Parenting Style and Children's Skill Development

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Motivation

- **The way parents rise children** shapes their development throughout childhood:

$\longrightarrow$ Long-run impacts on human capital, well-being, health, and labour market outcomes (Conti et al., 2019, Hanushek and Woessmann, 2008, Heckman and Mosso, 2014).

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- A **key component of upbringing** is parenting style:

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- A **key component of upbringing** is parenting style:

$\longrightarrow$ The way parents set rules, provide guidance, and respond to children's behaviour.

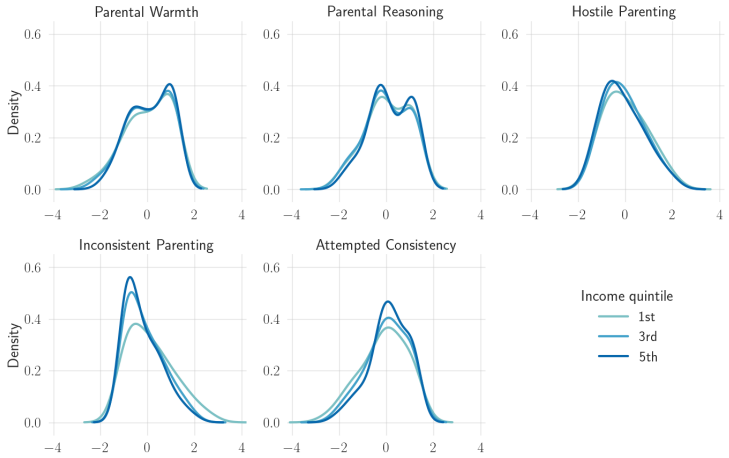
- **Parenting style** is associated with cognitive and non-cognitive skill development, contributing to human capital accumulation (Doepke and Zilibotti (2019), Agostinelli et al. (2023)).

Motivation

- **Parenting style** and its specific dimensions—such as warmth, reasoning, hostility, and consistency—often vary by socio-economic status:

Motivation

Figure: Distribution of parenting style dimensions by income



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

education

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- **Parenting style** and its specific dimensions—such as warmth, reasoning, hostility, and consistency—often vary by socio-economic status:

$\longrightarrow$ Highlights the potential for targeted parental interventions to reduce skill gaps and promote inter-generational mobility.

- To design effective interventions, such as parenting programmes, **policymakers need evidence** on:
  - Which dimensions of parenting style are most critical for skill development?
  - How their impact varies across different stages of childhood?

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- To design effective interventions, such as parenting programmes, **policymakers need evidence** on:
  - Which dimensions of parenting style are most critical for skill development?
  - How their impact varies across different stages of childhood?
- While the role of other aspects of upbringing is well-documented, the influence of parenting style and its specific dimensions remains less explored.

This paper

1. We study how different dimensions of parenting style influence children's skill development:
   - → In middle childhood and adolescence
   - → Focusing on children's cognitive and non-cognitive skills
2. We exploit panel data from Australia:
   - → Rich information on parenting style and skill measures

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2. We exploit panel data from Australia:
   - → Rich information on parenting style and skill measures
3. We use an instrumental variable (IV) approach to address potential endogeneity and simultaneity bias.
4. We incorporate both parent and teacher-reported skill measures to account for reporting bias.

Contribution to the literature

- Factors influencing child development

  Todd and Wolpin (2007), Cunha and Heckman (2008), Cunha et al. (2010), Del Boca et al. (2016), Doepke and Zilibotti (2017), Kim (2019), Cobb-Clark et al. (2019), Attanasio et al. (2020a,b), Agostinelli et al. (2023)

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$\rightarrow$ We study impact of different parenting style dimensions on child development

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  → We model parenting style as a factor directly influencing child skill formation

  → We study impact of different parenting style dimensions on child development

- Link economic and psychology literature on parenting style

  Baumrind (1967), Maccoby and Martin (1983), Spera (2005), McWhirter et al. (2023)

  → We analyse bias in parent- and teacher-reported measures

  → We use rich panel data structure to address endogeneity and simultaneity issues

DATA

Estimation sample

- Longitudinal Study of Australian Children (LSAC)
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- Rich information on parenting behavior and children's skill measures
  - Measures on parenting style dimensions
  - Non-cognitive skills: Strengths and difficulties questionnaire (SDQ)
  - Cognitive skills: Matrix reasoning, Peabody Picture Vocabulary test, school performance

Demographic characteristics of the sample

	Age			
	8-9	10-11	12-13	14-15
Child:				
Female	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
Premature infant	0.072	0.073	0.069	0.068
Older cohort (K)	0.510	0.510	0.510	0.510
Primary caregiver:				
Female	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
Living in poverty	0.189	0.202	0.190	0.203
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.

Parenting style

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- We use factor analysis to summarize variation across survey questions

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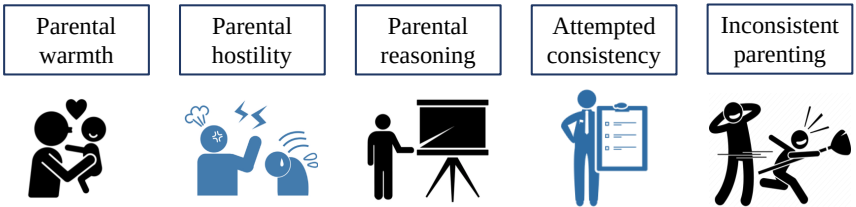
- Survey collects data on parents behaviour towards the child in four areas
- We use factor analysis to summarize variation across survey questions
- Doing so, we obtain five factors (parenting style dimensions):



Five parenting style dimensions

How often does the parent express affection, hugs the child and enjoys spending time with it?

Parental warmth	Parental hostility	Parental reasoning	Attempted consistency	Inconsistent parenting
				

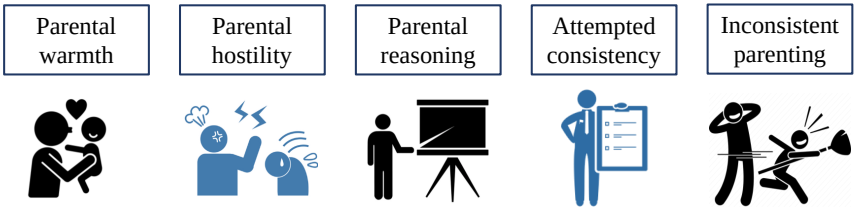
Five parenting style dimensions

How often does the parent praise and show disapproval or display negative emotions when punishing children?

Parental warmth	Parental hostility	Parental reasoning	Attempted consistency	Inconsistent parenting
				

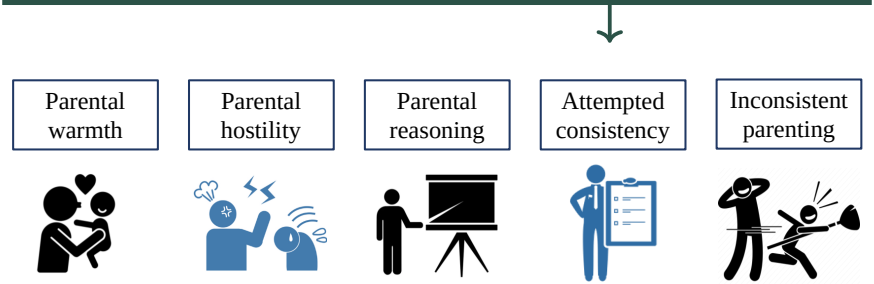
Five parenting style dimensions

How often does the parent explain rules or corrections to the child?



Five parenting style dimensions

How often does the parent attempt to punish the child or ensure requests are completed?

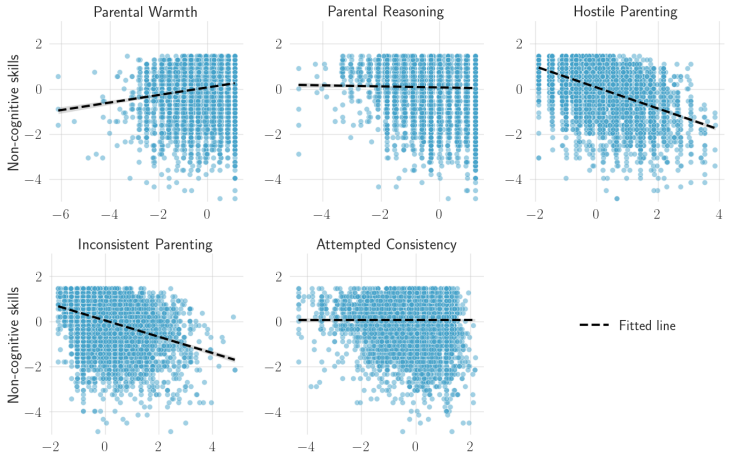


Five parenting style dimensions

How often does the parent allow the child to escape punishment or ignore it?

Parental warmth	Parental hostility	Parental reasoning	Attempted consistency	Inconsistent parenting
				

Parenting style is correlated with non-cognitive skills



Note: Each data point represents a child from the 8-9 age group, while a line plotted on the graph represents the fitted values based on a linear regression analysis.

cognitive

ESTIMATION

Estimation strategy

- Research question: How do different dimensions of parenting style impact children's cognitive and non-cognitive skills?
- We address the research question by estimating the parameters of the skills production function.

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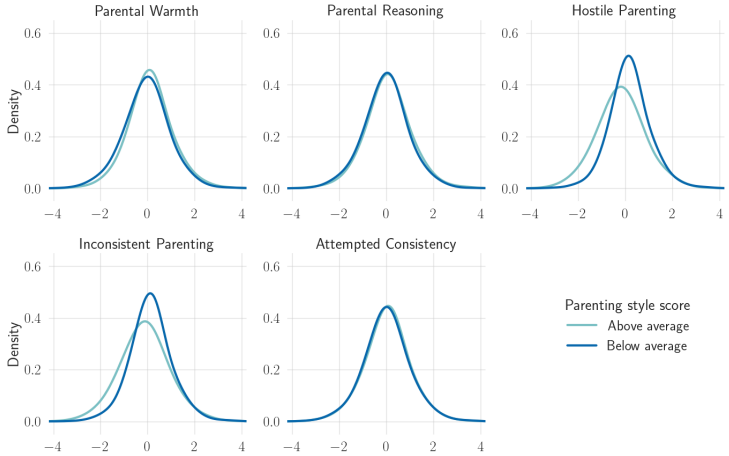
- We address the research question by estimating the parameters of the skills production function.
- There are three potential sources of bias in the estimates:
  - Omitted variable: missing factors (e.g., parental time investments) correlated with parenting styles
  - Simultaneity: parenting style and children's skills can influence each other
  - Reporting bias: parent-reported skill measures may contain reporting bias, correlated with parenting styles

Reporting bias: parent vs teacher measure

- Parents and teachers differ in reporting child's non-cognitive skills: De Los Reyes et al. (2015), Kraemer et al. (2003)
  - Observe child in a different environment
  - Subjective interpretation of child behaviour
- Reporting bias varies with parent's characteristics: Del Bono et al. (2020)
  - With education, own non-cognitive skills, etc.
  - With parenting style

Hostile and inconsistent parents tend to underreport skills



Note: The figure displays the empirical distribution (smoothed using the kernel function approach with population weights) of reported non-cognitive skills by parenting style dimensions for children aged 8-9.

table

Addressing the estimation threats by

- Employing fixed-effects model with rich set of controls:

$\longrightarrow$ Eliminates time-invariant bias in skills reporting

$\longrightarrow$ Reduces risk of omitted variable bias

- Applying Blundell and Bond (1998) instrument for skills and parenting style:

$\longrightarrow$ Addresses simultaneity issue

$\longrightarrow$ Eliminates time-variant bias in skills reporting

- Estimating the model with teacher-reported measures:

$\longrightarrow$ Allows to asses extend of simultanity and reporting bias

$\longrightarrow$ Test robustness of the results

Skill's production function

We assume a linear form of the production function

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

- y_{ia}: skill outcome of child i at age a
- α_i: child fixed effect
- PS_{ia}: parenting style dimensions
- TI_{ia}: time investments
- X_{ia}: controls (age and mental health status of the primary caregiver, presence of both biological parents, number of siblings, log of caregivers' income, and a neighbourhood quality measure)

RESULTS

NON-COGNITIVE SKILLS

Hostility and inconsistency impact non-cognitive skills

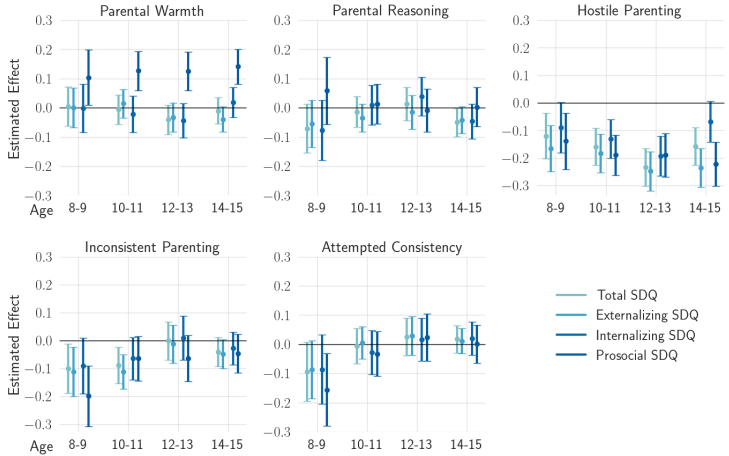
	Effect at age			
	8-9	10-11	12-13	14-15
Parental warmth	0.004	-0.006	-0.041	-0.010
	(0.034)	(0.026)	(0.026)	(0.023)
Parental reasoning	-0.071*	-0.014	0.013	-0.050**
	(0.042)	(0.027)	(0.029)	(0.025)
Hostile parenting	-0.120***	-0.159***	-0.233***	-0.158***
	(0.042)	(0.034)	(0.035)	(0.035)
Inconsistent 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).

Dimensions of non-cognitive skills using the SDQ

- **Externalizing difficulties**: Sum of conduct problems and hyperactivity/inattention subscales. Captures behaviors directed outward, such as impulsivity and aggression.
- **Internalizing difficulties**: Sum of emotional symptoms and peer relationship problems subscales. Captures behaviors directed inward, such as anxiety and social withdrawal.
- **Total difficulties**: Combines scores from externalizing and internalizing difficulties.
- **Pro-social behaviour**: A separate subscale measuring positive social behaviours like empathy, cooperation, and helping others.

Effect varies across dimensions of non-cognitive skills



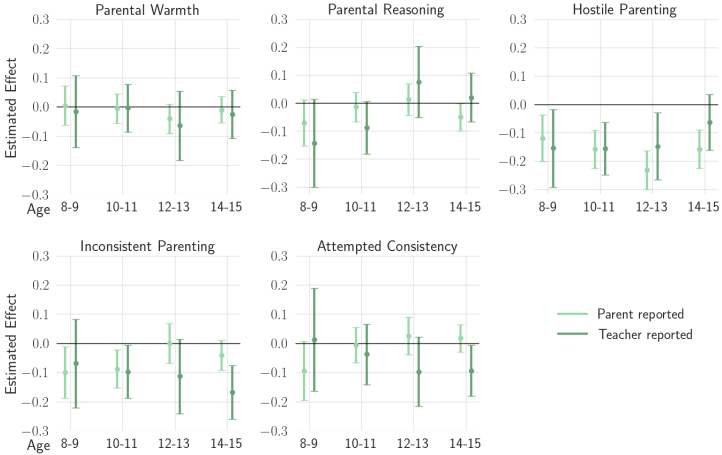
Note: The figure presents estimated coefficients for the impact of five parenting styles on total, external, internal and prosocial skills measured by SDQ score using Blundel-Bond method. The range bars correspond to a 95% confidence interval for the estimated coefficients.

Results for parent- and teacher-reported measures

- Is the estimation strategy successful in mitigating biases?

$\longrightarrow$ Estimates for parent- and teacher-reported measures should be similar.

Results for parent- and teacher-reported measures



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.

Results for parent- and teacher-reported measures

- Is the estimation strategy successful in mitigating biases?

$\longrightarrow$ Estimates for parent- and teacher-reported measures should be similar.

- Testing for simultaneity: comparing IV and non-IV estimates for teacher-reported measures.

$\longrightarrow$ There are no significant differences (Hausman tests)

$\longrightarrow$ Simultaneity bias is less of a concern.

- Testing for reporting bias: comparing IV and non-IV estimates for parent-reported non-cognitive skills.

$\longrightarrow$ There are significant differences (Hausman tests)

$\longrightarrow$ Reporting bias should be addressed.

RESULTS

COGNITIVE SKILLS

Results for cognitive skills

	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)
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.

Results for 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)
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).

Additional results and robustness checks

- Heterogeneity by gender?
  - No significant differences for both cognitive and non-cognitive skills table
- Additional controls?
  - Controlling for type of school, number of books at home, family financial shocks, child health shocks and other stressful events do not change the results
- Alternative definitions of parenting style dimensions:
  - Defining parenting style dimensions by pooling all variables together
  - Results are consistent, parenting warmth is positive and significant

SUMMARY

Summary

- In this paper:
  - We estimate the impact of parenting style on skill development at different ages using panel data
  - We address potential endogeneity, reporting bias and simultaneity issues
- Main findings:
  - Bias present in parent-reporting measures of non-cognitive skills
  - Parental hostility and inconsistency $\uparrow \rightarrow$ Non-cognitive skills $\downarrow$ (potential target for parental interventions)
  - Impact of parenting style on cognitive skills is limited

THANK YOU!

If you have any questions or comments, please feel free email us!

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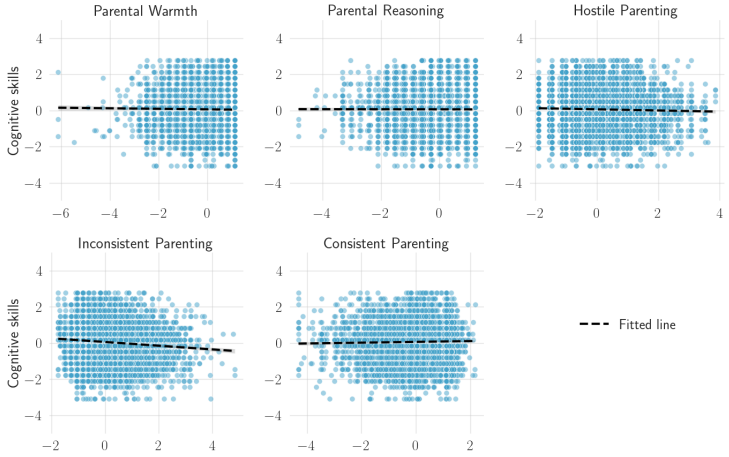
Figure: Correlation of parenting style dimensions and cognitive skills



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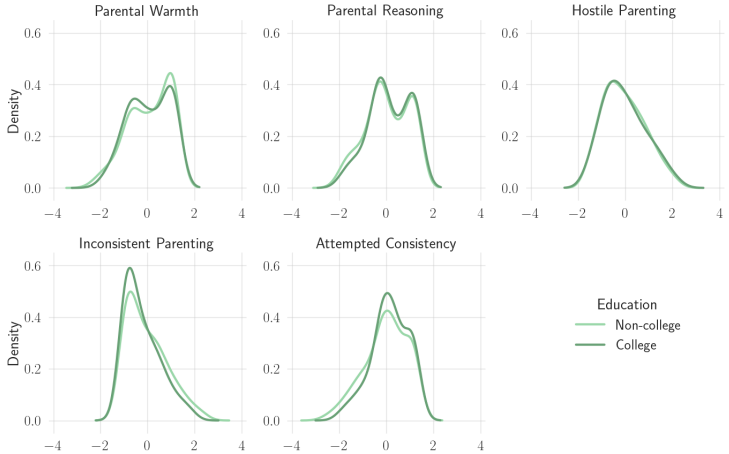
non-cognitive

Figure: Distribution of parenting dimensions by primary caregiver's education



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

income

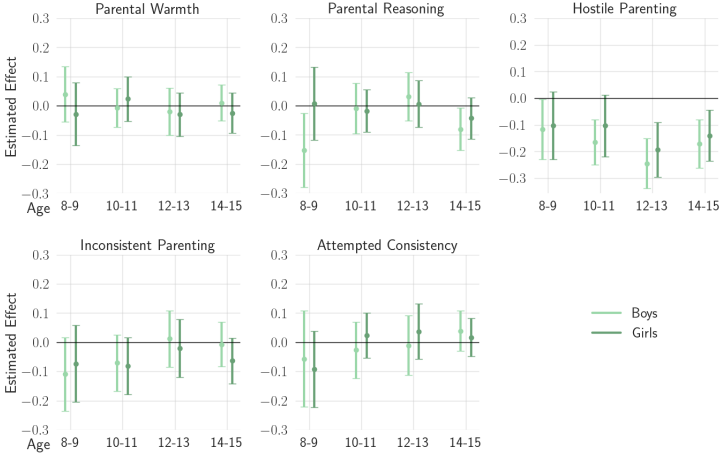
Reporting bias: estimation

	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)
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).

graph

Results by gender



Note: The figure presents estimated coefficients for the impact of five parenting style dimensions 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.

Robustness