.067	0.071
	(0.222)	(0.329)	(0.155)	(0.212)
Care time parents	-0.093	-0.062	0.111	0.198*
	(0.097)	(0.222)	(0.111)	(0.118)
Care time others	0.212	-0.267	0.269	-0.117
	(0.167)	(0.226)	(0.215)	(0.115)
Observations	1292	3171	2899	2660

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 17: Estimated parameters of production function for cognitive skills (matrix reasoning and vocabulary tests) - male

	Matrix reasoning	Vocabulary test
Parental warmth	-0.038**	-0.036*
	(0.017)	(0.021)
Parental reasoning	0.021	0.017
	(0.015)	(0.021)
Hostile parenting	-0.010	0.019
	(0.016)	(0.020)
Inconsistent parenting	-0.057***	-0.066***
	(0.016)	(0.022)
Attempted consistency	-0.010	-0.002
	(0.014)	(0.019)
Educational time parents	0.008	0.074***
	(0.013)	(0.019)
Educational time others	0.010	0.028
	(0.010)	(0.017)
Care time parents	0.009	-0.013
	(0.012)	(0.018)
Care time others	0.026*	0.001
	(0.014)	(0.020)
Observations	4947	1322

Note: All parameters are obtained from a single regression. Estimation for matrix reasoning uses sample of children 8-9 and 10-11, while estimation for vocabulary tests uses sample of children aged 6-7 and 8-9. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 18: Estimated parameters of production function for cognitive skills (matrix reasoning and vocabulary tests) - female

	Matrix reasoning	Vocabulary test
Parental warmth	-0.032*	-0.026
	(0.017)	(0.022)
Parental reasoning	-0.001	0.012
	(0.015)	(0.020)
Hostile parenting	0.006	-0.013
	(0.017)	(0.022)
Inconsistent parenting	-0.082***	-0.074***
	(0.017)	(0.022)
Attempted consistency	0.007	0.023
	(0.013)	(0.017)
Educational time parents	0.010	0.035**
	(0.013)	(0.017)
Educational time others	0.002	-0.038**
	(0.010)	(0.016)
Care time parents	0.021	0.011
	(0.013)	(0.018)
Care time others	0.027**	0.001
	(0.012)	(0.020)
Observations	4767	2635

Note: All parameters are obtained from a single regression. Estimation for matrix reasoning uses sample of children 8-9 and 10-11, while estimation for vocabulary tests uses sample of children aged 6-7 and 8-9. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 19: Estimated parameters of production function for cognitive skills (reported school performance) - male

	Effect at age		
	10-11	12-13	14-15
Parental warmth	-0.056	-0.002	-0.030
	(0.045)	(0.049)	(0.057)
Parental reasoning	0.037	0.062	-0.012
	(0.058)	(0.065)	(0.061)
Hostile parenting	-0.063	-0.037	0.009
	(0.052)	(0.059)	(0.072)
Inconsistent parenting	-0.084	-0.222***	-0.217***
	(0.067)	(0.070)	(0.071)
Attempted consistency	-0.008	-0.105	-0.091
	(0.067)	(0.073)	(0.061)
Educational time parents	0.278	-0.052	0.203
	(0.243)	(0.263)	(0.158)
Educational time others	0.022	0.316	0.008
	(0.244)	(0.374)	(0.331)
Care time parents	0.110	0.198	0.343**
	(0.467)	(0.160)	(0.168)
Care time others	-0.172	-0.278	-0.749
	(0.265)	(0.223)	(0.461)
Observations	3509	3125	2703

Note: The employed specification includes controls as the age of the primary caregiver, the number of siblings, the log of family income, and dummies for the college education of the primary caregiver, the presence of both biological parents at home, the gender of the study child, the indigenous status of the study child, the study child's cohort, and the day of data collection.

TABLE 20: Estimated parameters of production function for cognitive skills (reported school performance) - female

	Effect at age		
	10-11	12-13	14-15
Parental warmth	0.024	-0.053	0.024
	(0.054)	(0.055)	(0.046)
Parental reasoning	0.002	0.022	-0.075
	(0.048)	(0.063)	(0.046)
Hostile parenting	-0.096	-0.122*	-0.097*
	(0.074)	(0.069)	(0.056)
Inconsistent parenting	-0.092	-0.085	-0.090*
	(0.063)	(0.076)	(0.048)
Attempted consistency	0.011	-0.000	0.030
	(0.052)	(0.078)	(0.041)
Educational time parents	-0.306	0.245	-0.093
	(0.287)	(0.304)	(0.198)
Educational time others	0.208	0.213	0.361
	(0.375)	(0.271)	(0.259)
Care time parents	-0.006	0.065	0.109
	(0.316)	(0.177)	(0.153)
Care time others	-0.236	0.311	-0.122
	(0.289)	(0.317)	(0.184)
Observations	3363	3035	2643

Note: The employed specification includes controls as the age of the primary caregiver, the number of siblings, the log of family income, and dummies for the college education of the primary caregiver, the presence of both biological parents at home, the gender of the study child, the indigenous status of the study child, the study child's cohort, and the day of data collection.

TABLE 21: Estimated parameters of production function for cognitive skills (reported math performance) - male

	Effect at age	
	10-11	12-13
Parental warmth	-0.067	-0.068
	(0.048)	(0.051)
Parental reasoning	0.077	0.058
	(0.059)	(0.075)
Hostile parenting	-0.130**	-0.096*
	(0.053)	(0.057)
Inconsistent parenting	0.015	-0.165**
	(0.073)	(0.078)
Attempted consistency	0.007	-0.026
	(0.075)	(0.070)
Educational time parents	-0.174	-0.609
	(0.197)	(0.487)
Educational time others	0.137	0.178
	(0.244)	(0.775)
Care time parents	0.336	-0.107
	(0.384)	(0.306)
Care time others	0.025	0.029
	(0.199)	(0.315)
Observations	3446	3060

Note: The employed specification includes controls as the age of the primary caregiver, the number of siblings, the log of family income, and dummies for the college education of the primary caregiver, the presence of both biological parents at home, the gender of the study child, the indigenous status of the study child, the study child's cohort, and the day of data collection.

TABLE 22: Estimated parameters of production function for cognitive skills (reported math performance) - female

	Effect at age	
	10-11	12-13
Parental warmth	-0.068	-0.095
	(0.061)	(0.063)
Parental reasoning	-0.035	0.056
	(0.068)	(0.065)
Hostile parenting	-0.109	-0.075
	(0.083)	(0.069)
Inconsistent parenting	-0.070	-0.069
	(0.067)	(0.078)
Attempted consistency	-0.050	-0.039
	(0.060)	(0.083)
Educational time parents	0.048	-0.023
	(0.269)	(0.389)
Educational time others	-0.536	-0.113
	(0.454)	(0.344)
Care time parents	-0.025	0.509
	(0.334)	(0.359)
Care time others	0.400	0.176
	(0.250)	(0.361)
Observations	3295	2962

Note: The employed specification includes controls as the age of the primary caregiver, the number of siblings, the log of family income, and dummies for the college education of the primary caregiver, the presence of both biological parents at home, the gender of the study child, the indigenous status of the study child, the study child's cohort, and the day of data collection.

TABLE 23: Estimated parameters of production function for cognitive skills (reported math performance) - male

	Effect at age	
	10-11	12-13
Parental warmth	-0.086	-0.073
	(0.078)	(0.060)
Parental reasoning	0.122	0.184**
	(0.080)	(0.089)
Hostile parenting	-0.083	-0.124*
	(0.085)	(0.068)
Inconsistent parenting	-0.155	-0.194**
	(0.095)	(0.089)
Attempted consistency	-0.140	-0.140*
	(0.093)	(0.084)
Educational time parents	0.063	-0.323
	(0.297)	(0.529)
Educational time others	-0.025	0.259
	(0.152)	(1.138)
Care time parents	-0.603	-0.491
	(0.737)	(0.324)
Care time others	-0.128	0.044
	(0.206)	(0.518)
Observations	3457	3032

Note: The employed specification includes controls as the age of the primary caregiver, the number of siblings, the log of family income, and dummies for the college education of the primary caregiver, the presence of both biological parents at home, the gender of the study child, the indigenous status of the study child, the study child's cohort, and the day of data collection.

TABLE 24: Estimated parameters of production function for cognitive skills (reported math performance) - female

	Effect at age	
	10-11	12-13
Parental warmth	-0.030	-0.069
	(0.058)	(0.066)
Parental reasoning	-0.041	0.085
	(0.058)	(0.058)
Hostile parenting	-0.035	-0.024
	(0.082)	(0.064)
Inconsistent parenting	-0.067	-0.215***
	(0.061)	(0.076)
Attempted consistency	0.008	-0.135*
	(0.054)	(0.072)
Educational time parents	0.137	-0.416
	(0.233)	(0.297)
Educational time others	-0.222	0.299
	(0.405)	(0.358)
Care time parents	0.148	0.332
	(0.318)	(0.296)
Care time others	0.019	-0.236
	(0.275)	(0.372)
Observations	3321	2954

Note: The employed specification includes controls as the age of the primary caregiver, the number of siblings, the log of family income, and dummies for the college education of the primary caregiver, the presence of both biological parents at home, the gender of the study child, the indigenous status of the study child, the study child's cohort, and the day of data collection.

TABLE 25: Remaining estimated parameters of production function for non-cognitive skills - teachers-reported

	Effect at age			
	8-9	10-11	12-13	14-15
Parental warmth	-0.016	-0.004	-0.065	-0.025
	(0.063)	(0.042)	(0.061)	(0.042)
Parental reasoning	-0.144*	-0.088*	0.076	0.021
	(0.080)	(0.048)	(0.065)	(0.045)
Hostile parenting	-0.155**	-0.156***	-0.148**	-0.064
	(0.070)	(0.047)	(0.060)	(0.050)
Inconsistent parenting	-0.069	-0.097**	-0.113*	-0.167***
	(0.077)	(0.046)	(0.065)	(0.047)
Attempted consistency	0.012	-0.038	-0.098	-0.094**
	(0.090)	(0.053)	(0.060)	(0.045)
Educational time parents	0.109	-0.084	-0.450	0.148
	(0.112)	(0.178)	(0.314)	(0.222)
Educational time others	-0.113	0.170	0.124	-0.122
	(0.156)	(0.262)	(0.426)	(0.280)
Care time parents	-0.064	-0.109	0.011	-0.010
	(0.106)	(0.340)	(0.170)	(0.139)
Care time others	0.287	-0.078	0.423	-0.182
	(0.359)	(0.189)	(0.345)	(0.230)
Observations	1367	4185	3630	2859

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 26: Comparison of parent and teacher samples

Characteristic	Parents sample	Teacher sample	P-value
Child:			
Gender	0.498	0.489	0.081
Indigenous	0.026	0.026	0.874
Living with both parents	0.765	0.750	0.001
Born early	0.066	0.070	0.134
Older cohort (K)	0.562	0.547	0.003
Primary caregiver:			
Age	42.954	43.003	0.401
College education	0.314	0.305	0.045
Household:			
Number of children	1.559	1.561	0.834
Weekly income (in AUD)	2415.675	2386.055	0.088
Urban	0.851	0.859	0.030
Observations	20,368	12,041	

Note: For each characteristic, means of in-estimation and out-of-estimation samples are reported. The last column is the result of a non-parametric test for significance of difference between in-estimation and out-of-estimation samples for each characteristic.

TABLE 27: Estimated parameters of production function for non-cognitive skills without IV

	Effect at age			
	8-9	10-11	12-13	14-15
Parental warmth	0.015	0.020**	0.028***	0.026**
	(0.015)	(0.009)	(0.010)	(0.010)
Parental reasoning	-0.042***	-0.035***	-0.028***	-0.044***
	(0.013)	(0.008)	(0.008)	(0.008)
Hostile parenting	-0.204***	-0.196***	-0.207***	-0.169***
	(0.016)	(0.011)	(0.013)	(0.013)
Inconsistent parenting	-0.058***	-0.082***	-0.056***	-0.093***
	(0.016)	(0.010)	(0.010)	(0.012)
Attempted consistency	-0.016	0.000	0.005	0.016**
	(0.012)	(0.007)	(0.007)	(0.008)
Educational time parents	0.006	-0.003	-0.002	0.011
	(0.011)	(0.008)	(0.008)	(0.007)
Educational time others	-0.007	0.005	-0.007	-0.008
	(0.010)	(0.007)	(0.006)	(0.008)
Care time parents	-0.012	-0.009	0.001	0.000
	(0.012)	(0.007)	(0.008)	(0.008)
Care time others	-0.005	0.016**	0.004	-0.006
	(0.015)	(0.008)	(0.007)	(0.007)
Observations	2635	6469	5879	5385

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 28: Estimated parameters of production function for non-cognitive skills (teacher reported) without IV

	Effect at age			
	8-9	10-11	12-13	14-15
Parental warmth	0.012	0.009	0.025	0.026
	(0.025)	(0.015)	(0.016)	(0.018)
Parental reasoning	-0.026	-0.049***	-0.039***	-0.032**
	(0.021)	(0.013)	(0.014)	(0.015)
Hostile parenting	-0.113***	-0.146***	-0.095***	-0.093***
	(0.025)	(0.016)	(0.019)	(0.021)
Inconsistent parenting	-0.028	0.002	-0.036**	-0.056***
	(0.025)	(0.015)	(0.017)	(0.020)
Attempted consistency	0.003	0.012	-0.002	-0.008
	(0.019)	(0.012)	(0.013)	(0.014)
Educational time parents	0.008	0.006	0.002	0.017
	(0.021)	(0.011)	(0.012)	(0.011)
Educational time others	0.004	0.008	-0.006	-0.018
	(0.019)	(0.009)	(0.013)	(0.015)
Care time parents	-0.009	0.009	0.003	-0.000
	(0.019)	(0.011)	(0.013)	(0.015)
Care time others	0.036	0.016	-0.026*	-0.019
	(0.023)	(0.010)	(0.014)	(0.018)
Observations	1367	4185	3630	2859

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 29: Estimated parameters of production function for cognitive skills (reported school performance) without IV

	Effect at age		
	10-11	12-13	14-15
Parental warmth	0.020*	0.028**	0.050***
	(0.012)	(0.013)	(0.013)
Parental reasoning	-0.013	-0.026**	-0.051***
	(0.011)	(0.012)	(0.011)
Hostile parenting	-0.103***	-0.143***	-0.115***
	(0.012)	(0.014)	(0.014)
Inconsistent parenting	-0.004	-0.042***	-0.065***
	(0.012)	(0.013)	(0.013)
Attempted consistency	0.015	0.003	-0.000
	(0.011)	(0.011)	(0.011)
Educational time parents	-0.011	0.010	-0.014
	(0.009)	(0.010)	(0.009)
Educational time others	0.002	-0.001	-0.002
	(0.009)	(0.013)	(0.009)
Care time parents	-0.021**	0.006	0.023**
	(0.010)	(0.010)	(0.010)
Care time others	0.007	0.000	-0.015
	(0.010)	(0.009)	(0.011)
Observations	6872	6160	5346

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 30: Estimated parameters of production function for cognitive skills (matrix reasoning and vocabulary tests) with IV

	Matrix reasoning	Vocabulary test
Parental warmth	0.290	-0.155
	(0.178)	(0.361)
Parental reasoning	-0.306	0.126
	(0.242)	(0.355)
Hostile parenting	0.273	-0.134
	(0.224)	(0.397)
Inconsistent parenting	-0.267	0.017
	(0.198)	(0.232)
Attempted consistency	0.025	0.042
	(0.202)	(0.334)
Educational time parents	0.100	0.039
	(0.108)	(0.209)
Educational time others	0.029	0.105
	(0.206)	(0.158)
Care time parents	-0.072	0.080
	(0.107)	(0.177)
Care time others	0.310	-0.021
	(0.285)	(0.343)
Observations	9714	2607

Note: All parameters are obtained from a single regression. Estimation for matrix reasoning uses sample of children 8-9 and 10-11, while estimation for vocabulary tests uses sample of children aged 6-7 and 8-9. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 31: Estimated parameters of production function for non-cognitive skills without time investments

	Effect at age			
	8-9	10-11	12-13	14-15
Parental warmth	-0.067***	-0.005	-0.034	-0.004
	(0.022)	(0.022)	(0.023)	(0.019)
Parental reasoning	-0.001	-0.000	0.027	-0.054***
	(0.028)	(0.025)	(0.025)	(0.021)
Hostile parenting	-0.193***	-0.138***	-0.235***	-0.167***
	(0.026)	(0.028)	(0.029)	(0.029)
Inconsistent parenting	-0.055**	-0.095***	-0.013	-0.051**
	(0.026)	(0.024)	(0.027)	(0.024)
Attempted consistency	-0.076**	-0.029	0.004	0.018
	(0.033)	(0.029)	(0.028)	(0.020)
Observations	6764	6769	6263	5948

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 32: Estimated parameters of production function for cognitive skills (matrix reasoning and vocabulary tests) without time investments

	Matrix reasoning	Vocabulary test
Parental warmth	-0.032***	-0.034***
	(0.010)	(0.009)
Parental reasoning	0.013	0.038***
	(0.009)	(0.009)
Hostile parenting	0.003	0.003
	(0.010)	(0.009)
Inconsistent parenting	-0.068***	-0.073***
	(0.009)	(0.009)
Attempted consistency	0.003	0.030***
	(0.008)	(0.008)
Observations	14511	7160

Note: All parameters are obtained from a single regression. Estimation for matrix reasoning uses sample of children 8-9 and 10-11, while estimation for vocabulary tests uses sample of children aged 6-7 and 8-9. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 33: Estimated parameters of production function for cognitive skills (reported school performance) without time investments

	Effect at age		
	10-11	12-13	14-15
Parental warmth	0.007	-0.004	0.008
	(0.026)	(0.028)	(0.024)
Parental reasoning	-0.006	0.014	-0.047*
	(0.030)	(0.033)	(0.028)
Hostile parenting	-0.067**	-0.103***	-0.099***
	(0.029)	(0.033)	(0.032)
Inconsistent parenting	-0.097***	-0.125***	-0.142***
	(0.030)	(0.034)	(0.029)
Attempted consistency	-0.021	-0.051	-0.020
	(0.031)	(0.035)	(0.026)
Observations	7195	6584	5903

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 34: Estimated parameters of production function for non-cognitive skills with additional controls

	Effect at age			
	8-9	10-11	12-13	14-15
Parental warmth	0.014	-0.000	-0.034	-0.008
	(0.034)	(0.026)	(0.025)	(0.022)
Parental reasoning	-0.079*	-0.017	0.016	-0.052**
	(0.043)	(0.026)	(0.028)	(0.024)
Hostile parenting	-0.108**	-0.154***	-0.228***	-0.155***
	(0.043)	(0.034)	(0.034)	(0.034)
Inconsistent parenting	-0.104**	-0.086***	-0.006	-0.038
	(0.046)	(0.033)	(0.033)	(0.026)
Attempted consistency	-0.089*	-0.003	0.016	0.020
	(0.053)	(0.031)	(0.031)	(0.023)
Educational time parents	0.078	-0.069	0.016	0.023
	(0.053)	(0.136)	(0.119)	(0.076)
Educational time others	-0.061	0.201	0.158	0.077
	(0.139)	(0.248)	(0.148)	(0.219)
Care time parents	-0.041	-0.104	0.101	0.184**
	(0.052)	(0.211)	(0.086)	(0.072)
Care time others	-0.000	-0.185	0.125	-0.168
	(0.156)	(0.136)	(0.153)	(0.142)
Observations	2541	6468	5878	5385

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home, for moderate and severe mental issues of the primary caregiver (measured by the Kessler test), presence of financial shock in the household, presence of child's health shock, presence of other stressful events in the household (death, imprisonment, alcohol abuse of a household member, etc.) number of books at home, and dummies for attending catholic and private school.

TABLE 35: Estimated parameters of production function for cognitive skills (matrix reasoning and vocabulary tests) with additional controls

	Matrix reasoning	Vocabulary test
Parental warmth	-0.034***	-0.031**
	(0.012)	(0.015)
Parental reasoning	0.006	0.012
	(0.011)	(0.014)
Hostile parenting	-0.005	0.011
	(0.012)	(0.015)
Inconsistent parenting	-0.065***	-0.066***
	(0.012)	(0.015)
Attempted consistency	-0.005	0.009
	(0.010)	(0.013)
Educational time parents	0.009	0.051***
	(0.009)	(0.013)
Educational time others	0.005	-0.001
	(0.007)	(0.014)
Care time parents	0.015*	-0.001
	(0.009)	(0.013)
Care time others	0.028***	-0.005
	(0.009)	(0.014)
Observations	9714	2607

Note: All parameters are obtained from a single regression. Estimation for matrix reasoning uses sample of children 8-9 and 10-11, while estimation for vocabulary tests uses sample of children aged 6-7 and 8-9. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home, for moderate and severe mental issues of the primary caregiver (measured by the Kessler test), presence of financial shock in the household, presence of child's health shock, presence of other stressful events in the household (death, imprisonment, alcohol abuse of a household member, etc.) number of books at home, and dummies for attending catholic and private school.

TABLE 36: Estimated parameters of production function for cognitive skills (reported school performance) with additional controls

	Effect at age		
	10-11	12-13	14-15
Parental warmth	-0.050	-0.048	-0.009
	(0.033)	(0.037)	(0.031)
Parental reasoning	0.038	0.011	-0.035
	(0.040)	(0.044)	(0.037)
Hostile parenting	-0.086**	-0.101**	-0.070
	(0.040)	(0.046)	(0.044)
Inconsistent parenting	-0.088**	-0.137***	-0.137***
	(0.043)	(0.051)	(0.038)
Attempted consistency	-0.020	-0.046	-0.059*
	(0.042)	(0.050)	(0.034)
Educational time parents	0.086	0.317	0.149
	(0.183)	(0.247)	(0.138)
Educational time others	-0.157	0.348	0.239
	(0.321)	(0.248)	(0.360)
Care time parents	0.280	0.216*	0.314***
	(0.267)	(0.126)	(0.118)
Care time others	-0.100	-0.427	-0.289
	(0.184)	(0.314)	(0.245)
Observations	6871	6159	5346

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home, for moderate and severe mental issues of the primary caregiver (measured by the Kessler test), presence of financial shock in the household, presence of child's health shock, presence of other stressful events in the household (death, imprisonment, alcohol abuse of a household member, etc.) number of books at home, and dummies for attending catholic and private school.

TABLE 37: Rotated factor loadings at age 4-5 - joint estimation

	Factor 1	Factor 2	Factor 3	Factor 4
Parental warmth:				
Expresses affection	**0.808**	-0.070	0.024	0.014
Hugs child	**0.812**	-0.061	0.016	0.024
Expresses happiness	**0.660**	0.001	-0.157	**0.335**
Warm/close times together	**0.742**	0.012	-0.118	0.238
Enjoy time together	**0.609**	0.001	-0.225	**0.357**
Feels close to child	**0.649**	-0.003	-0.217	**0.277**
Parental hostility:				
Praise child	**0.276**	0.076	**-0.468**	**0.319**
Disapproval	-0.143	0.122	**0.686**	0.038
Angry when punishing	-0.020	0.077	**0.684**	-0.050
Having problems managing	-0.113	**0.289**	**0.674**	-0.034
Parental consistency:				
Ensures requests complete	0.053	**-0.424**	0.062	**0.479**
Punishes child	0.023	**-0.668**	**0.286**	**0.257**
Child gets away	-0.018	**0.747**	0.212	-0.021
Child gets out of punishment	-0.020	**0.763**	0.176	0.037
Child ignores punishment	-0.077	**0.621**	**0.437**	0.019
Parental inductive reasoning:				
Explains corrections	0.212	-0.072	-0.011	**0.761**
Reasons when misbehaves	**0.256**	-0.016	-0.033	**0.741**

Note: Factor loadings larger than 0.25 in absolute value printed in bold. Factors can be assigned the following across waves: factor 1: parental warmth, factor 2: reasoning, factor 3: hostile and inconsistent parenting, factor 4: consistency. As at age 4-5 factor 2 describes inconsistency, we assign it to the variable consistency, but we reverse values of factor 2 before assignment to ensure comparability across waves. Instead we assign factor 4 as reasoning.

TABLE 38: Rotated factor loadings at age 6-7 - joint estimation

	Factor 1	Factor 2	Factor 3	Factor 4
Parental warmth:				
Expresses affection	**0.837**	0.104	0.002	-0.057
Hugs child	**0.799**	0.121	0.021	-0.057
Expresses happiness	**0.677**	**0.336**	-0.188	0.011
Warm/close times together	**0.787**	0.234	-0.119	-0.014
Enjoy time together	**0.701**	**0.268**	-0.172	-0.031
Feels close to child	**0.736**	0.213	-0.170	-0.036
Parental hostility:				
Praise child	**0.400**	0.162	**-0.449**	0.110
Disapproval	-0.197	0.038	**0.699**	0.065
Angry when punishing	-0.039	-0.083	**0.687**	0.011
Having problems managing	-0.150	0.021	**0.686**	**0.272**
Parental consistency:				
Ensures requests complete	0.151	**0.254**	0.105	**-0.537**
Punishes child	0.037	0.198	0.218	**-0.722**
Child gets away	-0.024	-0.044	**0.330**	**0.715**
Child gets out of punishment	0.003	0.003	**0.298**	**0.691**
Child ignores punishment	-0.059	0.012	**0.534**	**0.543**
Parental inductive reasoning:				
Explains corrections	0.196	**0.866**	-0.023	-0.077
Reasons when misbehaves	**0.285**	**0.736**	0.007	-0.067
Reasons for rules	0.212	**0.855**	-0.003	-0.068

Note: Factor loadings larger than 0.25 in absolute value printed in bold. Factors can be assigned the following across waves: factor 1: parental warmth, factor 2: reasoning, factor 3: hostile and inconsistent parenting, factor 4: consistency. As at age 6-7 factor 4 describes inconsistency, when creating the variable consistency, we reverse values of factor 4 before assignment to ensure comparability across waves.

TABLE 39: Rotated factor loadings at age 8-9 - joint estimation

	Factor 1	Factor 2	Factor 3	Factor 4
Parental warmth:				
Expresses affection	**0.833**	0.155	0.001	-0.053
Hugs child	**0.794**	0.144	0.009	-0.055
Expresses happiness	**0.705**	**0.319**	-0.179	0.034
Warm/close times together	**0.787**	**0.269**	-0.114	-0.014
Enjoy time together	**0.729**	**0.256**	-0.179	-0.048
Feels close to child	**0.736**	0.212	-0.191	-0.043
Parental hostility:				
Praise child	**0.437**	0.121	**-0.479**	0.067
Disapproval	**-0.268**	0.088	**0.680**	0.020
Angry when punishing	-0.047	-0.025	**0.690**	0.008
Having problems managing	-0.163	0.059	**0.688**	**0.254**
Parental consistency:				
Ensures requests complete	0.139	0.219	0.132	**-0.549**
Punishes child	0.020	0.181	0.203	**-0.747**
Child gets away	-0.027	-0.050	**0.355**	**0.698**
Child gets out of punishment	-0.000	-0.028	**0.339**	**0.672**
Child ignores punishment	-0.072	0.012	**0.536**	**0.538**
Parental inductive reasoning:				
Explains corrections	0.170	**0.864**	-0.017	-0.073
Reasons when misbehaves	**0.271**	**0.687**	0.033	-0.107
Reasons for rules	0.180	**0.852**	0.002	-0.047
Explains consequences	0.202	**0.864**	0.037	-0.061
Emphasizes reasons	0.171	**0.874**	0.003	-0.035

Note: Factor loadings larger than 0.25 in absolute value printed in bold. Factors can be assigned the following across waves: factor 1: parental warmth, factor 2: reasoning, factor 3: hostile and inconsistent parenting, factor 4: consistency. As at age 8-9 factor 4 describes inconsistency, when creating the variable consistency, we reverse values of factor 4 before assignment to ensure comparability across waves.

Table 40: Rotated factor loadings at age 10-11 - joint estimation

	Factor 1	Factor 2	Factor 3	Factor 4
Parental warmth:				
Expresses affection	**0.840**	0.156	-0.009	-0.066
Hugs child	**0.817**	0.121	0.002	-0.076
Expresses happiness	**0.724**	**0.277**	-0.185	0.021
Warm/close times together	**0.792**	0.245	-0.147	-0.019
Enjoy time together	**0.697**	**0.261**	-0.237	-0.022
Feels close to child	**0.724**	0.196	-0.235	-0.005
Parental hostility:				
Praise child	**0.454**	0.085	**-0.474**	0.051
Disapproval	**-0.291**	0.117	**0.690**	-0.041
Angry when punishing	-0.103	0.002	**0.689**	-0.005
Having problems managing	-0.191	0.046	**0.716**	0.167
Parental consistency:				
Ensures requests complete	0.114	0.208	0.109	**-0.598**
Punishes child	0.031	0.187	0.124	**-0.772**
Child gets away	-0.024	-0.015	**0.445**	**0.653**
Child gets out of punishment	-0.000	-0.018	**0.415**	**0.630**
Child ignores punishment	-0.082	-0.012	**0.581**	**0.488**
Parental inductive reasoning:				
Explains corrections	0.151	**0.876**	-0.007	-0.076
Reasons when misbehaves	**0.258**	**0.693**	0.013	-0.088
Reasons for rules	0.149	**0.861**	-0.016	-0.026
Explains consequences	0.185	**0.873**	0.057	-0.079
Emphasizes reasons	0.161	**0.883**	0.020	-0.050

Note: Factor loadings larger than 0.25 in absolute value printed in bold. Factors can be assigned the following across waves: factor 1: parental warmth, factor 2: reasoning, factor 3: hostile and inconsistent parenting, factor 4: consistency. As at age 10-11 factor 4 describes inconsistency, when creating the variable consistency, we reverse values of factor 4 before assignment to ensure comparability across waves.

TABLE 41: Rotated factor loadings at age 12-13 - joint estimation

	Factor 1	Factor 2	Factor 3	Factor 4
Parental warmth:				
Expresses affection	**0.849**	0.140	-0.021	0.086
Hugs child	**0.820**	0.113	-0.002	0.106
Expresses happiness	**0.715**	**0.260**	-0.203	-0.084
Warm/close times together	**0.794**	0.210	-0.148	0.013
Enjoy time together	**0.715**	0.192	-0.232	0.024
Feels close to child	**0.728**	0.163	**-0.258**	0.007
Parental hostility:				
Praise child	**0.482**	0.037	**-0.467**	-0.154
Disapproval	**-0.311**	0.166	**0.661**	0.159
Angry when punishing	-0.099	0.034	**0.684**	0.156
Having problems managing	-0.236	0.113	**0.716**	-0.073
Parental consistency:				
Ensures requests complete	0.108	0.249	0.030	**0.595**
Punishes child	0.026	0.196	0.004	**0.766**
Child gets away	-0.091	0.009	**0.584**	**-0.531**
Child gets out of punishment	0.005	0.002	**0.549**	**-0.531**
Child ignores punishment	-0.130	0.042	**0.675**	**-0.368**
Parental inductive reasoning:				
Explains corrections	0.121	**0.889**	0.012	0.070
Reasons when misbehaves	0.240	**0.707**	0.021	0.076
Reasons for rules	0.129	**0.877**	0.034	0.017
Explains consequences	0.154	**0.890**	0.065	0.092
Emphasizes reasons	0.126	**0.898**	0.047	0.048

Note: Factor loadings larger than 0.25 in absolute value printed in bold. Factors can be assigned the following across waves: factor 1: parental warmth, factor 2: reasoning, factor 3: hostile and inconsistent parenting, factor 4: consistency.

TABLE 42: Rotated factor loadings at age 14-15 - joint estimation

	Factor 1	Factor 2	Factor 3	Factor 4
Parental warmth:				
Expresses affection	**0.854**	0.105	-0.023	0.110
Hugs child	**0.818**	0.083	-0.009	0.121
Expresses happiness	**0.745**	0.235	-0.153	-0.074
Warm/close times together	**0.792**	0.193	-0.155	-0.032
Enjoy time together	**0.721**	0.180	-0.222	-0.039
Feels close to child	**0.725**	0.152	-0.246	-0.067
Parental hostility:				
Praise child	**0.522**	-0.006	**-0.407**	-0.201
Disapproval	**-0.347**	0.226	**0.568**	**0.294**
Angry when punishing	-0.121	0.083	**0.600**	**0.322**
Having problems managing	-0.239	0.121	**0.718**	0.097
Parental consistency:				
Ensures requests complete	0.082	0.223	-0.134	**0.640**
Punishes child	0.011	0.206	-0.197	**0.736**
Child gets away	-0.094	0.037	**0.744**	**-0.292**
Child gets out of punishment	-0.042	0.020	**0.706**	**-0.313**
Child ignores punishment	-0.148	0.052	**0.771**	-0.166
Parental inductive reasoning:				
Explains corrections	0.100	**0.904**	0.022	0.055
Reasons when misbehaves	0.230	**0.713**	0.052	0.122
Reasons for rules	0.102	**0.890**	0.033	0.021
Explains consequences	0.138	**0.889**	0.072	0.091
Emphasizes reasons	0.101	**0.899**	0.066	0.076

Note: Factor loadings larger than 0.25 in absolute value printed in bold. Factors can be assigned the following across waves: factor 1: parental warmth, factor 2: reasoning, factor 3: hostile and inconsistent parenting, factor 4: consistency.

TABLE 43: Estimated parameters of production function for non-cognitive skills with jointly determine parenting styles

	Effect at age			
	8-9	10-11	12-13	14-15
Warm style	0.026	0.051***	0.053***	0.063***
	(0.023)	(0.019)	(0.019)	(0.017)
Reasoning style	-0.021	-0.054***	-0.008	-0.073***
	(0.024)	(0.016)	(0.021)	(0.018)
Hostile/inconsistent style	-0.178***	-0.185***	-0.196***	-0.165***
	(0.034)	(0.027)	(0.026)	(0.023)
Consistent style	0.096**	0.033*	-0.013	-0.033*
	(0.039)	(0.020)	(0.020)	(0.020)
Educational time parents	0.086	-0.077	0.026	-0.019
	(0.054)	(0.150)	(0.137)	(0.082)
Educational time others	-0.076	0.233	0.162	0.224
	(0.130)	(0.235)	(0.174)	(0.263)
Care time parents	-0.044	-0.085	0.119	0.154**
	(0.053)	(0.245)	(0.090)	(0.074)
Care time others	0.128	-0.177	0.230	-0.058
	(0.171)	(0.156)	(0.174)	(0.151)
Observations	2635	6469	5879	5385

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 44: Estimated parameters of production function for cognitive skills (matrix reasoning and vocabulary tests) with jointly determine parenting styles

	Matrix reasoning	Vocabulary test
Warm style	-0.026***	-0.026**
	(0.009)	(0.013)
Reasoning style	-0.041***	-0.054***
	(0.010)	(0.014)
Hostile/inconsistent style	-0.040***	-0.019
	(0.010)	(0.013)
Consistent style	0.005	-0.001
	(0.009)	(0.012)
Educational time parents	0.009	0.054***
	(0.009)	(0.013)
Educational time others	0.005	-0.001
	(0.007)	(0.014)
Care time parents	0.017*	-0.000
	(0.009)	(0.013)
Care time others	0.027***	-0.004
	(0.009)	(0.014)
Observations	9714	2607

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

TABLE 45: Estimated parameters of production function for cognitive skills (total school pefromance) with jointly determine parenting styles

	Effect at age		
	10-11	12-13	14-15
Warm style	-0.001	0.014	0.036*
	(0.022)	(0.025)	(0.021)
Reasoning style	-0.043**	-0.034	-0.071***
	(0.020)	(0.029)	(0.025)
Hostile/inconsistent style	-0.120***	-0.174***	-0.166***
	(0.030)	(0.031)	(0.024)
Consistent style	-0.015	0.026	-0.043
	(0.027)	(0.029)	(0.027)
Educational time parents	0.176	0.338	0.098
	(0.201)	(0.237)	(0.142)
Educational time others	-0.018	0.241	0.339
	(0.257)	(0.205)	(0.391)
Care time parents	0.127	0.184	0.257**
	(0.264)	(0.119)	(0.112)
Care time others	-0.244	-0.196	-0.126
	(0.204)	(0.299)	(0.240)
Observations	6872	6160	5346

Note: All parameters are obtained from a single regression. The employed specification includes various controls: the age of the primary caregiver, the number of siblings, the log of family income, the local neighborhood disadvantage index, and dummies for the presence of both biological parents at home as well as for moderate and severe mental issues of the primary caregiver (measured by the Kessler test).

D Appendix tables

TABLE 46: Correlation between parenting dimensions

	Parental warmth	Parental reasoning	Hostile parenting	Inconsistent parenting	Attempted consistency
Parental warmth	1.000				
Parental reasoning	**0.492**	1.000			
Hostile parenting	**-0.385**	-0.047	1.000		
Attempted consistency	-0.134	-0.031	**0.442**	1.000	
Inconsistent parenting	0.128	**0.310**	0.036	0.000	1.000

Note: Displayed are correlation between different dimensions of parenting styles in the data (exemplary for age group 8-9). Statistics are calculated using population weights.

TABLE 47: Remaining estimated parameters of production function for non-cognitive skills

	Effect at age			
	8-9	10-11	12-13	14-15
Educational time parents	0.087*	-0.101	0.055	0.011
	(0.052)	(0.136)	(0.127)	(0.077)
Educational time others	-0.044	0.238	0.208	0.149
	(0.127)	(0.241)	(0.165)	(0.229)
Care time parents	-0.036	-0.071	0.116	0.187**
	(0.053)	(0.222)	(0.087)	(0.073)
Care time others	0.023	-0.182	0.127	-0.175
	(0.161)	(0.140)	(0.158)	(0.146)
	Age invariant			
Living with both parents	0.071***			
	(0.017)			
Primary caregiver's age	0.000			
	(0.001)			
Degree of primary caregiver's mental disorder:				
moderate	-0.139***			
	(0.014)			
severe	-0.299***			
	(0.040)			
Number of children	0.015**			
	(0.007)			
Log of weekly income	0.025**			
	(0.010)			
Neighborhood advantage score	0.038***			
	(0.007)			
1st lag of non-cognitive skills	0.427***			
	(0.019)			
2nd lag of non-cognitive skills	0.134***			
	(0.015)			
Observations	2635	6469	5879	5385

Note: All parameters are obtained from a single regression. Standard errors are shown in parentheses. Base category for degree of primary caregiver's mental disorder is no or mild.