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Article - Version of Record

Suggested Citation:

Bretkopf, L., Chowdhury, S., Priyam, S., Schildberg-Hörisch, H., & Sutter, M. (2026). Nurturing the future: How positive parenting is related to children's skills and well-being. *Journal of Economic Behavior & Organization*, 248, Article 107630. <https://doi.org/10.1016/j.jebo.2026.107630>

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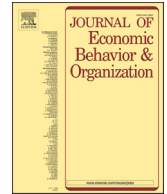
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Research Paper

Nurturing the future: How positive parenting is related to children's skills and well-being

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ARTICLE INFO

JEL classification:

C91
D01
D10

Keywords:

Parenting style
Child outcomes
Economic preferences
Personality traits
IQ

ABSTRACT

We study the relationship between maternal parenting style and a broad range of children's skills and outcomes. Using survey and incentivized experimental data from 5644 children aged 6 to 16 and their parents, we find that children whose mothers are classified as practicing a positive parenting style score higher on IQ, are more altruistic, exhibit higher openness, conscientiousness, and agreeableness, and have a higher locus of control, self-control, and self-esteem. They also perform better in scholarly achievement tests, display more prosocial behavior in everyday life, and report higher life satisfaction. Additionally, positive parenting is negatively associated with children's patience, neuroticism, engagement in risky behaviors, and their emotional and behavioral problems.

1. Introduction

Children are deeply influenced by how their parents raise them (Kaufmann et al., 2000; Doepke and Zilibotti 2019). Parental investments affect children's formation of cognitive and non-cognitive skills, which has long-term consequences for the life outcomes of children, including their education, health, and labor market success (Cunha et al. 2010; Francesconi and Heckman 2016; Cobb-Clark et al. 2019). Parenting styles are a key dimension of parental investments. Positive parenting styles—i.e., parenting styles characterized by supportive or affirmative attention and care—have been shown to have positive associations with health and well-being (Ranson and Urlichuk 2008; Davids et al. 2017; Chen et al. 2019), fewer risky behaviors (Borawski et al. 2003), and academic achievement (Dornbusch et al. 1987; Pinquart 2016; Pinquart and Kauser 2018). Negative parenting styles—i.e., parenting styles predominantly characterized by parents behaving harshly towards their children and exerting control over them—are negatively

Financial support by the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG) through grant SCHI-1377/1–1 and through Germany's Excellence Strategy – EXC 2126/2 – 390,838,866 is gratefully acknowledged. We declare no competing financial interests. IRB approval (Heinrich Heine University Düsseldorf) was granted under study number 6212.

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<https://doi.org/10.1016/j.jebo.2026.107630>

Received 17 September 2025; Received in revised form 11 May 2026; Accepted 22 May 2026

Available online 15 June 2026

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associated with children's behavior and outcomes (Doepke and Zilibotti 2017; Dohmen et al. 2026).

Existing work from different disciplines has typically studied the relationship between parenting styles and a single or a few child outcomes (Dornbusch et al. 1987; Aunola and Nurmi 2004, 2005; Dallaire et al. 2006; Dooley and Stewart 2006; Lohaus et al. 2009; Chen et al. 2019), building evidence piece by piece rather than looking at large sets of outcomes simultaneously within a unified framework. Such a piecewise approach, however, may overlook the scope that parenting styles can have regarding children's development as a whole and across many different dimensions, including cognitive and non-cognitive skills, and behavioral outcomes.

In this paper, we present a comprehensive approach in which we relate mothers' parenting style to a uniquely large set of skills and outcomes of children. While maintaining a broad perspective, this large set allows us in particular to study children's cognitive and non-cognitive skills, rather than narrowly focusing on children's behavioral outcomes (which we still consider along the way). Our insights on skills can help to better understand why parenting style is related to child outcomes, as the latter are shaped by children's skills (Cunha and Heckman 2008; Cunha et al. 2010). Our measures of children's non-cognitive skills go beyond those in previous studies on parenting style because they encompass measures of children's time, risk, and social preferences on top of their personality traits (Big Five, locus of control, self-control, self-esteem).

The key features of our study are that we (i) capture an exceptionally broad age range, i.e., ages 6 to 16, (ii) provide novel evidence on the link between maternal parenting style and children's economic preferences that we measure in incentivized experiments, and (iii) present data from a non-WEIRD (Western, Educated, Industrial, Rich, and Democratic) country, namely Bangladesh. Covering a large age range from childhood to adolescence allows investigating whether the relationship between maternal parenting style and children's skills depends on the children's age—for example, if there is a stronger link earlier on in life. Economic preferences are not only key ingredients in many economic models, but also highly predictive of important outcomes in life.¹ Hence, studying their link to parenting styles contributes to a better understanding of what determines children's life-time outcomes.²

Despite their advantages for measurement, the use of incentivized experiments to elicit child outcomes is less common in studies on parenting, which typically originate from disciplines such as clinical or developmental psychology that primarily rely on survey scales for measurement (see, e.g., the reviews and meta-analyses of Furlong et al. 2013 and Sanders et al. 2014). Experiments directly reveal children's own decisions in controlled environments with real (monetary) consequences, can reduce demand effects, and allow for a straightforward comparison of behavior across children. Compared to parent-assessed child outcomes, they also avoid common-rater bias. We therefore hope to inspire the use of incentivized experiments as a measurement tool in future studies on the link between parenting style and children's skills.

As an additional distinctive feature, our sample comes from a lower-middle income, developing country, i.e., Bangladesh. Although the majority of the world's population lives in non-WEIRD countries, only very few studies on the implications of parenting style have been conducted in these contexts (Gertler et al. 2014; Attanasio et al. 2020; Carneiro et al. 2024). A priori, it is not obvious that how parents raise their children affects children living in different economic and cultural contexts in the same way. For example, in wealthier countries, children may benefit more from a less controlling parenting style, encouraging exploration, creativity, and openness to new experiences within a less vulnerable, resource-rich environment. In poorer countries, however, more monitoring may be needed to ensure children take advantage of limited opportunities. Providing evidence on the link between parenting style and skill formation of children in relatively poorer regions of the world is particularly relevant since enhanced skills may help children escape poverty. Moreover, the degree to which the home environment, including parenting style, mediates the established relationship between income and child outcomes remains a subject of debate (Berger et al. 2009; Cobb-Clark et al. 2019). This makes it even more relevant to better understand the interplay of parenting style and child outcomes in less developed countries.

We use data from surveys and incentivized experiments with 5644 children, aged 6 to 16, and their parents in Bangladesh to examine the relationship between mothers' parenting style and a very broad range of cognitive and non-cognitive skills, including IQ, time, risk, and social preferences as well as personality traits (Big Five, locus of control, self-control, and self-esteem). Our measure of parenting style that is answered by the mothers covers five different dimensions: emotional warmth, monitoring, negative communication, psychological control, and strict control (Thönnissen et al. 2017). Applying linear discriminant analysis (LDA) reduces these parenting style dimensions to a binary classification that relates well to what the literature recurrently refers to as positive and negative

¹ Social preferences are related to cooperative behaviors, e.g., at the work place, donations, repayment of loans, and management of common pool resources (Karlan 2005; Dohmen et al. 2009; Rustagi et al. 2010; Carpenter and Seki 2011; Becker et al. 2012; Burks et al. 2016; Deming 2017; Kosse and Tincani 2020). Time preferences are linked to criminal behaviors, educational attainment, occupational success, income, wealth, and health outcomes (Fuchs 1982; Bickel et al. 1999; Kirby et al. 1999; Ventura 2003; DellaVigna and Paserman 2005; Eckel et al. 2005; Chabris et al. 2008; Golsteyn et al. 2014; Cadena and Keys 2015; Åkerlund et al. 2016; Sunde et al. 2022). Risk preferences are associated with labor market success, health outcomes, investment decisions, addictive behaviors, and migration (Barsky et al. 1997; Hong et al. 2004; Bonin et al. 2007; Anderson and Mellor 2008; Kimball et al. 2008; Jaeger et al. 2010; Dohmen et al. 2011; von Gaudecker et al. 2011; Becker et al. 2012; Hsieh et al. 2017; Schneider and Sutter 2026). We do not measure children's preferences for competition. Note that some papers have studied how competitiveness of children is related to parents' competitiveness or their socio-economic status (see, e.g., Almås et al. 2016; Khadjavi and Nicklisch 2018; Tungodden and Willén 2023), yet none of them has investigated parenting styles and their potential relation to children's competitiveness.

² The link between parenting styles and economic preferences has so far only been investigated by Falk et al. (2021). They study how IQ and economic preferences differ by a family's socio-economic status and report higher levels of patience and altruism, but lower risk-taking among 7-9-year-old children in (wealthy) Germany who are exposed to positive, maternal parenting styles.

parenting (Dallaire et al. 2006; Rodriguez et al. 2022; Rauh and Renée 2023).³ What we consequently term “positive parenting” shows positive correlations with emotional warmth and monitoring, and negative correlations with negative communication, psychological control, and strict control. We then analyze associations between positive maternal parenting and a wide range of children’s cognitive and non-cognitive skills. For a more comprehensive picture, we additionally link maternal parenting style to children’s performance in objective achievement tests, their engagement in risky and prosocial behaviors in everyday life, emotional and behavioral problems, and life satisfaction.

We find that children of mothers characterized by positive parenting have higher IQs, more pronounced social preferences (i.e., they are more altruistic), are more open to new experiences, conscientious, and agreeable, feel more in control of their lives, have higher self-esteem and self-control. They also perform better in achievement tests at school (in math and Bangla, the country’s language), behave more prosocially in everyday life, and are more satisfied with their lives. By contrast, positive maternal parenting is negatively associated with patience, neuroticism, children’s engagement in risky behaviors, as well as their emotional and behavioral problems.

Before proceeding with the description of our data and presentation of results, it is important to note that—given our cross-sectional setting—we refrain from making causal claims. Since socio-economic disadvantage has been identified as a key determinant of parenting style (Cobb-Clark et al. 2019), we control for family income and parental literacy throughout our analyses. Nevertheless, we cannot rule out that further unobservable factors may drive both children’s skill development as well as their mothers’ way of parenting. Moreover, not only do parents influence children, but children’s behavior may also induce parents to adapt their parenting style. This suggests that analyzing the impact of (likely endogenous) changes in parenting style on changes in child outcomes even in panel data may not fully address the possibility of reverse causality.

Nonetheless, our results complement evidence from randomized interventions targeting parenting and home environment that, if successful, induce exogenous changes in parenting (e.g., Hart et al. 2003; Furlong et al. 2013; Gertler et al. 2014; Sanders et al. 2014; Hackworth et al. 2017; van IJzendoorn et al. 2023; Carneiro et al. 2024). These studies typically assess parenting and selected child outcomes such as cognitive skills, socio-emotional development, problem behaviors, school attainment, involvement in conflicts, or later-life earnings. By contrast, we relate parenting style to an unusually broad set of children’s skills and outcomes—covering cognitive skills, economic preferences, personality traits, achievement tests, everyday behavior, and well-being—across a wide age span from early childhood to adolescence. This helps to clarify which domains of child development are most strongly associated with maternal parenting style and at which ages these associations are most pronounced, thereby informing the choice of outcomes, measurement, and target ages in future parenting interventions and randomized evaluations. Jointly with earlier findings, our results offer a more complete picture of maternal parenting as a key parameter in human capital development.

2. Data

In this study, we use data from incentivized experiments and surveys with 5644 children, aged 6 to 16 years, and their parents from 3543 families in Bangladesh. The data were collected in four different districts across four administrative divisions of Bangladesh between March and May 2018. The sample consists of families from 150 randomly selected villages, with most families having been randomly drawn via local primary schools’ class lists in 2018.⁴ Our data collection aimed at establishing a large sample of families in which we measure whole families’ skills as comprehensively as possible. We elicited cognitive skills, economic preferences (time, risk, and social preferences), and personality traits of up to four household members. Mothers were surveyed regarding their parenting style and answered questions about their children’s behavior. The household head (usually the father) participated in a general household survey which, among other things, measured socio-economic information about the household. Trained interviewers visited each household to collect the data, manually on paper for the experimental modules, and else using electronic data collection tools on mobile tablets. Children and their parents were interviewed individually and separately at their homes to ensure independent responses. Our sample consists of 2101 households in which two (out of at least two) children got interviewed and 1442 households with only one interviewed child. Appendix Tables A1 and A2 provide summary statistics on our sample. Here, we also compare our households to a nationally representative rural sample from the Bangladesh Bureau of Statistics’ (BBS) periodic Household Income and Expenditure Survey (HIES) 2016.⁵ Table A1 demonstrates that the characteristics of our interviewed families are similar to those of other Bangladeshi households, including household size, income, education, and occupation. Table A2

2.1. Outcome measures: skills and behaviors

In the following, we briefly describe all outcome measures for children’s cognitive and non-cognitive skills and behaviors that we

³ There exist different taxonomies of parenting style. One traditional classification in developmental psychology is differentiating between permissive parenting, authoritarian parenting, and authoritative parenting (Baumrind 1966; Doepke et al. 2019). Our measure of parenting style better maps into a binary classification of positive versus negative or non-positive parenting (Weisbecker and DiLalla 2024).

⁴ 18 percent of the children in our sample come from families that have been randomly sampled from the 150 selected villages in the course of an earlier study on arsenic water contamination. Parents in these households were exposed to a randomized controlled trial on how to contain arsenic water contamination in 2015. In Appendix D, we describe the study in more detail and show that our results are robust to controlling for participation in its treatments (Appendix Table A22).

⁵ For more information on the HIES, please visit the official website of the BBS: <https://bbs.gov.bd/> (last accessed on February 16, 2026).

use in our study. Appendix Table A3 presents further details and summarizes the scales (and corresponding references), the exact elicitation tools are available in the online appendix accompanying this paper. For our analyses, all outcome measures are standardized to have a mean of zero and a standard deviation of one for all available observations.

Cognitive skills. To measure children's fluid and crystallized IQ, which together form overall IQ (Cattell 1971), we used the matrix reasoning, digit span, symbol search, and (word) similarities tests of the well-established Wechsler Intelligence Scale for Children (WISC-IV, see Wechsler 2003). Where necessary, the tests were adapted to the specific context of Bangladesh by local academics. These components are standardized and enter the aggregate IQ measure with equal weight.

Economic preferences. To measure their time, risk, and social preferences, all children participated in incentivized experiments, either using monetary values (Bangladeshi Taka) or the experimental currency *stars*. At the end of the experiments, stars were also exchanged into money, and all incentives were proportional to average weekly pocket money at a given age.

Our measure of patience is composed of: (i) the number of patient choices out of six decisions between smaller, sooner and larger, later rewards in the time preferences game (Bauer et al. 2012), and (ii) a survey question that asked children how willing they are to give up something nice today in order to get something even nicer in the future (Falk et al. 2018).

The risk-taking measure consists of: (i) a child's incentivized choice of one out of six lotteries, where higher-numbered lotteries (1 to 6) have both higher expected payoffs and a higher variance of payoffs (Bauer et al. 2012), and (ii) the degree of agreement to the statement "I often take risks" (Falk et al. 2018).

For measuring altruism, we rely on four dictator games in which children had to divide stars between themselves and another, unknown child (Bauer et al. 2014) and calculate the share of stars a child has given away. In each of the four choices (x,y), with x being the number of stars children kept for themselves and y being the number of stars given to the other child, one option was the allocation (1,1), while the alternative allocation benefited children differently ($y > x$ in two cases and $y < x$ in two cases).

For time and risk preferences, we first standardize both components of the respective measure, obtain the mean, and then standardize the overall measure again. This synthesis of lab-in-the-field and survey assessments of skills results in measures that reflect the underlying skills' multi-dimensional nature and comprehensively characterize individuals (Falk et al. 2018; Kosse et al. 2020). Moreover, our approach reduces measurement error and potential demand effects (Hertwig and Ortmann 2001). For social preferences, we only draw on the experimental component, which, however, encompasses four different games.

Personality traits. For younger children up to age 9, the Big Five personality traits were measured using ten items on an eleven-point scale, where mothers ranked their child in comparison to other children of their age (Weinert et al. 2007). Older children (age 10 to 16) assessed themselves using a battery of 16 questions with a scale from one to five (Gerlitz and Schupp 2005).

Children's locus of control (Rotter 1966)—the extent to which they feel being in control over the outcome of events in their lives—was elicited by asking them to rate five items on a five-point scale. To elicit self-control for children aged 6 to 11, mothers answered eight items on impulsivity on a five-point scale (Tsukayama et al. 2013). Older children, aged 12 to 16, responded to a 13-item index on a five-point scale to measure their self-control (Tangney et al. 2004). Self-esteem was measured for children aged 9 to 16 using a four-point scale where children rated themselves on ten statements concerning how they view their qualities and self-worth (Rosenberg 1965). For children younger than 9 years, no self-esteem module was implemented.

To construct the personality indices for the Big Five traits, locus of control, self-control, and self-esteem, items of the respective scales were added and the resulting scores standardized across all available observations. If measures were elicited separately for different ages, each scale was first standardized within the younger or older age groups, then combined, and standardized again across all ages.

Behavioral outcomes. In order to elicit an objective measure of children's educational attainment, we administered achievement tests in the primary schools of our sample at the end of the school year in 2019.⁶ The tests were developed in cooperation with local education professionals and assessed math and Bangla (the national language) skills, as covered in the national curriculum. Our achievement test measure is a composite score that spans both subjects, math and Bangla, which each contain two test components: a multiple-choice and a written-answer section. We first separately standardize the two subjects' total scores, take the average, and then standardize the overall score again.

For children aged 10 to 16, we measured risky behaviors in everyday life by an index constructed from responses to how frequently a child takes risks in 16 situations that are characteristic for rural Bangladesh (e.g., "Do you jump from a tree/a bridge into a river or canal?" or "Do you often get into physical fights?"). The set of questions was developed in focus group discussions with respondents similar to our sample and pre-tested in villages similar to the villages in our sample.

We used the well-established Strengths and Difficulties Questionnaire (SDQ; Goodman 1997; Goodman et al. 2000; Goodman et al. 2010; Briole et al. 2020) to measure emotional and behavioral problems. The full SDQ score comprises four subscales which are further broken down into "internalizing" (indicating emotional and peer problems) and "externalizing" (indicating hyperactivity and conduct problems) behaviors. The SDQ also contains a stand-alone prosociality scale to measure the extent to which children interact with others in a cooperative way in their daily routine (Goodman 1997; Goodman et al. 2000).

Happiness (or life satisfaction) was elicited by asking "How happy are you most of the time?" using a visual Likert scale featuring five smiley faces, ranging from "very unhappy" to "very happy" (Falk et al. 2018).

⁶ During the 2019 school year, we implemented a social and emotional learning program as a randomized, school-based intervention, which we don't analyze here. The paper at hand relies exclusively on pre-treatment data, with the achievement test scores as the only exception. For the achievement test scores, we reduce our estimation sample to children in control group schools who weren't treated to avoid any confounding.

2.2. Parenting style measure

Mothers answered a survey module regarding their parenting style. They rated items such as “I use words and gestures to show my child that I love her/him,” “I talk to my child about things s/he has done, seen, or experienced when s/he was out,” or “I shout at my child when s/he did something wrong” on a five-point scale from “never” to “very frequently.” Appendix A contains the complete list of items. These items are grouped into five scales based on three items each, indicating the degree to which mothers’ parenting style is characterized by emotional warmth, monitoring, negative communication, psychological control, and strict control (Thönnissen et al. 2017). According to the official scale descriptions, emotional warmth and monitoring refer to the degrees of affirmative attention and care in parenting as well as to how well parents are informed about their child’s activities and social contacts. In contrast, negative communication, psychological control, and strict control assess parents’ negative intrusive thoughts, feelings, and behavior toward their child, and how much they employ harsh control and authoritarian behavior. For each of the five dimensions, we calculate the average of the respective items, which we then standardize to have a mean of zero and a standard deviation of one across our child sample. Applying principal component analyses to the sets of items and extracting (standardized) first principal components leads to very similar scales and correlational patterns of these scales with the respective scale’s items. Further, estimation results for regressions of outcomes on parenting style dimensions are similar.

Since only mothers, but not fathers reported their parenting style, all our results refer to maternal parenting and we cannot address the role of fathers’ parenting style. In the context of rural Bangladesh, mothers are the main caregivers of their children and many fathers migrate temporarily for work,⁷ suggesting that maternal parenting style may be particularly important for child outcomes. Moreover, mothers rated the items at the family level, so there is no within-family variation, and siblings from the same household have identical values for parenting style.⁸

2.3. Positive parenting categorization based on linear discriminant analysis (LDA)

Before linking maternal parenting style to outcomes, we use linear discriminant analysis (LDA) for dimensionality reduction of the five parenting scales. This leads to a binary classification of mother-child observations: while one group exhibits higher levels of emotional warmth and monitoring and lower levels of negative communication, psychological control, and strict control, the other group shows opposite behavior. Following these descriptions, we term our classification positive versus negative parenting.⁹ We have a similar number of observations within each parenting category. Since LDA is rarely used in economics, we are providing more details about the method here in the main text rather than simply relegating it to the appendix. Readers familiar with LDA may easily skip this part.

LDA is a supervised learning model commonly applied to reduce dimensionality. In general, discriminant analysis is a classificatory technique (Fisher 1936) that is used to classify cases or observations into pre-existing groups based on similarities between that case and the other cases belonging to the respective group. As a supervised learning model, LDA is based on a priori knowledge about the classification being formed: class-labeled data are provided and the algorithm maximizes the difference between these classes. We use a median split in monthly household income as the supervising class since previous research has documented a link between parenting style and income and/or socio-economic status as a combination of income and parental education (Barrera et al. 2002; Lee et al. 2009; Ponnet et al. 2016; Cobb-Clark et al. 2019). It seems plausible that high income allows parents to allocate more attention, material and cognitive resources to parenting with more and richer exchanges between parent and child, while low family income may be associated with increased parental stress or conflicts within the family, leading to negative parenting behaviors. Moreover, the family stress model emphasizes that economic hardship directly impacts parenting competence (Kim and Chung 2021).¹⁰

Our income measure is aggregated across all household members and includes income from a variety of sources that are common in non-WEIRD contexts. These include income from daily-wage or salaried work; agricultural income from own production, livestock, fish, or forestry; income from running a business; and income from other sources such as remittances. This detailed elicitation is built on survey modules used by the Bangladesh Bureau of Statistics in its recurrent Household Income and Expenditure Survey (HIES), which follows the well-established World Bank Living Standard Measurement Survey (LSMS) applied in about 100 developing

⁷ In our sample, 20 percent of fathers did not participate in the experiments due to living abroad or living/working outside of the survey area.

⁸ In light of the literature on parental differential treatment of children (Jenkins et al. 2003; Feinberg and Hetherington 2001; Eradus et al. 2024), this is a limitation. However, other empirical evidence shows moderate to high correlations of parenting style within families (Atzaba-Poria and Pike 2008; Roskam and Meunier 2009; Plomin and Daniels 2011). In particular parental warmth appears to be more similar across children and seems to be much related to parents’ personality (Weisbecker and DiLalla 2024). Other family-level factors that are known to influence parenting style and speak to a non-negligible share of persistency of parenting within families are, for example, institutional settings, family’s socio-economic status, and transmission of parenting behavior over generations (Doepke and Zilibotti 2017; Euser et al. 2020). We turn to predictors of parenting style in more detail in section 3.1.

⁹ In psychology, there is ongoing discussion whether and how much supportive-positive and harsh-negative parenting behavior may overlap and interact (Dallaire et al. 2006; Rodriguez et al. 2022). With our approach, observations are classified as positive [negative] according to their tendency to show both high [low] levels of warm/supportive-positive parenting behavior and low [high] levels of harsh/coercive-negative parenting behavior.

¹⁰ A further rationale for using household income as the supervising variable is that household income has been linked to children’s cognitive and non-cognitive skills as well as behavioral outcomes (Fletcher 2010; Noonan et al. 2018). However, income obviously does not capture all parental inputs (Anger and Schnitzlein 2017), calling for the investigation of further family characteristics such as parenting style.

countries to measure poverty.¹¹ It provides a comprehensive measure of what contributes to a household's economic well-being and reduces measurement error compared to asking households about total income, which they would otherwise have to calculate themselves.

The goal of LDA is to classify observations as clearly as possible according to underlying groups. That is, we aim at classifying child observations based on the maternal parenting style data according to whether they belong to a positive or a negative parenting group. LDA assumes that groups or classes are linearly separable and creates a multiple linear discriminant function (which represents hyperplanes in the feature space) to distinguish classes. If there are two classes, as in our setting, LDA draws one hyperplane and projects the data onto this hyperplane in such a way that the separation between the two classes is maximized by maximizing the ratio of the between-class variance and the within-class variance (Mohanty et al. 2013; Vaibhaw and Pattnaik 2020).¹²

The linear discriminant function that links the independent variables (parenting style dimensions) to the binary parenting style classification is given by:

$$D = \phi_1 x_1 + \phi_2 x_2 + \dots + \phi_n x_n \quad (1)$$

D is the discriminant score, ϕ_n are model coefficients, and x_n are the measurements of independent variables. Classification of observations is done based on their discriminant scores.

LDA searches for coefficients (i.e., linear combinations of parenting style dimensions or new data axes) that maximize the linear score function. This linear score function comprises the two simultaneous goals of LDA of maximizing the group differences (between-class scatter) and minimizing the variance (within-class scatter) for optimal separation. It is given by:

$$S(\phi) = \frac{(\phi' \mu_1 - \phi' \mu_2)^2}{\phi' \sum \phi} \quad (2)$$

where

μ_1 = (parenting style data) means of the group with below-median income,

μ_2 = (parenting style data) means of the group with above-median income,

$\sum$ = pooled variance-covariance matrix,

ϕ' = transpose of ϕ (vector of model coefficients).

LDA uses the linear discriminant function to obtain the classification rule. It stratifies the sample units (mother-child pairs) into two classes that are clustered on different sides of the separating hyperplane. In the appendix (section on LDA assumptions in Appendix B), we state the model assumptions of LDA and provide empirical tests to demonstrate that they are largely met by our data.

Column (1) of Table 1 contains the standardized discriminant function coefficients for the LDA (ϕ , see equation 2). The structure matrix, displayed in column (2), gives the correlations between the values of the independent variables and those of the discriminant function. These correlations are analogous to factor loadings in factor analysis. One can understand how to interpret a discriminant function by identifying the largest absolute correlation associated with it. Variables with higher values in the structure matrix play a more significant role in the discriminant function analysis. The last column gives pairwise correlations between the parenting style dimensions and the new classification.

LDA successfully separates our data into two different categories that can be predicted by the five measured parenting style dimensions. This separation has a straightforward interpretation as positive versus negative or non-positive parenting, as is supported by the correlations displayed in Table 1: positive parenting is positively associated with emotional warmth and monitoring, and negatively associated with negative communication, psychological control, and strict control.

Table 2 shows how the LDA classification of positive and negative maternal parenting relates to the income groups used as inputs for the LDA.¹³ The LDA classification substantially diverges from the income classes and thus contains and uses information (from the parenting style dimensions) that go beyond the classification of families according to income.¹⁴

¹¹ Our survey modules are available in the 2010 HIES questionnaire (<https://catalog.ihns.org/catalog/2257/related-materials>). For more information on the LSMS, please visit the World Bank's overview website: <https://www.worldbank.org/en/programs/lms/>. Websites were last accessed on February 16, 2026.

¹² Principal component analysis (PCA) is another prominent dimensionality-reduction method that also aims at reducing the number of variables of a data set, while preserving as much information as possible. Contrary to LDA, PCA is an unsupervised linear transformation technique that ignores classes, i.e., it is a clustering method in contrast to a classification method. PCA has no discriminatory power and does not take into account whether a dataset represents features from one or more classes. Applying PCA, the interpretation of associations of the principal components with our outcome variables is not as clear-cut as with the LDA approach. We discuss this in more detail when presenting alternative measures of parenting style in section 3.2.3.

¹³ In order to check model accuracy, we also created a random 80:20 data split to create training and testing data. We repeat the LDA over ten iterations and use a support-vector machine classifier to test model accuracy. The data is presented in the visual matrix in appendix Figure A2 which demonstrates that the model is able to correctly predict the binary parenting categories of observations with parenting style data only.

¹⁴ This is also supported by a direct mapping of income into our outcome variables in Appendix Table A7. This mapping is far less predictive, both in terms of effect sizes and significance, than the one in Table 3.

Table 1

Canonical discriminant function coefficients, structure matrix, and pairwise correlations of parenting style classes and underlying dimensions.

	(1) CDF coefficients	(2) Structure matrix	(3) Pairwise correlations
Emotional warmth	−0.123	−0.297	0.264
Monitoring	−0.649	−0.497	0.378
Negative communication	0.726	0.718	−0.579
Psychological control	0.253	0.404	−0.353
Strict control	0.056	0.308	−0.275

NOTES: Table displays the standardized LDA canonical discriminant function (CDF) coefficients in column (1), the structure matrix in column (2), and the pairwise correlation coefficients between the parenting style dimensions and the new parenting style classification where 1 = positive parenting and 0 = negative parenting in column (3).

Table 2

Income categories and categorization based on LDA.

Income category	Classified		Total
	0 (neg. parenting)	1 (pos. parenting)	
0 (low)	1478	1344	2822
	52.37%	47.63%	100%
1 (high)	1264	1558	2822
	44.79%	55.21%	100%
Total	2742	2902	5644
	48.58%	51.42%	100%

NOTES: The table shows a comparison of the median split by monthly income (table rows: p50 and above = 1, below = 0) and the split that results from the LDA classification (table columns) which is based on the five parenting style dimensions.

3. Results

Before we move on to presenting our results on the link between positive maternal parenting style and child outcomes in section 3.2, we start by discussing predictors of a positive parenting style in section 3.1 (Tables A4–A7).

3.1. Predictors of a positive parenting style

We first examine which parent and household characteristics predict positive maternal parenting. Appendix Table A8 reports OLS regressions of the positive parenting indicator on an increasingly rich set of covariates (parent and household characteristics as well as children's gender and age composition).¹⁵ Column (1) focuses on pre-determined characteristics (parental education and religion) or characteristics that are out of parents' control (the gender composition of their children). An *F*-test indicates that these exogenous variables are jointly significant predictors of maternal parenting style ($p < 0.001$). In particular, parental education matters: mothers with at least a secondary school leaving certificate (about 5 percent in our sample) are 11.8 percentage points more likely to have a positive parenting style; being married to a literate father—56 percent of fathers in our sample are literate—increases the likelihood of a positive parenting style by 5.6 percentage points. Parenting style does not differ between Muslim (82 percent in our sample) and non-Muslim households. The relationship between children's gender composition and positive parenting style is non-linear in the share of girls. Positive maternal parenting styles are more prevalent in households with girls only. Column (2) adds both parents' age and average child age, the number of children as well as household income and wealth as explanatory variables. The results reveal that positive parenting styles are moderately more common in families with older children. Other than that, these variables add relatively little predictive power and leave the previous results qualitatively unchanged. Finally, column (3) further adds an extensive set of both parents' skills (IQ, economic preferences, and personality traits that are typically considered stable in adulthood) as well as their life satisfaction as possible predictors of parenting style. The results reveal that more intelligent, altruistic, agreeable, extraverted, and self-controlled mothers as well as those with higher self-esteem are more likely to have a positive parenting style. The coefficient is largest for self-control: a one standard deviation increase in maternal self-control is associated with a 6.4 percentage point increase in having a positive parenting style. Fathers' characteristics are less predictive for maternal parenting; only IQ and self-esteem of fathers turn out to be significant predictors. Overall, the predictive power of mothers' traits for their parental style is substantial.¹⁶

The results above demonstrate that parent and household characteristics are predictive of maternal parenting style. Still, we cannot rule out reverse causality, i.e., mothers adjusting their parenting style in response to their children's behavior and needs. Consequently, our analysis is a descriptive one. In addition to child and parental characteristics, literature from different disciplines has

¹⁵ Using probit or logit regressions leaves our results unchanged.

¹⁶ Based on these results, we demonstrate below in a robustness check that the predictive power of maternal parenting style for child outcomes remains substantial when we control for the direct intergenerational transmission of parental skills to their children.

identified numerous factors that influence parents' choice of their parenting style (Klahr and Burt 2014). At the family level, the socioeconomic environment in which parents themselves grew up and in which they interact with their children affects their way of parenting, as does their religiosity (Doepke and Zilibotti 2019). Parenting behavior has also been shown to be transmitted over generations, with both negative and positive early experiences predicting later parenting behavior (Klahr and Burt 2014; Euser et al. 2020). At a higher level, the observation that parenting styles vary across countries and time has revealed that institutional and cultural contexts, with different degrees of income inequality, returns to education, redistributive policies, and quality of institutions, significantly influence how parents raise their children (Doepke and Zilibotti 2017, 2019, 2024). Although parental differential treatment may be present in families, the empirical prevalence of external, often even exogenous factors that determine parenting style and are shared across siblings limits the scope of parents reacting to their children's behaviors.

3.2. Positive parenting and children's skills and well-being

3.2.1. Empirical strategy

We estimate the following OLS regressions model:

$$y_{if} = \alpha + \beta_p P_f + \phi_X X_{if} + \sigma_H H_f + \lambda_{if} + \varepsilon_{if} \quad (3)$$

where y_{if} is the outcome of child i in family f , P_f is the positive parenting style indicator variable, X_{if} is a vector of control variables (gender and number of siblings) and H_f is a vector of household socio-demographics (family income, literacy of father, literacy of mother). We control for families' socio-economic status to alleviate concerns that mothers' self-assessed parenting style might simply reflect differences in family background. λ_{if} is a vector of district and age fixed effects¹⁷ and ε_{if} is the idiosyncratic error term. Standard errors are clustered at the village level. To correct for multiple hypothesis testing, we implement sharpened two-stage q -values.¹⁸ Our main results refer to specifications in which children of all ages are pooled together.

3.2.2. Main results

Table 3 displays our main results, which are based on separate OLS regressions for each dependent variable listed in the left-most column. These regressions use the binary, LDA-based indicator of mothers' positive parenting as the main explanatory variable and further include relevant control variables. The second column reports the estimated associations with positive parenting, and the third column illustrates their relative magnitudes using bars (light green for positive associations, dark green for negative associations). To account for multiple hypothesis testing, we not only show conventional standard errors in column (3) and significance levels illustrated by stars in column (1), but also false discovery rate adjusted q -values in column (5). The underlying full regression results are provided in the appendix (see Tables A9–A13).

Cognitive skills. Children raised with positive, as opposed to negative, maternal parenting have significantly higher IQs, with an effect size of about 12 percent of a standard deviation ($p < 0.01$). While empirical evidence specifically linking parenting style and cognitive skills is scarce, our finding is in line with related work documenting, e.g., a positive relationship between children's cognitive skills and the time parents spend with their children on educational activities (Fiorini and Keane 2014). Our finding also relates to reported positive associations between parental involvement and academic achievement of children (Pinquart 2016).

Economic preferences. We provide novel evidence that positive parenting is also associated with children's economic preferences. Children with mothers who adopt a positive parenting style are more altruistic (by 8 percent of a standard deviation, $p < 0.05$). Maternal positive parenting tends to be negatively related to children's risk-taking (6 percent of a standard deviation, only marginally significant with $p < 0.10$) and patience (8 percent of a standard deviation, $p < 0.05$). While the results for altruism and risk preferences seem intuitive, the finding on a negative relation between positive parenting and patience may seem surprising, as Falk et al. (2021) document a higher degree of patience (and altruism, but less risk-taking) in German children who are exposed to a positive parenting style. However, the negative association between positive maternal parenting and patience emerges consistently across age groups (see Appendix Tables A14 and A15), gender (splitting by gender, the coefficient is -0.118 with $p < 0.01$ for girls and -0.047 , not significant at conventional levels, for boys), and when separately analyzing the experimental and survey measure of patience instead of aggregating them into a single measure (the coefficient is -0.099 with $p < 0.05$ for the survey measure and -0.023 , not significant at conventional levels, for the experimental measure of patience). Bertermann et al. (2026) document a negative age trend in patience in our sample in Bangladesh and argue that the context under study is a particularly shock-prone environment in which investments into the future and forward-looking behavior (patience) may often not pay off due the high frequency of natural disasters such as floods and individual-level shocks that people are exposed to. The lower returns to patience may contribute to the fact that we do not observe a

¹⁷ While children from below-median-income households are younger on average, the distribution and mean of children's ages do not differ between the two parenting style classes. By controlling for age fixed effects in our regressions, we compare only children of the same age.

¹⁸ See Anderson (2008) for the application of adjusted p -values using False Discovery Rate (FDR) as per Benjamini, Krieger, and Yekutieli (2006). The FDR is the expected proportion of rejections that are type I errors (false rejections). Please note that, as Anderson also mentions in his code, sharpened q -values can actually be smaller than unadjusted p -values in some cases when many hypotheses are rejected.

Table 3

Child outcomes and positive parenting for children aged 6 to 16.

	(1)	(2)	(3)	(4)	(5)	(6)
	positive parenting					
	Coefficient		SE	Adj. R ²	q-value	Obs.
Cognitive skills						
IQ	0.120***		(0.029)	0.397	0.001	5,644
Non-cognitive skills						
<i>Economic preferences</i>						
patience	-0.082**		(0.036)	0.003	0.008	5,017
risk-taking	-0.064*		(0.038)	0.020	0.017	5,224
altruism	0.078**		(0.031)	0.005	0.006	5,426
<i>Personality traits</i>						
Big Five openness	0.311***		(0.036)	0.051	0.001	5,590
Big Five conscientiousness	0.366***		(0.035)	0.060	0.001	5,590
Big Five extraversion	0.050*		(0.030)	0.046	0.017	5,590
Big Five agreeableness	0.402***		(0.035)	0.056	0.001	5,590
Big Five neuroticism	-0.286***		(0.037)	0.035	0.001	5,590
locus of control	0.232***		(0.042)	0.040	0.001	5,644
self-control	0.451***		(0.045)	0.090	0.001	5,589
self-esteem	0.389***		(0.043)	0.125	0.001	4,010
Behavioral outcomes						
achievement test score	0.207***		(0.071)	0.166	0.002	710
risky behaviors	-0.205***		(0.039)	0.253	0.001	3,225
prosociality	0.408***		(0.042)	0.074	0.001	5,501
SDQ internalizing behavior	-0.449***		(0.046)	0.100	0.001	5,501
SDQ externalizing behavior	-0.502***		(0.043)	0.129	0.001	5,501
happiness	0.089***		(0.034)	0.028	0.004	5,644

NOTES: The table shows results for separate OLS regressions of child outcomes (stated in the left-most column, all standardized) on parenting style for children aged 6 to 16. Column (1) shows coefficients for the LDA-based, binary parenting style measure (1 = positive parenting, 0 = non-positive or negative parenting). Column (2) visualizes effect sizes. Column (3) shows conventional standard errors, column (4) the regressions' adjusted R², and column (6) the number of observations. To address multiple hypothesis testing, column (5) displays false discovery rate adjusted *q*-values. Control variables include gender, age fixed effects, number of siblings, log of yearly family income, literacy of father, literacy of mother, and district fixed effects. Standard errors are clustered at the village level. Significance at **p* < 0.10, ***p* < 0.05, ****p* < 0.01.

positive link between positive maternal parenting and patience.¹⁹

Personality traits. Mothers' parenting style is clearly connected to children's personality traits. Among the five dimensions captured by the Big Five, openness, conscientiousness, and agreeableness are all significantly positively associated with positive parenting (in the range of 30 to 40 percent of a standard deviation, *p* < 0.01), neuroticism has a negative relationship (in the order of 29 percent of a standard deviation, *p* < 0.01). For extraversion, we find an only marginally significant coefficient for positive parenting in the overall sample. Positive parenting is also significantly positively associated with children feeling more in control of their life (23 percent of a standard deviation, *p* < 0.01), as well as with children's greater self-control (45 percent of a standard deviation, *p* < 0.01) and higher self-esteem (39 percent of a standard deviation, *p* < 0.01).

¹⁹ Furthermore, our result resembles evidence from Kiessling et al. (2025) who study parental paternalism (measured by the extent to which parents interfere in the decision-making of their children) in part of our sample in Bangladesh. They find that more paternalistic parents make fewer patient choices for their children and have less patient children. As positive parenting is positively correlated with parental paternalism, their findings indirectly establish a similar negative link between positive parenting and children's patience as we find it here.

Behavioral outcomes. Mothers' positive parenting is associated with better performance in objective achievement tests in primary school in math and Bangla (21 percent of a standard deviation for a composite score of both subjects, $p < 0.01$). This goes well together with the positive relationship between parental involvement and children's academic achievement (Pinquart 2016) as well as with associations of respectful parenting with positive educational outcomes of youths (Cobb-Clark et al. 2019).

Furthermore, risky behaviors are less often (21 percent of a standard deviation, $p < 0.01$) and prosocial behaviors (like helping others or sharing) are more frequently observed with positive parenting (41 percent of a standard deviation, $p < 0.01$). In a similar vein, respectful and monitoring parenting have been found to be related to fewer risky behaviors of youths (Cobb-Clark et al. 2019).

Children raised with positive parenting styles have fewer emotional and behavioral problems, as measured by the Strength and Difficulties Questionnaire (SDQ) scores for internalizing and externalizing behavior; maternal positive parenting goes along with 45 to 50 percent of a standard deviation ($p < 0.01$) lower levels of problems; for related findings, see Fiorini and Keane (2014). Finally, positive parenting and children's happiness are positively associated (9 percent of a standard deviation, $p < 0.01$).

3.2.3. Robustness checks and further results

Heterogeneity by age.²⁰ Our data cover a broad age span, allowing us to investigate whether the predictive power of mothers' parenting style differs between younger and older children (age 6 to 9 versus 10 to 16). We use an age cutoff of 10 years because the Big Five personality traits that enter our main analysis are self-assessed by children from age 10 onwards and assessed by their mothers for children younger than 10. The results on heterogeneity by age are presented in Appendix Tables A14 and A15, in which child outcomes are standardized separately for younger and older children.

In sum, the documented patterns are broadly consistent for younger and older children. Mothers' parenting style has the same sign for all child outcomes but one (extraversion²¹) across both groups and significance levels are similar as well. Overall, the results reveal a slightly stronger link between maternal parenting style and child outcomes for younger children. This is particularly true for children's IQ, achievement test scores, and happiness, but also, to a smaller extent, for their Big Five and locus of control. The result for IQ is consistent with younger ages being so-called sensitive periods for the acquisition of cognitive skills (Cunha and Heckman 2008), during which returns to investments are particularly high (Cunha and Heckman 2007). For the SDQ prosociality, internalizing, and externalizing scales and the economic preferences, the strength of the association between parenting and child outcomes is comparable for younger and older children. Only for children's self-esteem, the reversed pattern emerges: parenting is a stronger predictor of self-esteem for older rather than younger children.

Common-rater bias. Most of the outcome measures we study are elicited from children themselves (IQ, incentivized measures of time, risk, and social preferences, locus of control, self-esteem, risky behaviors, happiness, achievement test scores at all ages; the Big Five personality traits from age 10 onwards and self-control from age 12 onwards). As is common, the SDQ with its three subscales for prosociality, internalizing, and externalizing behavior is reported by the mother. Moreover, we decided to ask mothers to rate their younger children's Big Five personality traits (up to age 11) and self-control (up to age 13), as younger children may still lack sufficient self-reflection to provide meaningful and reliable answers to the corresponding survey items. This may raise the concern that the strong associations between maternal positive parenting and the mother-rated outcomes could partly reflect common-rater bias: mothers who view themselves and their parenting style as positive may also rate their children more favorably regarding their behavior and personality. Fortunately, when designing our data collection we decided to have an overlapping interval of children's age in which both children and mothers rate the Big Five (10 to 11 years) and self-control (12 to 13 years) to be able to study the possible role of different sources of elicitation (children versus mothers) for the measured constructs and to address concerns like common-rater bias. Following our main specification, but focusing on the overlapping age range subsample only, Appendix Table A16 contrasts the estimation results for the Big Five and self-control of the exact same children when the outcome variables are elicited from the mothers versus children. With the exception of extraversion, the estimated associations of maternal positive parenting and child outcomes are comparable in size irrespective of whether they are elicited from mothers or children and, in the majority of cases, even slightly larger for child-reported outcomes. This alleviates the concern that common-rater bias may be a driving force behind the strong associations between maternal positive parenting and child outcomes that we document.

The role of intergenerational transmission. Due to possible endogeneity issues, we consider our analysis a descriptive one and refrain from making causal claims. However, we can use our data to address the concern that the predictive power of maternal parenting style for child outcomes may partly reflect the direct intergenerational transmission of parental skills to children due to omitted variable bias. In Appendix Tables A17 and A18, we add those skills of mothers and fathers to our main estimation equation (3) that directly (or, in the case of child behaviors, most closely) match the child outcome under study. For example, we control for both parents' agreeableness in regressions of child agreeableness on maternal parenting style on top of our standard set of control variables. As expected, the results provide strong evidence for intergenerational transmission of IQ, economic preferences, and all personality traits. Importantly, the predictive power of parenting style remains significant for 14 out of the 16 child outcomes for which parenting

²⁰ We also split our sample by gender. The associations are largely comparable across groups and our analyses don't reveal any striking patterns, so we don't report the results in detail here. It is worth noting that the relationships between parenting style and altruism as well as parenting style and patience are driven by girls. On the other hand, prosocial field behaviors are more strongly associated with positive parenting style for boys.

²¹ Extraversion is the single personality trait for which we only find a marginally significant coefficient for positive parenting in the overall sample. Interestingly, the age split reveals that this is driven by two offsetting, heterogeneous effects: the positive coefficient becomes much larger and more significant for the sample of older children ($\beta = 0.281$, $p < 0.01$) but turns significantly negative if we only consider the sample of younger children ($\beta = -0.266$, $p < 0.01$).

style is a significant predictor at the 95 percent level in Table 3. For about half of them, the coefficient of parenting style changes merely; for the other half, it decreases but remains significant. Only for IQ and altruism, the predictive power of maternal parenting style vanishes when controlling for direct intergenerational transmission.

Summary indices for outcome domains: socio-emotional and economic preferences index. So far, we have treated the rich set of child outcomes under study as a long list of separate dependent variables. While this provides a detailed and nuanced account of the link between maternal parenting style and child outcomes, it may make it harder to see the bigger picture and may raise the question of how correlated the outcomes are.

Appendix Fig. A3 displays a heat plot of all pairwise correlations among the 18 child outcomes under study. Overall, the correlation patterns seem intuitive. For example, the achievement test scores correlate most strongly and significantly with IQ. One of the highest correlations of risk-taking preferences is the one with risky behaviors. Positive correlations with prosocial behaviors are strongest (above 0.2 and significant) for openness, conscientiousness, agreeableness, self-confidence, locus of control, and self-esteem, and negative for neuroticism, internalizing and externalizing behavior; the correlation of altruism and prosocial behavior is positive and significant as well, but small. With the exception of extraversion, all personality traits (i.e., openness, conscientiousness, agreeableness, locus of control, self-control, self-esteem) correlate positively and significantly with each other and negatively with neuroticism; correlations are typically between 0.2 and 0.4. The correlations among the three economic preference dimensions are substantially smaller (all below 0.12), with risk taking and altruism being negatively correlated ($p < 0.01$), risk taking and patience positively ($p < 0.01$), while the correlation of altruism and patience is close to zero. All correlations with happiness are rather small. Happiness has its strongest correlation with self-esteem (0.18, with $p < 0.01$) and a negative one with neuroticism, which is intuitively plausible.

Based on conceptual reasons and the rather high and consistent correlations between the personality traits and behavioral outcomes, we proceed by forming two summary indices via principal component analysis (PCA): a socio-emotional and an economic preferences index. Due to the substantially lower numbers of observations than for the other outcome dimensions, we are dropping the achievement test scores ($N = 710$, subset of ages 6 to 12 only), risky behaviors ($N = 3225$, ages 10 to 16), and self-esteem ($N = 4010$, ages 9 to 16). As we have dropped the achievement tests, a third cognitive “index” consists of the standardized IQ scores only. Applying PCA to the three economic preference measures results in a single component with an eigenvalue greater than one that loads positively on time and risk preferences and negatively on altruism, see column (1) of Appendix Table A19. Applying PCA to the Big Five, locus of control, self-control, the SDQ prosociality, internalizing, and externalizing scales as well as happiness and imposing a single component results in an index that loads positively on openness, conscientiousness, agreeableness, locus of control, self-control, prosociality, and happiness, and negatively on extraversion, neuroticism, internalizing, and externalizing behavior. All loadings are comparable in size, except for those of extraversion and happiness which are substantially smaller; see column (2) of Appendix Table A19.²² Table 4 displays the results of regressions of the three indices on maternal parenting style. They confirm that the association between socio-emotional skills and behaviors and maternal parenting style are stronger than those between parenting style and IQ and the economic preferences. In combination with the signs of the factor loadings, the positive coefficients for the socio-emotional index and IQ and the negative one for the economic preferences index align extremely well with the outcome-wise results in Table 3.

Alternative measures of parenting style. Our main results rely on a binary parenting style classification that relates well to what the literature refers to as positive and negative parenting (Dallaire et al. 2006; Rodriguez et al. 2022; Rauh and Renée 2023). This approach allows for a concise mapping of parenting style into the numerous child outcomes under study. However, a single, binary measure of parenting style substantially reduces the richness of the continuous and five-dimensional parenting style data that are underlying it. In the following, we therefore demonstrate that our results remain very similar if we use (i) a continuous instead of binary, single-dimension measure of maternal parenting style and (ii) the underlying continuous measures of emotional warmth, monitoring, negative communication, psychological control, and strict control as separate independent variables in our regressions of child outcomes on maternal parenting style.

For (ii), we use the separate, continuous five parenting style dimensions as they enter the LDA as input variables (see section 2.2 for how the five parenting style dimensions are constructed based on the items listed in Appendix A). To derive a continuous, yet single-dimensional index of the five parenting style dimensions, we group emotional warmth and monitoring as the two dimensions that are associated with a positive parenting style, characterized by affirmative attention and care, and negative communication, psychological control, and strict control as the three dimensions that reflect a more negative style, characterized by harshness and rigid as well as manipulative control. We reverse the negative dimensions and then construct the average of all five standardized scales, standardizing the resulting index once more to have a mean of zero and standard deviation of one across the estimation sample. This continuous “positive parenting index” shows comparable correlations with the five original style dimensions as the LDA-based positive parenting indicator (see Appendix Table A20). In addition to its intuitive appeal, the grouping of dimensions is further guided by the traditional taxonomy of parenting style in developmental psychology that differentiates between permissive parenting, authoritarian parenting, and authoritative parenting (Baumrind 1966; Doepke et al. 2019). The framework delineates two core dimensions along which parenting is then classified: responsiveness and warmth on the one hand, and demandingness and control on the other hand. The former dimension captures the degree to which parents are supportive, affectionate, and attuned to their child’s needs. The latter dimension captures the degree to which parents set standards, monitor behavior, and enforce rules. Our emotional warmth scale

²² Not imposing a single component results in three components with eigenvalues greater than one, with the first eigenvalue of 3.58 being much larger than the other two (1.13 and 1.09, respectively). The second component loads high on extraversion, the third on happiness, while the first component loads high on all other traits and behaviors.

Table 4

Regressions of child outcome indices on parenting style.

	(1) Cognitive skills: IQ	(2) Economic preferences index	(3) Socio- emotional index
positive parenting	0.120*** (0.029)	−0.132*** (0.039)	0.604*** (0.045)
Adj. R ²	0.397	0.017	0.151
Observations	5644	4779	5448

NOTES: The table shows results for OLS regressions of child outcomes and outcome indices (stated in the column headers, all standardized to have mean 0 and standard deviation 1 across the respective estimation sample) on the LDA-based, binary parenting style measure (1 = positive parenting). Outcome indices in columns (2) and (3) are generated by running principal component analyses (PCA's) across different sets of child outcomes. See Appendix Table A19 for details on variables and factor loadings. Control variables include gender, age fixed effects, number of siblings, log of yearly family income, literacy of father, literacy of mother, and district fixed effects. Standard errors (in parentheses) are clustered at the village level. Significance at * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

directly captures the positive responsiveness dimension, while negative communication reflects its other end, a harsh, critical, or hostile interaction style. The three control-related scales—monitoring, psychological control, and strict control—capture different types of control, where monitoring represents interest and structure-providing control, and psychological and strict control represent maladaptive control, featuring rigid, inflexible rule enforcement, and manipulation through guilt or love withdrawal (Table A21).²³

Tables 5 and 6 present three sets of results for regressions of the 18 child outcomes on the various measures of maternal parenting style: to ease comparison, Panel A repeats the results in Table 3 that are based on the binary parenting style measure. Panel B uses the continuous parenting style index instead of the binary measure and Panel C the five continuous, separate dimensions of parenting style. The results for the continuous index and the binary measure of parenting style align closely. For all 18 child outcomes, the sign of parenting style coefficients is the same, for 15 out of 18 outcomes significance levels remain comparable, and most effect sizes are large across both specifications. Analyzing the five parenting style dimensions separately, emotional warmth, negative communication, and psychological control turn out to be most predictive of child outcomes, but all five dimensions predict some outcomes. Notably, when a parenting style dimension is a significant predictor, the signs align well with how the five dimensions are aggregated into the binary measure of parenting style and the continuous index: emotional warmth and monitoring have the same sign and the same is true for negative communication, psychological control, and strict control. There are only very few exceptions: while negative communication and psychological control predict higher participation in risky behaviors and lower prosociality as one would expect, strict control has the opposite sign. This seems intuitive since parents who strictly control their children may effectively restrict their children's everyday behavior, hindering them to take excessive risks or to behave in an antisocial manner.²⁴

4. Conclusion

Parenting has been recognized as an essential contributor to the skills, health, shared norms, and well-being of children (Cobb-Clark et al. 2019; Doepke et al. 2019; Brouwer et al. 2023). While numerous factors shape children's life outcomes—such as peers, teachers, and neighborhood environments—the way children are raised and treated by their parents plays a central role.

This study contributes to the empirical evidence on the prime importance of mothers' parenting style for a wide range of children's skills and behaviors. In contrast to previous studies, we examine an extraordinarily broad range of outcomes simultaneously, offering a uniquely comprehensive perspective on the relation of mothers' parenting styles to such outcomes. Moreover, we present novel evidence that children of mothers who adopt a positive parenting style are more altruistic, but tend to be less risk-taking and patient. Making use of the extensive age span of children in our data, we find that the relationship of mothers' parenting style to children's outcomes is broadly consistent for younger and older children (age 6 to 9 versus 10 to 16), with a slightly stronger link between parenting style and outcomes for younger children.

We find consistent and robust associations between maternal positive parenting and a wide range of cognitive and non-cognitive skills, as well as behavioral outcomes of children. All of these traits have been shown to influence children's later life outcomes as adults (Golsteyn et al. 2014; Falk et al. 2018; Kosse and Tincani 2020). While the relationship between maternal positive parenting and

²³ An alternative to our aggregation approach is to apply a principal component analysis (PCA) to the five parenting dimensions. This yields two principal components with eigenvalues greater than one (see Appendix Table A21 for their factor loadings). The second component closely mirrors our LDA-based parenting-style classification: it loads positively and highly on the two positive parenting dimensions (emotional warmth and monitoring) and negatively on the three negative ones (negative communications, psychological control, and strict control). The first component instead captures a broader notion of *engaged and controlling* parenting, with relatively high loadings on the three negative dimensions and positive loadings on all dimensions. Regression results using these two PCA components (not shown) display patterns that are qualitatively consistent with those obtained using LDA-based classification and the separate dimensions. In particular, the second component is a significant predictor ($p < 0.01$) of IQ, all personality traits, risky behaviors, prosociality, internalizing and externalizing behaviors with the same sign as the LDA-based parenting measure. Since associations of parenting style and child outcomes are similarly, but more compactly and intuitively organized by the LDA-based binary parenting style indicator, we prefer this approach, which is further supported by the manual aggregation of scales into the continuous positive parenting index.

²⁴ Moreover, negative communication predicts extraversion with a positive sign, which is unexpected.

Table 5

Child outcomes and positive parenting—different ways of aggregating parenting style I.

	Cognitive skills	Non-cognitive skills: Economic preferences			Behavioral outcomes					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	IQ	patience	risk-taking	altruism	achievement test score	risky behaviors	prosociality	SDQ intern.	SDQ extern.	happiness
Panel A										
LDA-based positive parenting indicator	0.120*** (0.029)	−0.082** (0.036)	−0.064* (0.038)	0.078** (0.031)	0.207*** (0.071)	−0.205*** (0.039)	0.408*** (0.042)	−0.449*** (0.046)	−0.502*** (0.043)	0.089*** (0.034)
Adj. R ²	0.397	0.003	0.020	0.005	0.166	0.253	0.074	0.100	0.129	0.028
Panel B										
positive parenting index (std)	0.081*** (0.017)	−0.048*** (0.018)	−0.043** (0.020)	0.015 (0.018)	0.068* (0.040)	−0.095*** (0.021)	0.233*** (0.023)	−0.341*** (0.029)	−0.346*** (0.025)	0.062*** (0.021)
q-value	0.001	0.003	0.008	0.049	0.017	0.001	0.001	0.001	0.001	0.002
Adj. R ²	0.400	0.004	0.021	0.003	0.160	0.251	0.085	0.160	0.180	0.030
Panel C										
dimension emotional warmth (std)	0.090*** (0.020)	−0.007 (0.023)	0.044** (0.019)	−0.063*** (0.015)	0.018 (0.046)	0.005 (0.017)	0.226*** (0.022)	−0.184*** (0.018)	−0.178*** (0.016)	−0.034* (0.018)
q-value	0.001	0.305	0.018	0.001	0.288	0.305	0.001	0.001	0.001	0.041
dimension monitoring (std)	0.008 (0.014)	−0.010 (0.020)	−0.010 (0.019)	0.024 (0.015)	0.040 (0.038)	−0.027 (0.020)	0.174*** (0.023)	0.009 (0.019)	−0.061*** (0.016)	0.018 (0.018)
q-value	0.243	0.262	0.262	0.075	0.163	0.099	0.001	0.262	0.001	0.167
dimension neg. communication (std)	0.018 (0.017)	0.033* (0.019)	0.017 (0.017)	−0.037** (0.017)	−0.111** (0.049)	0.130*** (0.025)	−0.060** (0.023)	0.066*** (0.019)	0.121*** (0.020)	−0.051*** (0.018)
q-value	0.157	0.062	0.165	0.023	0.022	0.001	0.010	0.002	0.001	0.005
dimension psychological control (std)	−0.107*** (0.014)	0.062*** (0.018)	0.073*** (0.019)	−0.064*** (0.020)	−0.038 (0.049)	0.118*** (0.024)	−0.149*** (0.023)	0.340*** (0.027)	0.284*** (0.024)	−0.030* (0.018)
q-value	0.001	0.001	0.001	0.003	0.211	0.001	0.001	0.001	0.001	0.059
dimension strict control (std)	0.026 (0.017)	−0.021 (0.021)	0.013 (0.018)	0.035** (0.017)	0.066 (0.049)	−0.087*** (0.023)	0.078*** (0.028)	0.032 (0.020)	0.011 (0.022)	−0.040** (0.018)
q-value	0.075	0.165	0.211	0.029	0.109	0.001	0.007	0.075	0.262	0.024
Adj. R ²	0.410	0.005	0.028	0.011	0.164	0.270	0.153	0.216	0.208	0.035
Observations	5644	5017	5224	5426	710	3225	5501	5501	5501	5644

NOTES: The table shows results for OLS regressions of child outcomes (stated in the column headers, all standardized to have mean 0 and standard deviation 1 across the respective estimation sample) on parenting style for children. **Panel A** shows coefficients of the LDA-based, binary parenting style measure (1 = positive parenting). **Panel B** shows coefficients of the continuous positive parenting index that is built by adding the dimensions emotional warmth and monitoring and subtracting the dimensions negative communication, psychological control, and strict control. **Panel C** shows coefficients of the five parenting style dimensions when they are kept separately. The positive parenting index as well as the five dimensions are standardized to have mean 0 and standard deviation 1 across all child observations for whom they are available (the whole sample with N = 5644). Different age groups and children not understanding experiments in addition to randomly missing values lead to varying numbers of observations across specifications. Control variables include gender, age fixed effects, number of siblings, log of yearly family income, literacy of father, literacy of mother, and district fixed effects. To address multiple hypothesis testing, false discovery rate adjusted *q*-values are displayed below conventional standard errors for the positive parenting index and the parenting style dimensions. *q*-values for the positive parenting indicator are shown in Table 3. *q*-values are calculated panel-wise. Standard errors (in parentheses) are clustered at the village level. Significance at **p* < 0.10, ***p* < 0.05, ****p* < 0.01.

Table 6
Child outcomes and positive parenting—different ways of aggregating parenting style II.

	Non-cognitive skills: Personality traits							
	(1) Big Five openness	(2) Big Five conscient.	(3) Big Five extraversion	(4) Big Five agreeableness	(5) Big Five neuroticism	(6) locus of control	(7) self-control	(8) self-esteem
Panel A								
LDA-based positive parenting indicator	0.311*** (0.036)	0.366*** (0.035)	0.050* (0.030)	0.402*** (0.035)	−0.286*** (0.037)	0.232*** (0.042)	0.451*** (0.045)	0.389*** (0.043)
Adj. R ²	0.051	0.060	0.046	0.056	0.035	0.040	0.090	0.125
Panel B								
positive parenting index (std)	0.193*** (0.021)	0.226*** (0.019)	0.060*** (0.018)	0.264*** (0.019)	−0.193*** (0.019)	0.178*** (0.026)	0.277*** (0.027)	0.277*** (0.021)
q-value	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Adj. R ²	0.062	0.076	0.049	0.082	0.050	0.057	0.113	0.159
Panel C								
dimension emotional warmth (std)	0.128*** (0.021)	0.117*** (0.020)	0.086*** (0.017)	0.181*** (0.018)	−0.126*** (0.019)	0.113*** (0.022)	0.058*** (0.017)	0.172*** (0.020)
q-value	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
dimension monitoring (std)	0.097*** (0.020)	0.135*** (0.021)	0.032* (0.018)	0.086*** (0.018)	−0.074*** (0.019)	0.023 (0.024)	−0.002 (0.019)	0.051** (0.021)
q-value	0.001	0.001	0.053	0.001	0.001	0.167	0.356	0.013
dimension neg. communication (std)	−0.066*** (0.018)	−0.070*** (0.019)	0.050*** (0.017)	−0.109*** (0.018)	0.055*** (0.020)	−0.027 (0.023)	−0.200*** (0.018)	−0.099*** (0.023)
q-value	0.001	0.001	0.004	0.001	0.007	0.138	0.001	0.001
dimension psychological control (std)	−0.110*** (0.024)	−0.163*** (0.021)	−0.034* (0.020)	−0.140*** (0.023)	0.122*** (0.022)	−0.170*** (0.022)	−0.248*** (0.021)	−0.201*** (0.023)
q-value	0.001	0.001	0.059	0.001	0.001	0.001	0.001	0.001
dimension strict control (std)	0.000 (0.019)	0.010 (0.022)	−0.030* (0.018)	−0.010 (0.020)	0.012 (0.021)	−0.003 (0.023)	0.020 (0.022)	−0.006 (0.021)
q-value	0.382	0.262	0.063	0.262	0.251	0.337	0.175	0.305
Adj. R ²	0.072	0.090	0.058	0.094	0.057	0.069	0.163	0.175
Observations	5590	5590	5590	5590	5590	5644	5589	4010

NOTES: The table shows results for OLS regressions of child outcomes (stated in the column headers, all standardized to have mean 0 and standard deviation 1 across the respective estimation sample) on parenting style for children. **Panel A** shows coefficients of the LDA-based, binary parenting style measure (1 = positive parenting). **Panel B** shows coefficients of the continuous positive parenting index that is built by adding the dimensions emotional warmth and monitoring and subtracting the dimensions negative communication, psychological control, and strict control. **Panel C** shows coefficients of the five parenting style dimensions when they are kept separately. The positive parenting index as well as the five dimensions are standardized to have mean 0 and standard deviation 1 across all child observations for whom they are available (the whole sample with N = 5644). Different age groups in addition to randomly missing values lead to varying numbers of observations across specifications. Control variables include gender, age fixed effects, number of siblings, log of yearly family income, literacy of father, literacy of mother, and district fixed effects. To address multiple hypothesis testing, false discovery rate adjusted *q*-values are displayed below conventional standard errors for the positive parenting index and the parenting style dimensions. *q*-values for the positive parenting indicator are shown in Table 3. *q*-values are calculated panel-wise. Standard errors (in parentheses) are clustered at the village level. Significance at **p* < 0.10, ***p* < 0.05, ****p* < 0.01.

each of these traits individually may be considered to be of minor importance for a child's later life, the persistent pattern of positive parenting being related to so many skills and behavioral outcomes at once is very likely to leave a lasting imprint on a child's life. This makes our encompassing results so important. Furthermore, if skills cross-fertilize each other (Cunha and Heckman 2007), single effects may reinforce each other and therefore have an even larger joint effect in the longer run.

Given the cross-sectional nature of our data, we refrain from making any causal claims. Rather, with our uniquely large set of skills and outcomes, we provide evidence that maternal positive parenting is strongly linked to better skills and outcomes of children. As such, our study complements previous work that has shown that parenting styles are an important input factor for human capital production (Cobb-Clark et al. 2019; Carneiro et al. 2024), a factor that can be molded (Furlong et al. 2013; Sanders et al. 2014; Carneiro et al. 2024) and has been found to relate to better health outcomes of children (Davids et al. 2017; Chen et al. 2019) or more prosociality (Cappelen et al., 2020).

Overall, our study results emphasize the deep connection between maternal parenting style and the development of children across a particularly broad age range, spanning primary school age up to adolescence. This link may be particularly important in poorer countries (like Bangladesh), where material investments of parents are often scarce, but good parenting may still be important for children's skill formation and emotional stability.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Hannah Schildberg-Hoersch reports financial support was provided by German Research Foundation. Matthias Sutter reports financial support was provided by German Research Foundation. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgements

We thank an associate editor, two referees, Pranjal Dhole, participants of the NHH-MPI Workshop, and members of the Experimental Economics Group at the MPI for Behavioral Economics, Bonn, for helpful comments.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.jebo.2026.107630](https://doi.org/10.1016/j.jebo.2026.107630).

Appendix A: Data

Table A1

Summary statistics for socio-demographics.

	Our sample					HIES data				
	Mean	SD	Min.	Max.	Obs.	Mean	SD	Min.	Max.	Obs.
Children's socio-demographic characteristics										
female	0.52		0	1	5,644	0.48		0	1	32,468
age (in years)	10.29	2.63	6	16	5,644	10.93	3.09	6	16	32,468
enrolled in school	0.95		0	1	5,641	0.87		0	1	32,468
Parental characteristics										
age (in years) of father	43.17	8.18	23	85	5,644	43.05	12.00	18	85	19,130
age (in years) of mother	35.82	6.21	20	75	5,644	35.33	9.94	18	65	20,969
literacy rate among fathers	0.55		0	1	5,644	0.52		0	1	19,130
literacy rate among mothers	0.65		0	1	5,644	0.57		0	1	20,969
has secondary school certificate	0.07		0	1	11,288	0.10		0	1	40,099
father works in agriculture	0.47		0	1	5,644	0.45		0	1	19,130
mother is a housewife	0.73		0	1	5,644	0.87		0	1	20,969
Household characteristics										
household size	5.46	1.47	3	15	3,543	4.68	1.47	2	20	19,776
number of children	2.55	1.01	1	7	3,543	2.13	0.99	1	12	19,776
monthly income (in Taka)	16,698	25,766	-140,053	856,575	3,543	13,789	24,093	0	3,340,401	19,575
no electricity connection	0.08		0	1	3,543	0.30		0	1	19,776
Muslim household	0.82		0	1	3,543	0.90		0	1	19,776

NOTES: The table provides summary statistics for the sample of this study (children for whom parenting style variables, income information, and all control variables are available: N = 5644 from 3543 households). Total income values can be negative, for example, if costs in agricultural businesses, such as labor or feeding costs, have been higher than the income. In the last five columns, we compare our families to the nationally representative rural sample from the Bangladesh Bureau of Statistics' (BBS) periodic Household Income and Expenditure Survey (HIES) 2016 (Bangladesh Bureau of Statistics, 2019). We restrict the HIES sample to households with at least one child aged 6 to 16 for better comparison.

Table A2
Summary statistics for skills and behavioral outcomes.

	Mean	SD	Min.	Max.	Obs.
Cognitive skills					
IQ	0	1	-2.945	4.807	5,644
Non-cognitive skills					
<i>Economic preferences</i>					
patience	0	1	-1.995	1.976	5,017
risk-taking	0	1	-2.485	2.075	5,224
altruism	0	1	-2.591	1.541	5,426
<i>Personality traits</i>					
Big Five openness	0	1	-3.634	1.909	5,590
Big Five conscientiousness	0	1	-3.564	1.545	5,590
Big Five extraversion	0	1	-3.713	2.361	5,590
Big Five agreeableness	0	1	-3.957	1.940	5,590
Big Five neuroticism	0	1	-1.660	3.676	5,590
locus of control	0	1	-4.189	1.979	5,644
self-control	0	1	-4.171	2.297	5,589
self-esteem	0	1	-4.225	2.325	4,010
Behavioral outcomes					
achievement test score (math/Bangla)	0	1	-3.338	1.703	710
risky behaviors	0	1	-1.166	3.831	3,225
prosociality	0	1	-2.851	1.554	5,501
SDQ internalizing behavior	0	1	-1.993	4.105	5,501
SDQ externalizing behavior	0	1	-1.831	4.008	5,501
happiness	0	1	-5.229	0.670	5,644

NOTES: The table provides summary statistics for the sample of this study (children for whom parenting style variables, income information, and all control variables are available: N = 5644). Outcomes are standardized to a mean of zero and standard deviation of one across available observations. Observations vary among variables due to measures being elicited for different age groups or from different sources (children themselves versus mothers about their children). For economic preferences, we drop children who did not understand the games after possibly repeated explanations by the interviewer, according to a set of control questions.

Table A3
Outcome measures.

Outcome	Components	Scale	Resp.	Standardization	Source
IQ	fluid IQ and crystallized IQ	WISC-IV modified for local context	children	across all ages	Wechsler (2003)
patience	number of patient choices	out of 6 incentivized choices	children	standardized mean of two standardized components across	Bauer et al. (2012)
	question on time preferences	Likert-scale (5-point)	children	all ages	Falk et al. (2018), GPS, modified
risk-taking	choice of gamble	out of 6 incentivized gambles	children	standardized mean of two standardized components across	Binswanger (1980); Bauer et al. (2012)
	question on risk preferences	Likert-scale (5-point)	children	all ages	Falk et al. (2018), GPS, modified
altruism	share of stars given to other child	across 4 incentivized games	children	across all ages	Fehr et al. (2008); Bauer et al. (2014)
Big Five (age 6–9)	10-item questionnaire	Likert-scale (11-point)	mothers	first within age groups, then	Weinert et al. (2007)
Big Five (age 10–16)	16-item questionnaire	Likert-scale (5-point)	children	across all ages	Gerlitz and Schupp (2005)
locus of control	5-item questionnaire	Likert-scale (5-point)	children	across all ages	Rotter (1966)
(composite) achievement test score (math/Bangla; grades 2–5)	composite score of multiple-choice and written-answer tests for the two subjects	30 points for math in total, 50 points for Bangla in total	children	standardized mean of two standardized subject scores across primary school age group	developed by local education professionals with respect to school curriculum
self-control (age 6–11)	8-item questionnaire	Likert-scale (5-point)	mothers	first within age groups, then	Tsukayama et al. (2013)
self-control (age 12–16)	13-item questionnaire	Likert-scale (5-point)	children	across all ages	Tangney et al. (2004)
self-esteem (age 9–16)	10-item questionnaire	Likert-scale (5-point)	children	across age group	Rosenberg (1965)
risky behaviors (age 10–16)	16-item index of risky behaviors	yes/no	children	across age group	developed by authors, building on local focus group discussions
prosociality	5-item subscale of SDQ on prosociality	Likert-scale (3-point)	mothers	across all ages	Goodman (1997)
SDQ internalizing behaviors	5-item subscales on emotional problems and peer problems	Likert-scale (3-point)	mothers	across all ages	Goodman (1997); Goodman et al. (2010)
SDQ externalizing behaviors	5-item subscales on hyperactivity and conduct problems	Likert-scale (3-point)	mothers	across all ages	Goodman (1997); Goodman et al. (2010)
happiness	question on general happiness	visual Likert-scale(5-point)	children	across all ages	Falk et al. (2018), GPS, modified

NOTES: Table summarizes outcome measures used. Detailed instructions and lists of items are available in the online appendix accompanying this paper.

Parenting style

Items

Mothers rated 18 items on a five-point scale, stating the frequency of different actions (ranging from “never” to “very frequently”). The items were answered once for each household such that values are identical for siblings. The 18 items are combined into six scales (three items per scale), indicating for each mother how much her parenting style is characterized by emotional warmth, monitoring, negative communication, psychological control, strict control, and inconsistent parenting (Thönnissen et al. 2017).

Emotional warmth encompasses the degree of affirmative attention and care in parenting. Monitoring refers to how well parents are informed about activities and social contacts of their child. Negative communication indicates the degree of negative behavior of parents towards their child. Psychological control assesses parents’ negative intrusive thoughts, feelings, and behaviors towards their child with parents potentially building up psychological pressure. Strict control measures how rigorously and harshly parents interact with their child. Inconsistent parenting points to inconsistencies in parents’ behavior when bringing up their children.

Emotional warmth..

- 1) I use words and gestures to show my child that I love her/him.
- 2) I comfort my child when s/he feels sad.
- 3) I praise my child.

Monitoring..

- 1) I talk to my child about things s/he has done, seen, or experienced when s/he was out.
- 2) When my child is outside the home, I know exactly where s/he is.
- 3) I try to actively influence my child’s circle of friends.

Negative communication..

- 1) I criticize my child.
- 2) I shout at my child when s/he did something wrong.
- 3) I scold my child when I am angry at her/him.

Psychological control..

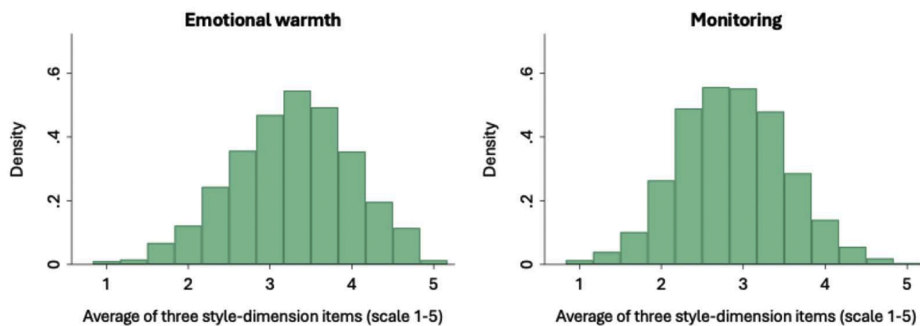
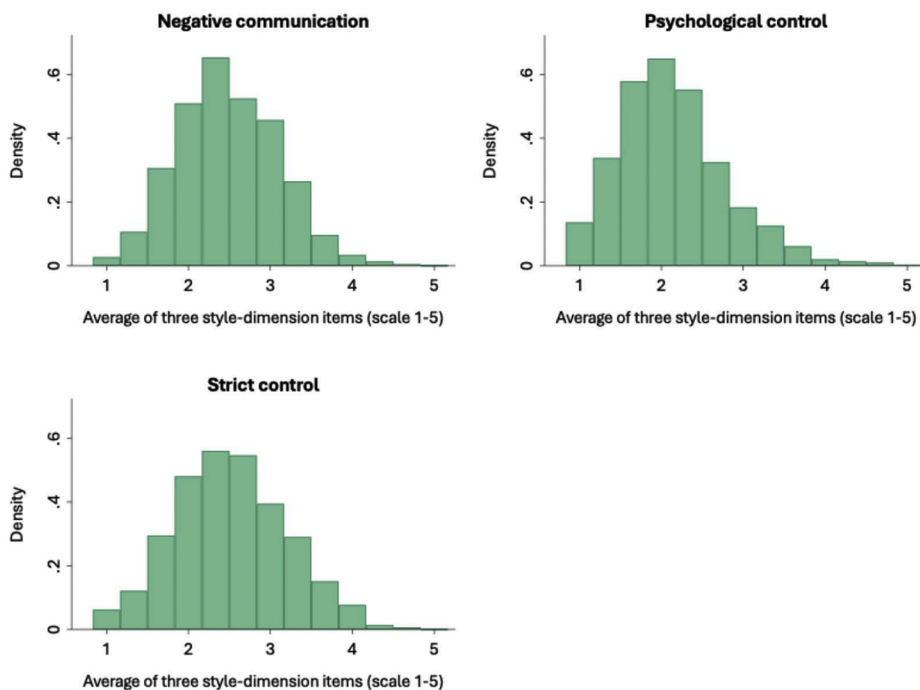
- 1) I feel that my child is ungrateful because s/he disobeys.
- 2) I stop talking to my child for a while when s/he did something wrong.
- 3) I am disappointed and sad when my child misbehaves.

Strict control..

- 1) I punish my child when s/he was disobedient.
- 2) I tend to be strict with my child.
- 3) I make it clear to my child that s/he should not oppose orders and decisions.

Inconsistent parenting²⁵..

- 1) I threaten my child with punishment, but don't actually follow through with it.
- 2) I reduce punishments or lift them ahead of time.
- 3) It is hard for me to be consistent in my childrearing.

Distributions**Positive parenting****Negative parenting**

²⁵ Due to translation issues, the dimension “inconsistent parenting” is reduced to item 3. The translation of the other two items into Bengali did not convey their intended meaning. As a consequence, we drop the inconsistent parenting scale from our analyses.

Fig. A1. Distributions of parenting style dimensions.

NOTES: The figures show the distributions (histograms, all with $N = 5644$) of the five components of parenting style: emotional warmth, monitoring, negative communication, psychological control, and strict control.

Appendix B: Linear discriminant analysis

LDA assumptions

In the following, we state and empirically test the model assumptions of LDA.²⁶

Assumption 1. Means of the independent variables are significantly different across the two groups.

In our application of LDA, the parenting style dimensions are the independent variables. Table A4 summarizes the unstandardized parenting style data for the two income groups. The low-income group shows lower means for the positive parenting style dimensions (emotional warmth and monitoring) and higher means for the negative parenting style dimensions (negative communication, psychological control, and strict control) than the high-income group. Tests of equality of group means confirm that parenting style dimensions differ significantly in the two income groups, with all p -values < 0.1 and three out of five p -values < 0.01 .

Table A4

Income group descriptive statistics.

Income group		Emotional warmth	Monitoring	Negative commun.	Psych. control	Strict control
Low	Obs.	2822	2822	2822	2822	2822
	Mean	3.249	2.833	2.524	2.161	2.535
	Std. dev.	0.721	0.653	0.618	0.678	0.692
High	Obs.	2822	2822	2822	2822	2822
	Mean	3.287	2.896	2.446	2.114	2.498
	Std. dev.	0.745	0.673	0.624	0.661	0.686
Test of equality of group means						
p -value		0.053	0.001	0.000	0.009	0.045

NOTES: The table shows descriptive statistics for each of the parenting style dimensions corresponding to the income categories. The low-income category is composed of those households that have less than median monthly income. The lower panel displays p -values for tests of equality of group means for the different parenting style dimensions.

Assumption 2. The independent variables from the groups have a common variance-covariance matrix, i.e., equal group covariances.

We perform the Box's M test of homogeneous covariance matrices. With p -values < 0.05 , we reject the null hypothesis that there exist homogeneous covariance matrices of the parenting styles by the two income groups. However, LDA is not overly sensitive to heterogeneous covariance matrices (Melton 1963).

Assumption 3. The independent variables are not highly correlated.

Table A5 shows the pairwise correlations between the maternal parenting style dimensions that are low to moderate (all below 0.5). As expected, the two dimensions of "warm" parenting as well as the three dimensions of "negative" parenting show higher correlations within than across these two categories.

Table A5

Pairwise correlations between parenting style dimensions.

	Emotional warmth	Monitoring	Negative commun.	Psych. control	Strict control
Emotional warmth	1				
Monitoring	0.367	1			
Negative communication	0.079	0.175	1		
Psychological control	0.007	0.214	0.372	1	
Strict control	0.054	0.228	0.426	0.394	1

NOTES: Displayed are Pearson correlation coefficients. Observations for all pairs: 5644. Correlations are significant at the 1 percent level, except for emotional warmth and psychological control (not significant).

²⁶ Some literature on LDA (e.g., Lachenbruch and Goldstein 1979, as an early contribution) lists independent sampling of observations as a fifth assumption. Families in our data are sampled independently, yet, siblings within families (who also have the same values for parenting style) are drawn together. Running the LDA on family level leads to an identical classification of individual observations into positive and negative parenting.

Assumption 4. The independent variables are normally distributed.

Table A6 shows the results of a test for normality of the parenting style dimensions based on skewness and kurtosis. As p -values < 0.05 , we reject the null hypothesis that the parenting style dimensions are normally distributed. However, visual inspection of the distributions of the five parenting style dimensions in Fig. A1 reveals no large divergence from normality.

Fig. A2

Table A6

Skewness and kurtosis test for normality.

	Skewness	Kurtosis	p -value
Emotional warmth	0.000	0.000	0.000
Monitoring	0.012	0.154	0.015
Negative communication	0.000	0.731	0.000
Psychological control	0.000	0.000	0.000
Strict control	0.000	0.000	0.000

NOTES: The table displays results from skewness and kurtosis tests for normality of parenting style dimensions. The last column shows the respective p -value of a combined test with the null hypothesis of normality.

In sum, our data largely fulfill the assumptions for LDA to be applied.

LDA accuracy

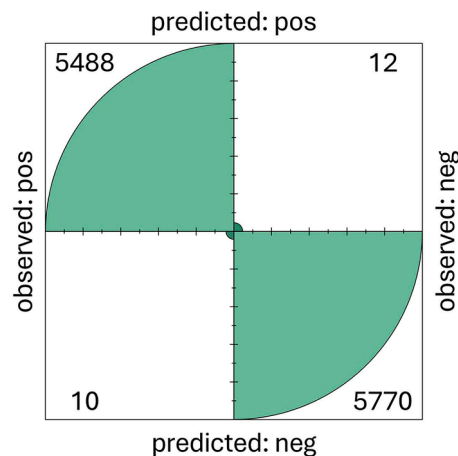


Fig. A2. Accuracy of linear discriminant analysis (LDA).

NOTES: The matrix shows the accuracy of the linear discriminant analysis using a support-vector machine model. The light green areas show instances where the model was correctly specified, dark green areas show instances where the model was incorrectly specified for the data. The visualized results rely on a random 20 percent split of the data (testing set), over 10 iterations. 80 percent of the data was used as the training set in each iteration.

Appendix C: Further results

Table A7

Child outcomes and income for children aged 6 to 16.

	(1) income category	(2)	(3)	(4)	(5)
	Coeff.	SE	Adj. R ²	q -value	Obs.
Cognitive skills					
IQ	0.092***	(0.026)	0.394	0.005	5,644
Non-cognitive skills					
<i>Economic preferences</i>					
patience	-0.006	(0.033)	0.002	0.685	5,017
risk-taking	-0.010	(0.031)	0.018	0.605	5,224
altruism	0.028	(0.028)	0.003	0.35	5,426

(continued on next page)

Table A7 (continued)

	(1) income category	(2)	(3)	(4)	(5)
	Coeff.	SE	Adj. R ²	q-value	Obs.
Personality traits					
Big Five openness	0.084***	(0.032)	0.028	0.048	5,590
Big Five conscientiousness	0.047	(0.031)	0.028	0.209	5,590
Big Five extraversion	-0.000	(0.026)	0.046	0.79	5,590
Big Five agreeableness	0.017	(0.031)	0.018	0.459	5,590
Big Five neuroticism	-0.045	(0.031)	0.015	0.209	5,590
locus of control	0.019	(0.033)	0.027	0.459	5,644
self-control	0.084**	(0.033)	0.041	0.048	5,589
self-esteem	0.091**	(0.038)	0.089	0.054	4,010
Behavioral outcomes					
achievement test score	0.048	(0.079)	0.156	0.459	710
risky behaviors	-0.147***	(0.035)	0.245	0.001	3,225
prosociality	0.052*	(0.031)	0.034	0.187	5,501
SDQ internalizing behavior	-0.036	(0.037)	0.051	0.35	5,501
SDQ externalizing behavior	-0.047	(0.031)	0.068	0.209	5,501
happiness	0.052*	(0.027)	0.026	0.123	5,644

NOTES: The table shows results for separate OLS regressions of child outcomes (stated in the left-most column, all standardized) on income categories (based on the family's monthly income) for children aged 6 to 16. Column (1) shows coefficients for the income median split indicator (1 = p50 and above, 0 = below). Column (2) shows conventional standard errors, column (3) the regressions' adjusted R², and column (5) the number of observations. To address multiple hypothesis testing, column (4) displays false discovery rate adjusted *q*-values. Control variables include gender, age fixed effects, number of siblings, literacy of father, literacy of mother, and district fixed effects. Standard errors are clustered at the village level. Significance at **p* < 0.10, ***p* < 0.05, ****p* < 0.01.

Table A8

Predictors of maternal parenting style.

	Dependent variable: positive parenting indicator					
	(1)		(2)		(3)	
	parents' literacy and education, HH religion, child gender		specification (1) plus no. and age of children, ages of parents, income, wealth		specification (2) plus parents' traits	
	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)
Parental socio-demographics and household characteristics						
mother's literacy	0.013	(0.022)	0.009	(0.023)	-0.001	(0.023)
father's literacy	0.056***	(0.018)	0.045**	(0.019)	0.015	(0.021)
mother has secondary school certificate	0.118***	(0.041)	0.101**	(0.041)	0.055	(0.041)
father has secondary school certificate	0.042	(0.032)	0.036	(0.032)	-0.008	(0.031)
Muslim HH	0.020	(0.034)	0.016	(0.034)	0.003	(0.030)
children: only boys (base category)						
more boys than girls	-0.023	(0.027)	-0.009	(0.030)	0.003	(0.030)
50:50 boys and girls	0.025	(0.025)	0.032	(0.026)	0.038	(0.027)
more girls than boys	-0.030	(0.026)	-0.006	(0.030)	-0.002	(0.031)
only girls	0.055*	(0.031)	0.070**	(0.031)	0.090***	(0.034)
number of children			-0.014	(0.009)	-0.001	(0.010)
average age of children			0.007**	(0.003)	0.006*	(0.003)
age (in years) of mother			-0.004	(0.011)	-0.004	(0.011)
age ² of mother			0.000	(0.000)	0.000	(0.000)
age (in years) of father			-0.003	(0.008)	-0.006	(0.010)
age ² of father			-0.000	(0.000)	0.000	(0.000)
log of yearly HH income			0.014	(0.011)	0.010	(0.011)
wealth index			0.020*	(0.011)	0.006	(0.011)
Parental skills						
mother's IQ					0.038***	(0.013)
mother's patience					-0.014	(0.009)
mother's risk-taking					0.005	(0.009)
mother's altruism					0.023***	(0.008)
mother's Big Five openness					0.005	(0.011)
mother's Big Five conscientiousness					-0.005	(0.013)
mother's Big Five extraversion					0.033***	(0.012)
mother's Big Five agreeableness					0.034***	(0.012)
mother's Big Five neuroticism					0.012	(0.011)
mother's locus of control					-0.023	(0.014)

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Table A8 (continued)

	Dependent variable: positive parenting indicator					
	(1)		(2)		(3)	
	parents' literacy and education, HH religion, child gender		specification (1) plus no. and age of children, ages of parents, income, wealth		specification (2) plus parents' traits	
	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)
mother's self-control					0.064***	(0.016)
mother's self-esteem					0.045***	(0.016)
mother's happiness/life-satisfaction					0.013	(0.010)
father's IQ					0.035***	(0.013)
father's patience					-0.016	(0.010)
father's risk-taking					-0.002	(0.011)
father's altruism					0.007	(0.009)
father's Big Five openness					0.007	(0.013)
father's Big Five conscientiousness					-0.024	(0.015)
father's Big Five extraversion					0.017	(0.010)
father's Big Five agreeableness					0.015	(0.012)
father's Big Five neuroticism					-0.012	(0.013)
father's locus of control					0.016	(0.012)
father's self-control					0.013	(0.016)
father's self-esteem					0.035**	(0.017)
father's happiness/life-satisfaction					-0.014	(0.011)
constant	0.443***	(0.043)	0.663***	(0.226)	0.592**	(0.266)
<i>p</i> -value for <i>F</i> -test of joint significance of listed characteristics (<i>F</i> -statistics in parentheses)	0.000	(6.15)	0.000	(5.32)	0.000	(13.63)
Adj. R^2	0.043		0.046		0.161	
Observations	3,543		3,542		2,939	

NOTES: The table shows results for OLS regressions of the LDA-based, binary parenting style measure (1 = positive parenting) on parental and household characteristics as well as parental cognitive and non-cognitive skills. Parents' literacy, whether they have attained higher education, and whether the household is a Muslim household are indicator variables (1 = yes, 0 else). The gender distribution of children is a categorical variable with having only boys being the base category. The number of children, the average age of children (in years), parents' ages (in years), the yearly household income, and a household's wealth are continuous variables. The wealth index is generated by running a principal component analysis (PCA) across a set of variables that reflect a households' wealth level, such as building material of the house, land ownership, savings, and assets. Parental skills are standardized to have mean 0 and standard deviation 1 across the mothers' and fathers' of the respective estimation sample. Since in particular fathers are often not available for the survey due to work, missing values for parental skills are set to 0 and indicators are added to control for these missing values (missing-indicator method). Missing values due to not understanding experiments (for the measurement of economic preferences) are not set to 0. Standard errors are clustered at the village level. Significance at * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A9
Association between cognitive skills and positive parenting.

	IQ
positive parenting	0.120*** (0.029)
female	0.069*** (0.022)
number of siblings	-0.038*** (0.009)
log income	0.046*** (0.013)
father's literacy	0.246*** (0.028)
mother's literacy	0.140*** (0.031)
<i>districts (base: Netrokona)</i>	
Chandpur	0.263*** (0.058)
Sunamganj	0.026 (0.060)
Gopalganj	0.354*** (0.049)
<i>age (base: age = 6)</i>	
age = 7	0.234*** (0.050)

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Table A9 (continued)

	IQ
age = 8	0.386*** (0.046)
age = 9	0.759*** (0.044)
age = 10	0.984*** (0.047)
age = 11	1.117*** (0.049)
age = 12	1.546*** (0.050)
age = 13	1.647*** (0.055)
age = 14	1.750*** (0.061)
age = 15	1.976*** (0.072)
age = 16	1.910*** (0.080)
constant	−1.344*** (0.090)
Adjusted R ²	0.397
Observations	5644

NOTES: The table above shows results for OLS regressions of children's standardized IQ on the LDA-based, binary parenting style measure (1 = positive parenting, 0 = non-positive or negative parenting) and a set of control variables for children aged 6 to 16. Female and parents' literacy are dummy variables where 1 = true. For yearly family income (measured in Taka) the log is taken and a dummy is added (not displayed here) to control for negative income values. Base categories for district and age fixed effects are Netrokona and age 6, respectively. Standard errors (in parentheses) are clustered at the village level. Significance at * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A10

Association between economic preferences and positive parenting.

	patience	risk-taking	altruism
positive parenting	−0.082** (0.036)	−0.064* (0.038)	0.078** (0.031)
female	0.013 (0.031)	−0.090*** (0.028)	0.030 (0.031)
number of siblings	−0.014 (0.013)	0.016 (0.013)	0.007 (0.010)
log income	0.008 (0.019)	−0.016 (0.018)	−0.012 (0.015)
father's literacy	−0.001 (0.037)	0.040 (0.033)	−0.014 (0.034)
mother's literacy	−0.048 (0.035)	−0.041 (0.037)	−0.047 (0.033)
<i>districts (base: Netrokona)</i>			
Chandpur	0.020 (0.062)	0.059 (0.063)	−0.117** (0.050)
Sunamganj	0.110 (0.080)	0.235*** (0.058)	−0.058 (0.055)
Gopalganj	−0.032 (0.050)	−0.035 (0.047)	−0.118*** (0.043)
<i>age (base: age = 6)</i>			
age = 7	−0.046 (0.084)	0.052 (0.073)	0.024 (0.072)
age = 8	0.029 (0.072)	0.107 (0.066)	−0.067 (0.067)

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Table A10 (continued)

	patience	risk-taking	altruism
age = 9	−0.018 (0.078)	0.105 (0.067)	−0.018 (0.065)
age = 10	0.065 (0.073)	0.261*** (0.070)	−0.053 (0.063)
age = 11	0.026 (0.074)	0.297*** (0.068)	−0.059 (0.065)
age = 12	−0.097 (0.078)	0.205*** (0.070)	−0.038 (0.070)
age = 13	0.021 (0.079)	0.293*** (0.075)	−0.009 (0.075)
age = 14	−0.058 (0.093)	0.251*** (0.077)	0.022 (0.075)
age = 15	−0.038 (0.092)	0.227** (0.089)	0.081 (0.081)
age = 16	0.021 (0.112)	0.329*** (0.105)	−0.069 (0.095)
Constant	0.154 (0.144)	−0.464*** (0.130)	−0.159 (0.114)
Adjusted R ²	0.003	0.020	0.005
Observations	5017	5224	5426

NOTES: The table above shows results for OLS regressions of children's standardized economic preferences on the LDA-based, binary parenting style measure (1 = positive parenting, 0 = non-positive or negative parenting) and a set of control variables for children aged 6 to 16. Female and parents' literacy are dummy variables where 1 = true. For yearly family income (measured in Taka) the log is taken and a dummy is added (not displayed here) to control for negative income values. Base categories for district and age fixed effects are Netrokona and age 6, respectively. Standard errors (in parentheses) are clustered at the village level. Significance at * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A11

Association between Big Five personality traits and positive parenting.

	Big Five openness	Big Five conscient.	Big Five extraversion	Big Five agreeablen.	Big Five neuroticism
positive parenting	0.311*** (0.036)	0.366*** (0.035)	0.050* (0.030)	0.402*** (0.035)	−0.286*** (0.037)
female	0.031 (0.025)	0.127*** (0.026)	−0.163*** (0.026)	0.137*** (0.028)	0.075*** (0.027)
number of siblings	−0.033*** (0.011)	−0.004 (0.011)	0.002 (0.011)	−0.012 (0.010)	−0.004 (0.011)
log income	0.026 (0.017)	0.025 (0.019)	0.004 (0.013)	0.004 (0.018)	−0.017 (0.016)
father's literacy	0.086*** (0.031)	0.061** (0.030)	−0.004 (0.032)	0.069** (0.031)	−0.022 (0.030)
mother's literacy	0.054 (0.036)	0.024 (0.036)	0.024 (0.030)	0.003 (0.035)	−0.047 (0.034)
<i>districts (base: Netrokona)</i>					
Chandpur	−0.101 (0.064)	−0.223*** (0.083)	0.162*** (0.057)	−0.203** (0.081)	0.199** (0.086)
Sunamganj	−0.147** (0.059)	−0.395*** (0.068)	−0.105* (0.063)	−0.222*** (0.068)	0.344*** (0.066)
Gopalganj	0.098** (0.038)	−0.189*** (0.048)	0.431*** (0.051)	−0.084** (0.040)	0.098* (0.057)
<i>age (base: age = 6)</i>					
age = 7	0.063 (0.070)	0.076 (0.070)	−0.108 (0.066)	0.079 (0.070)	0.001 (0.071)
age = 8	0.141** (0.064)	0.150** (0.064)	−0.080 (0.062)	0.132* (0.067)	−0.024 (0.062)
age = 9	0.070 (0.066)	0.162** (0.063)	−0.107 (0.073)	0.086 (0.067)	−0.027 (0.067)
age = 10	0.053 (0.066)	0.081 (0.067)	−0.085 (0.076)	0.089 (0.072)	−0.011 (0.072)
age = 11	0.029 (0.067)	0.053 (0.069)	−0.105 (0.074)	0.098 (0.067)	−0.026 (0.069)
age = 12	0.100	0.139*	−0.068	0.109	−0.064

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Table A11 (continued)

	Big Five openness	Big Five conscient.	Big Five extraversion	Big Five agreeablen.	Big Five neuroticism
	(0.074)	(0.078)	(0.078)	(0.074)	(0.075)
age = 13	0.111	0.124	−0.092	0.077	0.027
	(0.078)	(0.076)	(0.080)	(0.075)	(0.073)
age = 14	0.204***	0.186**	−0.020	0.028	−0.033
	(0.075)	(0.083)	(0.084)	(0.072)	(0.079)
age = 15	0.285***	0.258***	−0.041	0.161**	0.003
	(0.082)	(0.083)	(0.085)	(0.080)	(0.085)
age = 16	0.340***	0.176*	0.022	0.247***	−0.000
	(0.098)	(0.092)	(0.107)	(0.086)	(0.096)
constant	−0.403***	−0.223*	0.019	−0.273**	0.010
	(0.126)	(0.118)	(0.131)	(0.117)	(0.117)
Adjusted R ²	0.051	0.060	0.046	0.056	0.035
Observations	5590	5590	5590	5590	5590

NOTES: The table above shows results for OLS regressions of children's standardized Big Five personality traits on the LDA-based, binary parenting style measure (1 = positive parenting, 0 = non-positive or negative parenting) and a set of control variables for children aged 6 to 16. Female and parents' literacy are dummy variables where 1 = true. For yearly family income (measured in Taka) the log is taken and a dummy is added (not displayed here) to control for negative income values. Base categories for district and age fixed effects are Netrokona and age 6, respectively. Standard errors (in parentheses) are clustered at the village level. Significance at * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A12

Association between personality traits/happiness and positive parenting.

	locus of control	self-control	self-esteem	happiness
positive parenting	0.232***	0.451***	0.389***	0.089***
	(0.042)	(0.045)	(0.043)	(0.034)
female	0.033	0.146***	0.041	0.061**
	(0.025)	(0.025)	(0.027)	(0.027)
number of siblings	−0.007	0.011	−0.025**	−0.035***
	(0.012)	(0.011)	(0.012)	(0.010)
log income	0.016	0.041**	0.036**	0.031**
	(0.018)	(0.017)	(0.018)	(0.015)
father's literacy	0.009	0.055*	0.110***	0.039
	(0.033)	(0.031)	(0.033)	(0.031)
mother's literacy	0.039	0.099***	0.055	−0.043
	(0.038)	(0.034)	(0.040)	(0.034)
<i>districts (base: Netrokona)</i>				
Chandpur	−0.006	−0.249**	−0.060	−0.142***
	(0.108)	(0.101)	(0.101)	(0.051)
Sunamganj	−0.481***	−0.466***	−0.571***	−0.320***
	(0.067)	(0.084)	(0.111)	(0.120)
Gopalganj	−0.113*	−0.215***	0.222***	−0.305***
	(0.060)	(0.067)	(0.052)	(0.043)
<i>age (base: age = 6; = 9 for self-esteem)</i>				
age = 7	−0.011	0.148**		0.056
	(0.077)	(0.073)		(0.079)
age = 8	0.008	0.128**		0.073
	(0.063)	(0.064)		(0.070)
age = 9	−0.018	0.134**		0.144*
	(0.061)	(0.064)		(0.082)
age = 10	−0.023	0.113*	−0.041	0.124
	(0.068)	(0.066)	(0.050)	(0.083)
age = 11	−0.000	0.261***	−0.027	0.126
	(0.070)	(0.063)	(0.051)	(0.082)
age = 12	0.116*	0.151**	−0.055	0.047
	(0.069)	(0.074)	(0.053)	(0.086)
age = 13	0.050	0.021	−0.162***	0.009
	(0.065)	(0.074)	(0.059)	(0.089)
age = 14	0.070	0.148**	−0.035	−0.041
	(0.080)	(0.074)	(0.063)	(0.090)
age = 15	0.121	0.266***	0.101	−0.043
	(0.089)	(0.078)	(0.068)	(0.096)

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Table A12 (continued)

	locus of control	self-control	self-esteem	happiness
age = 16	0.104 (0.107)	0.189** (0.092)	−0.048 (0.082)	−0.177 (0.116)
constant	−0.123 (0.132)	−0.461*** (0.132)	−0.050 (0.128)	0.237** (0.116)
Adjusted R ²	0.040	0.090	0.125	0.028
Observations	5644	5589	4010	5644

NOTES: The table above shows results for OLS regressions of children's standardized personality traits and happiness on the LDA-based, binary parenting style measure (1 = positive parenting, 0 = non-positive or negative parenting) and a set of control variables for children aged 6 to 16 (self-esteem: aged 9 to 16). Female and parents' literacy are dummy variables where 1 = true. For yearly family income (measured in Taka) the log is taken and a dummy is added (not displayed here) to control for negative income values. Base categories for district and age fixed effects are Netrokona and age 6 (age 9 for self-esteem), respectively. Standard errors (in parentheses) are clustered at the village level. Significance at * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A13

Association between behavioral outcomes and positive parenting.

	achievement test score	risky behaviors	prosociality	SDQ intern.	SDQ extern.
positive parenting	0.207*** (0.071)	−0.205*** (0.039)	0.408*** (0.042)	−0.449*** (0.046)	−0.502*** (0.043)
female	0.245*** (0.085)	−0.837*** (0.031)	0.098*** (0.026)	0.027 (0.025)	−0.229*** (0.025)
number of siblings	−0.042* (0.024)	0.013 (0.013)	0.000 (0.012)	0.017 (0.012)	0.013 (0.011)
log income	−0.016 (0.039)	−0.057*** (0.019)	0.020 (0.018)	−0.010 (0.020)	−0.026 (0.018)
father's literacy	0.229** (0.094)	−0.036 (0.034)	0.107*** (0.037)	−0.030 (0.033)	−0.135*** (0.035)
mother's literacy	0.096 (0.102)	−0.032 (0.041)	0.028 (0.036)	0.016 (0.038)	0.005 (0.038)
<i>districts (base: Netrokona)</i>					
Chandpur	0.718*** (0.197)	−0.352*** (0.086)	−0.084 (0.087)	−0.015 (0.082)	0.146* (0.080)
Sunamganj	0.577** (0.259)	0.114 (0.098)	−0.190*** (0.071)	0.508*** (0.087)	0.412*** (0.073)
Gopalganj	−0.035 (0.200)	−0.309*** (0.075)	−0.008 (0.073)	−0.093** (0.046)	0.294*** (0.055)
<i>age (base: age = 6; = 10 for risky behaviors)</i>					
age = 7	−0.056 (0.143)		0.097 (0.067)	−0.005 (0.070)	−0.187*** (0.065)
age = 8	−0.075 (0.130)		0.251*** (0.059)	−0.033 (0.058)	−0.218*** (0.063)
age = 9	−0.026 (0.140)		0.201*** (0.058)	−0.048 (0.063)	−0.194*** (0.063)
age = 10	−0.013 (0.180)		0.323*** (0.056)	−0.044 (0.067)	−0.306*** (0.063)
age = 11	−0.082 (0.194)	−0.028 (0.048)	0.323*** (0.059)	−0.088 (0.068)	−0.288*** (0.070)
age = 12	−0.162 (0.335)	−0.127*** (0.044)	0.412*** (0.060)	−0.145** (0.068)	−0.391*** (0.072)
age = 13		−0.168*** (0.047)	0.451*** (0.067)	−0.226*** (0.077)	−0.434*** (0.074)
age = 14		−0.259*** (0.050)	0.518*** (0.065)	−0.241*** (0.071)	−0.609*** (0.066)
age = 15		−0.367*** (0.061)	0.533*** (0.072)	−0.267*** (0.083)	−0.610*** (0.075)
age = 16		−0.447*** (0.075)	0.448*** (0.100)	−0.164 (0.104)	−0.632*** (0.104)
constant	−0.861** (0.383)	0.904*** (0.193)	−0.577*** (0.124)	0.054 (0.129)	0.487*** (0.126)
Adjusted R ²	0.166	0.253	0.074	0.100	0.129
Observations	710	3225	5501	5501	5501

NOTES: The table above shows results for OLS regressions of children's standardized behavioral outcomes on the LDA-based, binary parenting style measure (1 = positive parenting, 0 = non-positive or negative parenting) and a set of control variables for children aged 6 to 16 (achievement test

score: aged 6 to 12; risky behaviors: aged 10 to 16). Female and parents' literacy are dummy variables where 1 = true. For yearly family income (measured in Taka) the log is taken and a dummy is added (not displayed here) to control for negative income values. Base categories for district and age fixed effects are Netrokona and age 6 (age 10 for risky behaviors), respectively. Standard errors (in parentheses) are clustered at the village level. Significance at * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A14

Child outcomes and positive parenting for children aged 6 to 9.

	(1) positive parenting	(2)	(3)	(4)	(5)
	Coeff.	SE	Adj. R ²	q-value	Obs.
Cognitive skills					
IQ	0.162***	(0.048)	0.225	0.001	2,405
Non-cognitive skills					
<i>Economic preferences</i>					
patience	-0.081	(0.050)	0.003	0.022	2,085
risk-taking	-0.080	(0.052)	0.009	0.024	2,188
altruism	0.070	(0.048)	0.010	0.027	2,286
<i>Personality traits</i>					
Big Five openness	0.343***	(0.049)	0.061	0.001	2,365
Big Five conscientiousness	0.385***	(0.047)	0.067	0.001	2,365
Big Five extraversion	-0.266***	(0.042)	0.095	0.001	2,365
Big Five agreeableness	0.476***	(0.051)	0.085	0.001	2,365
Big Five neuroticism	-0.312***	(0.050)	0.039	0.001	2,365
locus of control	0.242***	(0.051)	0.043	0.001	2,405
self-control	0.448***	(0.059)	0.085	0.001	2,383
self-esteem	0.293***	(0.076)	0.129	0.001	779
Behavioral outcomes					
achievement test score	0.206***	(0.075)	0.161	0.003	586
prosociality	0.373***	(0.052)	0.054	0.001	2,377
SDQ internalizing behavior	-0.442***	(0.055)	0.092	0.001	2,377
SDQ externalizing behavior	-0.491***	(0.053)	0.106	0.001	2,377
happiness	0.131***	(0.047)	0.038	0.003	2,405

NOTES: The table shows results for separate OLS regressions of child outcomes (stated in the left-most column) on parenting style for children aged 6 to 9. All outcomes are standardized across all available observations within this age group. Column (1) shows coefficients for the LDA-based, binary parenting style measure (1 = positive parenting, 0 = non-positive or negative parenting). Column (2) shows conventional standard errors, column (3) the regressions' adjusted R², and column (5) the number of observations. To address multiple hypothesis testing, column (4) displays false discovery rate adjusted q -values. Control variables include gender, age fixed effects, number of siblings, log of yearly family income, literacy of father, literacy of mother, and district fixed effects. Standard errors are clustered at the village level. Significance at * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A15

Child outcomes and positive parenting for children aged 10 to 16.

	(1) positive parenting	(2)	(3)	(4)	(5)
	Coeff.	SE	Adj. R ²	q-value	Obs.
Cognitive skills					
IQ	0.124***	(0.036)	0.251	0.001	3,239
Non-cognitive skills					
<i>Economic preferences</i>					
Patience	-0.086*	(0.045)	0.005	0.022	2,932
risk-taking	-0.050	(0.044)	0.014	0.068	3,036
altruism	0.083**	(0.040)	0.003	0.016	3,140
<i>Personality traits</i>					
Big Five openness	0.290***	(0.045)	0.061	0.001	3,225
Big Five conscientiousness	0.354***	(0.044)	0.069	0.001	3,225
Big Five extraversion	0.281***	(0.043)	0.064	0.001	3,225
Big Five agreeableness	0.346***	(0.039)	0.042	0.001	3,225
Big Five neuroticism	-0.270***	(0.045)	0.041	0.001	3,225
locus of control	0.226***	(0.047)	0.038	0.001	3,239
self-control	0.454***	(0.048)	0.094	0.001	3,206
self-esteem	0.409***	(0.044)	0.124	0.001	3,231
Behavioral outcomes					
achievement test score	0.166	(0.161)	0.156	0.078	124
prosociality	0.440***	(0.048)	0.070	0.001	3,124
SDQ internalizing behavior	-0.456***	(0.049)	0.104	0.001	3,124
SDQ externalizing behavior	-0.515***	(0.049)	0.127	0.001	3,124
happiness	0.058	(0.038)	0.029	0.047	3,239

NOTES: The table shows results for separate OLS regressions of child outcomes (stated in the left-most column) on parenting style for children aged 10 to 16. All outcomes are standardized across all available observations within this age group. Column (1) shows coefficients for the LDA-based, binary parenting style measure (1 = positive parenting, 0 = non-positive or negative parenting). Column (2) shows conventional standard errors, column (3) the regressions' adjusted R^2 , and column (5) the number of observations. To address multiple hypothesis testing, column (4) displays false discovery rate adjusted q -values. Control variables include gender, age fixed effects, number of siblings, log of yearly family income, literacy of father, literacy of mother, and district fixed effects. Standard errors are clustered at the village level. Significance at $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Appendix D: Robustness checks

Table A16

Child outcomes and positive parenting—comparing mother and child elicitation.

	(1) Outcome elicited from mothers	(2)	(3)	(4) Outcome elicited from children	(5)	(6)
	Positive parenting coefficient (SE)	Adj. R^2	Obs.	Positive parenting coefficient (SE)	Adj. R^2	Obs.
Non-cognitive skills						
<i>Personality traits</i>						
Big Five openness	0.304*** (0.057)	0.067	1,403 (0.057)	0.298***	0.053	1,403
Big Five conscientiousness	0.411*** (0.057)	0.108	1,403 (0.059)	0.353***	0.084	1,403
Big Five extraversion	-0.215*** (0.061)	0.118	1,403 (0.058)	0.267***	0.062	1,403
Big Five agreeableness	0.489*** (0.056)	0.115	1,403 (0.054)	0.369***	0.046	1,403
Big Five neuroticism	-0.319*** (0.059)	0.065	1,403 (0.063)	-0.238***	0.050	1,403
self-control	0.383*** (0.080)	0.083	939 (0.069)	0.545***	0.109	939

NOTES: The table shows results for separate OLS regressions of child outcomes (stated in the left-most column, all standardized to have mean 0 and standard deviation 1 across the respective estimation sample) on parenting style for children. Columns (1) to (3) display results when the outcome is elicited by asking mothers about their children, columns (4) to (6) display results when the outcome is elicited by asking children themselves. For Big Five regressions, children are aged 10 to 11. For self-control regressions, children are aged 12 to 13. Columns (1) and (4) show coefficients and standard errors (in parentheses) for the LDA-based, binary parenting style measure (1 = positive parenting). Columns (2) and (5) show the regressions' adjusted R^2 , and columns (3) and (6) the number of observations. Control variables include gender, age fixed effects, number of siblings, log of yearly family income, literacy of father, literacy of mother, and district fixed effects. Standard errors are clustered at the village level. Significance at $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table A17

Child outcomes and positive parenting—controlling for intergenerational transmission I.

	Cogn. skills	Non-cognitive skills: Economic preferences			Non-cognitive skills: Personality traits							
	(1) IQ	(2) patience	(3) risk-taking	(4) altruism	(5) Big Five openness	(6) Big Five conscient.	(7) Big Five extraversion	(8) Big Five agreeablen.	(9) Big Five neuroticism	(10) locus of control	(11) self-control	(12) self-esteem
Parenting style												
positive parenting indicator	0.024 (0.025)	-0.083** (0.034)	-0.071* (0.040)	0.046 (0.030)	0.227*** (0.029)	0.242*** (0.030)	-0.008 (0.029)	0.295*** (0.030)	-0.217*** (0.035)	0.235*** (0.039)	0.272*** (0.034)	0.140*** (0.030)
<i>q</i> -value	0.089	0.009	0.027	0.042	0.001	0.001	0.150	0.001	0.001	0.001	0.001	0.001
Intergenerational transmission												
mother's skill	0.270*** (0.017)	0.257*** (0.020)	0.081*** (0.019)	0.172*** (0.018)	0.261*** (0.016)	0.271*** (0.018)	0.156*** (0.016)	0.218*** (0.018)	0.227*** (0.019)	0.168*** (0.023)	0.318*** (0.022)	0.460*** (0.020)
father's skill	0.100*** (0.018)	0.132*** (0.020)	-0.008 (0.019)	0.113*** (0.019)	0.126*** (0.019)	0.131*** (0.019)	0.098*** (0.016)	0.174*** (0.016)	0.141*** (0.019)	0.073*** (0.023)	0.101*** (0.021)	0.218*** (0.021)
Adj. R^2	0.477	0.101	0.027	0.047	0.150	0.165	0.082	0.153	0.122	0.082	0.212	0.419
Observations	5644	4615	4806	5129	5590	5590	5590	5590	5590	5644	5589	4010

NOTES: The table shows results for OLS regressions of child outcomes (stated in the column headers, all standardized to have mean 0 and standard deviation 1 across the respective estimation sample) on parenting style for children. Displayed are coefficients of the LDA-based, binary parenting style measure (1 = positive parenting) as well as coefficients of parental skill variables that match child outcomes to control for intergenerational

transmission. For example, in column (1), mothers' and fathers' IQ are added, in column (2), mothers' and fathers' patience are added, and so on. Parental skills are also standardized to have mean 0 and standard deviation 1 across the mothers' and fathers' of the respective estimation sample. Since in particular fathers are often not available for the survey due to work, missing values for parental skills are set to 0 and indicators are added to control for these missing values (missing-indicator method). Missing values due to not understanding experiments (for the measurement of economic preferences) are not set to 0. Note that this may lead to varying numbers of observations across specifications. Further control variables include gender, age fixed effects, number of siblings, log of yearly family income, literacy of father, literacy of mother, and district fixed effects. To address multiple hypothesis testing, false discovery rate adjusted q -values are displayed below conventional standard errors for the positive parenting indicator. Standard errors (in parentheses) are clustered at the village level. Significance at $*p < 0.10$, $**p < 0.05$, $***p < 0.01$.

Table A18

Child outcomes and positive parenting—controlling for intergenerational transmission II.

	Behavioral outcomes					
	(1) achievem. test score	(2) risky behaviors	(3) pro-sociality	(4) SDQ intern.	(5) SDQ extern.	(6) happiness
Parenting style						
positive parenting indicator	0.153** (0.071)	−0.197*** (0.037)	0.372*** (0.042)	−0.338*** (0.038)	−0.336*** (0.035)	0.082** (0.033)
q -value	0.018	0.001	0.001	0.001	0.001	0.009
Intergenerational transmission						
mother's IQ	0.060 (0.057)					
father's IQ	0.073 (0.047)					
mother's risky behaviors		0.198*** (0.021)				
father's risky behaviors		0.105*** (0.020)				
mother's altruism			0.062*** (0.017)			
father's altruism			0.039** (0.019)			
mother's Big Five extraversion				0.008 (0.018)		
father's Big Five extraversion				0.016 (0.016)		
mother's Big Five agreeableness			0.047* (0.026)	−0.153*** (0.016)	0.010 (0.019)	
father's Big Five agreeableness			0.063*** (0.021)	−0.067*** (0.020)	0.001 (0.017)	
mother's Big Five neuroticism				0.194*** (0.024)		
father's Big Five neuroticism				0.073*** (0.022)		
mother's self-control					−0.294*** (0.022)	
father's self-control					−0.109*** (0.024)	
mother's happiness						0.099*** (0.017)
father's happiness						0.091*** (0.020)
Adj. R^2	0.173	0.300	0.086	0.197	0.238	0.048
Observations	710	3225	5137	5501	5501	5644

NOTES: The table shows results for OLS regressions of child outcomes (stated in the column headers, all standardized to have mean 0 and standard deviation 1 across the respective estimation sample) on parenting style. Displayed are coefficients of the LDA-based, binary parenting style measure (1 = positive parenting) as well as coefficients of parental skill variables that match child outcomes as closely as possible to control for intergenerational transmission. Note that for risky behaviors and happiness, we elicited identical measures for children and adults. Parental skills and behaviors are also standardized to have mean 0 and standard deviation 1 across the mothers' and fathers' of the respective estimation sample. Since in particular fathers are often not available for the survey due to work, missing values for parental skills are set to 0 and indicators are added to control for these missing values (missing-indicator method). Missing values due to not understanding experiments (for the measurement of economic preferences) are not set to 0. Note that this may lead to varying numbers of observations across specifications. Further control variables include gender, age fixed effects, number of siblings, log of yearly family income, literacy of father, literacy of mother, and district fixed effects. To address multiple hypothesis testing, false discovery rate adjusted q -values are displayed below conventional standard errors for the positive parenting indicator. Standard errors (in parentheses) are clustered at the village level. Significance at $*p < 0.10$, $**p < 0.05$, $***p < 0.01$.

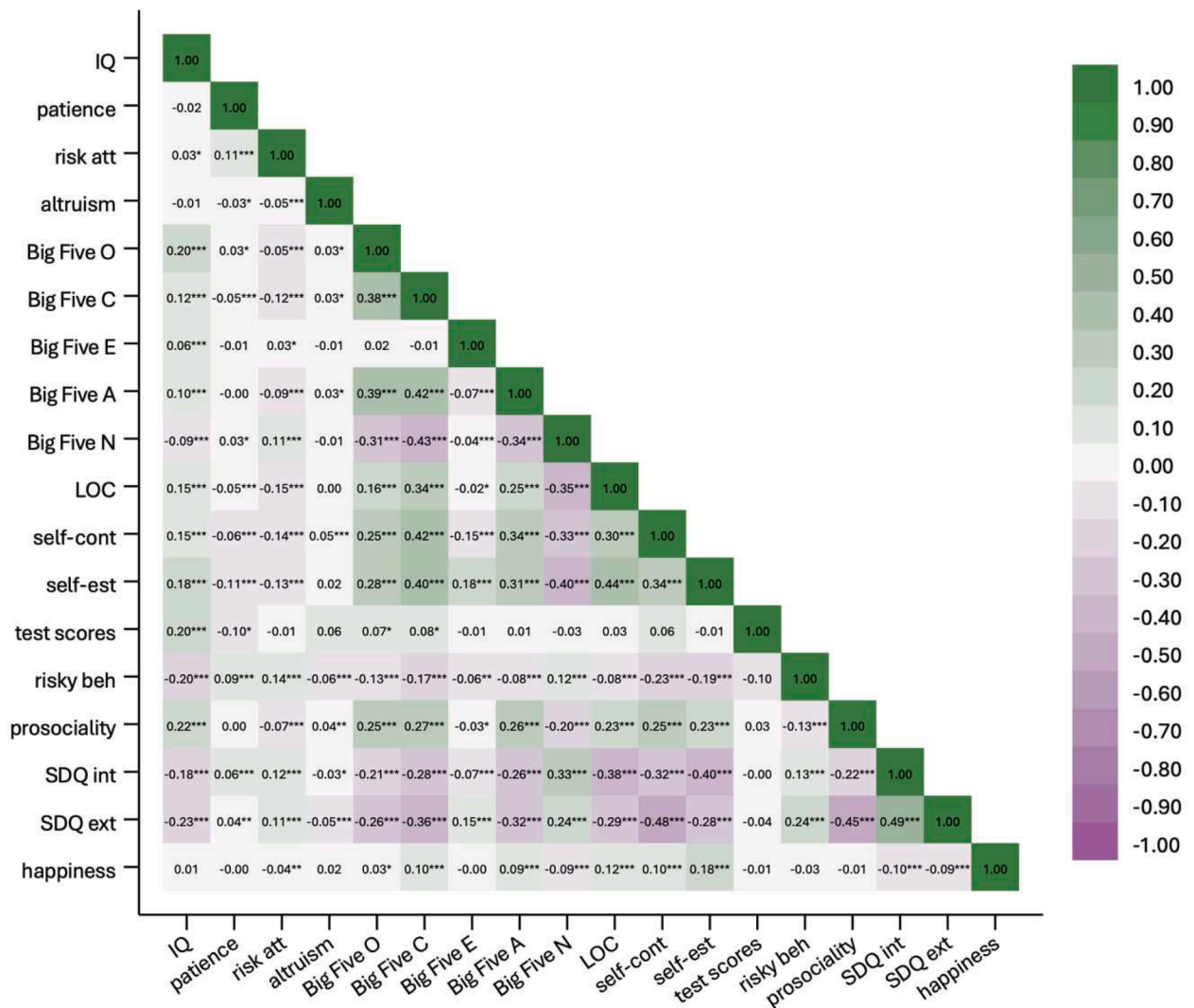


Fig. A3. Pairwise correlations of children's skills and behaviors.

NOTES: The heat map shows the pairwise correlations (Pearson's correlation coefficients) of child outcomes. Numbers of observations differ across pairs and are determined by the availability of measures for children (mainly differing due to different age ranges for measures). See Appendix Table A2 for the overall numbers of observations of outcomes. Significance at * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A19

PCA results for outcome indices.

	(1) Eigenvectors	(2)
	Economic preferences index	Socio-emotional index
patience	0.6405	
risk-taking	0.6742	
altruism	-0.3678	
Big Five openness		0.2935
Big Five conscientiousness		0.3711
Big Five extraversion		-0.0428
Big Five agreeableness		0.3365
Big Five neuroticism		-0.3300

(continued on next page)

Table A19 (continued)

	(1) Eigenvectors	(2)
	Economic preferences index	Socio-emotional index
locus of control		0.3060
self-control		0.3538
prosociality		0.2828
SDQ internalizing behavior		−0.3273
SDQ externalizing behavior		−0.3715
happiness		0.0906
Observations	4779	5448

NOTES: The table displays the first principal components (eigenvectors with their factor loadings) from principal component analyses (PCA) on two sets of child outcomes. Column (1) shows results of a PCA on children's economic preferences: patience, risk-taking, and altruism. Column (2) shows results of a PCA on children's personality traits and other socio-emotional outcomes: the Big Five, locus of control, self-control, prosociality, SDQ internalizing behavior, SDQ externalizing behavior, and happiness. Principal components have unit length and therefore the column-wise sum of the squares of the loadings is 1.

Table A20

Correlations of parenting style dimensions with the positive parenting index.

	(1) Positive parenting indicator (LDA)	(2) Positive parenting index (EW+MON−NEG−PC−SC)
Emotional warmth (EW)	0.264	0.478
Monitoring (MON)	0.378	0.292
Neg. communication (NEG)	−0.579	−0.601
Psychological control (PC)	−0.353	−0.601
Strict control (SC)	−0.275	−0.598

NOTES: The table displays pairwise correlation coefficients between the five parenting style dimensions and the binary LDA-based classification (1) as well as the continuous positive parenting index (2).

Table A21

PCA results for parenting style dimensions.

	(1) Eigenvectors	(2)	(3) Unexplained variance
	Component 1	Component 2	
Emotional warmth	0.226	0.733	0.245
Monitoring	0.407	0.527	0.334
Neg. communication	0.509	−0.236	0.420
Psychological control	0.496	−0.278	0.418
Strict control	0.528	−0.230	0.384

NOTES: The table displays results of a principal component analysis (PCA) on the five parenting style dimensions (N = 5644). Columns (1) and (2) list the first two principal components (eigenvectors) with their factor loadings. Principal components have unit length and therefore the column-wise sum of the squares of the loadings is 1. Column (3) gives for each parenting style dimension the variance that is not explained by the first two components.

Robustness to previous study

Some of the households included in our paper were exposed to a randomized controlled trial (RCT) on arsenic water contamination. We begin by briefly describing that study, before we demonstrate that the results reported in this paper remain qualitatively unchanged when taking into account that a subsample of our sample was exposed to this earlier intervention.

Millions of rural households in Bangladesh regularly drink tubewell water as their main source of drinking water. Until the discovery of arsenic in the tubewell water in the mid-1990s, it was considered a safe and affordable option and was widely promoted by the Department of Public Health and Engineering (DPHE), with support from UNICEF, the World Bank, and similar organizations. Following the discovery of arsenic, the DPHE conducted a nationwide arsenic testing of all tubewells between 1999 and 2002. With support from NGOs, they labeled each tubewell as either green (indicating safe water) or red (indicating unsafe levels of arsenic) and launched a nationwide public information campaign.

Between 2014 and 2016, an RCT was conducted in the villages of our sample to assess the effectiveness of a public information campaign similar to the earlier DPHE campaign, along with the promotion of arsenic filters intended to encourage households to switch to arsenic-free drinking water if affected. All tubewells in the study villages were tested for arsenic and labeled either green or red using the same protocol as the DPHE's nationwide campaign (which, according to regulations, should happen regularly anyhow but is not always enforced). In 23 percent of villages, households received information about the health risks of consuming arsenic-contaminated water (information treatment). In 22 percent of villages, this information was accompanied by an offer to purchase an arsenic water filter with cash on delivery (filter cash treatment). Households in another 22 percent of the villages received the same

information, along with the option to buy the filter through a credit scheme (filter credit treatment). Further details about this RCT can be found in the study's pre-registration: <https://www.socialscisearch.org/trials/11985/history/193353>.

The parents of 703 out of 5644 (12 percent) of the children in our sample were exposed to one of the three treatments described above. Conceptually, there is no reason to expect that refreshing information on the consequences of drinking arsenic-contaminated water and a possible reduction of the contamination (if any) should influence the link between parenting style and children's skills and outcomes that we examine here. Nonetheless, we demonstrate below that our main findings remain robust when controlling for exposure to the arsenic RCT (see Appendix Table A22).

Table A22

Child outcomes and positive parenting—controlling for arsenic-RCT treatments.

	(1)		(2)	(3)	(4)	(5)
	positive parenting					
	Coeff.		SE	Adj. R ²	q-value	Obs.
Cognitive skills						
IQ	0.121	***	(0.029)	0.398	0.001	5644
Non-cognitive skills						
<i>Economic preferences</i>						
patience	−0.083	**	(0.036)	0.004	0.007	5017
risk-taking	−0.061		(0.037)	0.023	0.018	5224
altruism	0.079	**	(0.031)	0.004	0.006	5426
<i>Personality traits</i>						
Big Five openness	0.311	***	(0.036)	0.051	0.001	5590
Big Five conscientiousness	0.367	***	(0.035)	0.061	0.001	5590
Big Five extraversion	0.050	*	(0.030)	0.047	0.018	5590
Big Five agreeableness	0.402	***	(0.034)	0.058	0.001	5590
Big Five neuroticism	−0.285	***	(0.037)	0.036	0.001	5590
locus of control	0.232	***	(0.041)	0.044	0.001	5644
self-control	0.452	***	(0.045)	0.090	0.001	5589
self-esteem	0.386	***	(0.042)	0.128	0.001	4010
Behavioral outcomes						
achievement test score	0.207	***	(0.071)	0.166	0.002	710
risky behaviors	−0.207	***	(0.039)	0.253	0.001	3225
prosociality	0.409	***	(0.042)	0.074	0.001	5501
SDQ internalizing behavior	−0.449	***	(0.046)	0.101	0.001	5501
SDQ externalizing behavior	−0.504	***	(0.043)	0.129	0.001	5501
happiness	0.089	***	(0.034)	0.028	0.005	5644

NOTES: The table shows results for separate OLS regressions of child outcomes (stated in the left-most column, all standardized) on parenting style for children aged 6 to 16. Column (1) shows coefficients for the LDA-based, binary parenting style measure (1 = positive parenting, 0 = non-positive or negative parenting). Column (2) shows conventional standard errors, column (3) the regressions' adjusted R², and column (5) the number of observations. To address multiple hypothesis testing, column (4) displays false discovery rate adjusted q-values. Control variables include gender, age fixed effects, number of siblings, log of yearly family income, literacy of father, literacy of mother, and district fixed effects. Further, indicator variables for the three different arsenic-RCT treatment arms are added: "info only," "info + filter offer (cash)," and "info + filter offer (credit)." Standard errors are clustered at the village level. Significance at * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

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Data availability

Data will be made available on request.

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