Economics and Human Biology 57 (2025) 101472

Contents lists available at ScienceDirect

Economics and Human Biology

journal homepage: www.elsevier.com/locate/ehb

Full length article

Gender gaps in early childhood development in Latin America and the Caribbean

Samuel Berlinski [a,b], Anna Sanz-de-Galdeano [c,b,*,1], Alba Sóñora-Noya [d,2]

[a] Research Department, Inter-American Development Bank, 1300 New York Avenue, N.W. Washington, DC, 20577, USA
[b] IZA, Germany
[c] University of Alicante, Spain
[d] University College London, United Kingdom

ARTICLE INFO

Dataset link: https://doi.org/10.7910/DVN/2T8MJS

JEL classification:
I24
I25
J13
J16

Keywords:
Early childhood development
Gender
Family disadvantage
Parental investments

ABSTRACT

We examine gender gaps in early childhood cognitive and social-behavioral skills across several Latin American and Caribbean (LAC) countries. Our study complements previous research focused on older children by analyzing the preschool period, a critical stage for lifelong human capital formation. We find that the female advantage commonly observed in school-aged children's achievement, as well as in high school enrollment and completion in both high-income and LAC countries, is also frequently evident in early childhood within our sample of LAC countries. On average, girls outperform boys in various developmental measures and are less likely to exhibit externalizing behaviors. Furthermore, these gender gaps generally remain stable across the distributions of developmental outcomes. Unlike findings for older children in high-income countries, our results suggest that during early childhood in LAC, boys and girls do not show differential benefits from socioeconomic status or a more favorable home environment.

1. Introduction

The critical role of early childhood in shaping lifelong learning and development is now well established (National Research Council et al., 2000). The first five years of life, in particular, lay the groundwork for a child's future health and educational success (Duncan et al., 2007; Sammons et al., 2015). Given the rapid and malleable nature of brain development during this period (Knudsen, 2004; Knudsen et al., 2006), experiences provided, stimulation received, and environmental and family influences during these early years play a pivotal role in the accumulation of human capital.[3]

Another strand of the literature has explored whether evidence of gendered parenting exists in early childhood over the past few decades. The results have been somewhat diverse, depending on the specific parenting domain analyzed. In a recent meta-analysis, Morawska (2020) identifies several areas where parents do not differ in their parenting towards boys and girls, as well as several domains, such as physical control (Endendijk et al., 2017), with significant gender differences. Along these lines, Chaplin et al. (2005) show that fathers respond to the emotional expressions of pre-school girls and boys differently, attending more to girls' submissive emotions (such as sadness and anxiety) and boys' disharmonious emotions (anger and disharmonious happiness). Baker and Milligan (2016) find that parents of preschool children devote more time to girls than to boys in activities that can be regarded as promoters of cognitive skills, such as reading, telling stories, and teaching new words and letters. These differences could,

* Corresponding author at: University of Alicante, Spain.
E-mail addresses: samuelb@iadb.org (S. Berlinski), anna.sanzdegaldeano@gmail.com (A. Sanz-de-Galdeano), alsona.alba@gmail.com (A. Sóñora-Noya).

[1] Sanz-de-Galdeano acknowledges financial support from Project PID2021-124237NB-I00 (financed by MCIN/AEI/10.13039/501100011033/ and by FEDER Una manera de hacer Europa) and from Generalitat Valenciana, Consellería de Innovación, Universidades, Ciencia y Sociedad Digital through project Prometeo CIPROM/2021/068.

[2] Sóñora-Noya acknowledges financial support from Project PID2021-124237NB-I00 (financed by MCIN/AEI/10.13039/501100011033/ and by FEDER Una manera de hacer Europa).

[3] See for instance (Heckman and Masterov, 2007; Shonkoff, 2010; Heckman, 2013; Campbell et al., 2014; Berlinski and Schady, 2015; Attanasio, 2015; Conti et al., 2016; Baulos and Heckman, 2022; García et al., 2023), and the references therein.

https://doi.org/10.1016/j.ehb.2025.101472
Received 17 August 2024; Received in revised form 18 January 2025; Accepted 23 January 2025
Available online 2 February 2025

in turn, translate into gender gaps in developmental indicators since early childhood (Morawska, 2020).

In this paper, we contribute to bridging these two strands of the literature by documenting gender differences in cognitive and social and behavioral skills in early childhood in several Latin American and Caribbean countries (Chile, Colombia, Dominican Republic, Ecuador, Nicaragua, Peru and Uruguay). We also investigate how such gaps are shaped both by family socioeconomic status and by children's rearing environment or parenting practices, and how they evolve throughout the developmental outcomes' distributions.[4]

We find that the advantage often observed for females in high-income and Latin American and Caribbean (LAC) countries among older children (Bertrand and Pan, 2013; Brenøe and Lundberg, 2018; DeRose et al., 2018; Autor et al., 2019, 2023) is also frequently evident in early childhood within our sample. In measures of general development and cognition, girls often achieve higher scores and are less prone to exhibiting externalizing behaviors. Moreover, in contrast with U.S. evidence for children during grade school (Autor et al., 2023), these mean gender gaps favorable to females do not appear to conceal significant heterogeneity across the distributions of child development outcomes. Instead, the gender gaps remain relatively stable and do not vary substantially throughout the distributions.

Additionally, and in contrast to findings for older children in high-income countries, boys and girls generally do not exhibit differential benefits from higher socioeconomic status or a more nurturing home environment during early childhood in the LAC countries analyzed.

We make several contributions to the literature. First, unlike most previous studies, we focus on the period preceding formal schooling and place emphasis on gender. Analyses of gender gaps among older children include, for instance, Bertrand and Pan (2013) and Autor et al. (2019) for the U.S.; Brenøe and Lundberg (2018) for Denmark; Dercon and Singh (2013) for Ethiopia, India (Andhra Pradesh), Peru, and Vietnam; Hervé et al. (2022) for rural India; and DeRose et al. (2018) for several LAC countries.

Second, while several studies have explored socioeconomic gradients in early childhood development in developing contexts (Fernald et al., 2011; Schady et al., 2015; López Bóo, 2016; Attanasio et al., 2024), we focus on gender gaps among preschool children across several countries in LAC. This region is especially interesting due to the early onset of the diminishing trend in girls' historical educational disadvantage. As for gender gaps in education among young children, Berniell et al. (2024) find little evidence of gender differences in the proportion of children age 5 attending pre-school and in the completion of primary-school education in the majority of LAC countries in 2019. They also find that this parity does not extend to secondary education completion, which is higher among girls in most LAC countries. The gender gap in secondary school completion in LAC closed for the cohort born in the 1960s (Bossavie and Kanninen, 2018) and, by 1990, LAC was the only region in the developing world where girls' gross enrollment rate in secondary education had already surpassed that of boys (UN, 2015). In line with this evidence, DeRose et al. (2018) rely on nationally representative data from the Demographic and Health Surveys from ten countries in the region and document the proportions of girls and boys who progress on time through school at the ages of 9 to 14. They find that girls are advantaged in terms of on-time progression in seven of those countries (Dominican Republic, Haiti, Colombia, Nicaragua, Brazil, Guatemala), and gender parity in the remaining three countries (Peru, Guyana and Bolivia).

Third, we adopt a distributional perspective to examine whether early childhood gender gaps vary across the distributions of developmental outcomes among LAC preschool children. Autor et al. (2023) show that, among U.S. grade school youth, the gender gap in math scores (favoring males) is most pronounced at the upper end of the achievement distribution, while the gender gap in reading scores (favoring females) is largest at the lower end of the distribution. Furthermore, they find that the well-documented female advantage in behavioral outcomes arises predominantly from disparities in the lower tails

Finally, we complement previous work on whether the family environment elicits a more pronounced response from boys compared to girls. The available evidence indicates that this is the case in the U.S. (Bertrand and Pan, 2013; Autor et al., 2019). In contrast, in the only paper that, to the extent of our knowledge, investigates whether boys benefit more from a good family environment using LAC data, DeRose et al. (2018) find that father absence does not compromise boys' on-time school progression at ages 9 to 14 more than girls'.

The remainder of the paper is organized as follows. Section 2 describes the data sources we rely on and the measurement of the relevant variables. Section 3 sequentially outlines each of our research questions and then describes and discusses the results of the paper. Section 4 concludes the paper.

2. Data

2.1. Overview of data sources and child development indicators

We searched for publicly available data sets for LAC that contain early childhood development indicators with good psychometric properties as well as family background information. We found data for Chile, Colombia, the Dominican Republic, Ecuador, Nicaragua, and Uruguay. In Table 1 we summarize the data sources we rely on and the child development measures available for each country, and describe them in further detail below.

Children are generally considered of preschool age up to 5–6 years old in high income countries and most often when they are up to 6 years old in LAC (UNESCO, 2024). Hence, our analysis exclusively focuses on children younger than 6.

Chile. We use information from the first wave (collected in 2010) of the Encuesta Longitudinal de Primera Infancia (ELPI), which gathered data on a representative sample of around 15.000 children up to 5 years old in Chile.

The development of children was assessed by applying a series of tests on general development and socio-emotional development. We use the following measures of general development: (i) the language, motor, and coordination domains of the Psychomotor Development Test (TEPSI, by its name in Spanish), which was administered to children aged 2–5 years (Haeussler and Marchant, 2003); (ii) and the PPVT, administered to children aged 2.5–5 years. Socioemotional development was measured using the externalization and internalization

[4] Gender gaps in cognitive and non-cognitive skills can be influenced by both environmental and biological factors. As far as the latter are concerned, there is evidence that female and male brains differ in how they perceive, process and respond to different tasks (Ramos-Loyo et al., 2022). It has been shown that male and female brains differ in structure and functions, even before birth, greatly influenced by hormones and genetic factors (Fausto-Sterling et al., 2012; Kheloui et al., 2023; Riva, 2023; Szadvári et al., 2023). Differences in brain connectivity (Wheelock et al., 2019) make males better in sensory perception of motor activities, whereas female brains exhibit better communication between the analytical and the intuitive processing models (Ingalhalikar et al., 2014). Imaging studies have shown different activation patterns between boys and girls in visuospatial tasks (Clements-Stephens et al., 2009). They also show gender differences in the growth rate and size of the corpus callosum, which is related to nonverbal skills development (Schmied et al., 2020). The role played by biological factors is beyond the scope of our study, which investigates instead on the potentially differential influence that parental socioeconomic status and upbringing practices could have on boys' and girls' early childhood developmental outcomes.

Table 1
Child development measures by country.

Country	Data Source	Age range	Years	Child Development Measures
Chile	Encuesta Longitudinal de Primera Infancia (ELPI)	7–58 m.o.	2010	- TEPSI (language, motor and coordination domains) - PPVT - CBCL (externalizing and internalizing scales)
Colombia	Data from Attanasio et al. (2014, 2020)	10–28 m.o.	2011	- MacArthur–Bates Communicative Development Inventories - ICQ (difficult, unadpatable, unstoppable and unsociable domains)
Dominican Republic	Data collected by the IADB	12–48 m.o.	2017	- Denver II (fine motor, gross motor, language, personal–social domains)
Ecuador	Ecuador Longitudinal Survey of Child Health and Development (ELSCHD)	2–71 m.o.	2003	- PPVT - BPI aggression subscale
Nicaragua	Data from Macours et al. (2012)	36–71 m.o.	2005	- PPVT
Peru	Young Lives Round 2 Young Cohort	53–71 m.o.	2006	- PPVT - Cognitive Development Assessment (CDA)
Uruguay	Encuesta de Nutrición, Desarrollo Infantil *y* Salud (ENDIS)	24–66 m.o.	2015	- ASQ-3 (fine motor, gross motor, communication, problem-solving, socio-individual domains)

scales of the Child Behavior Checklist (CBCL, Achenbach and Rescorla 2000) for the sample of children aged 1.5–5 years.[5]

Colombia. We use information from a baseline survey collected between March and August 2011 that was used by Attanasio et al. (2014, 2020) to evaluate the impact of an integrated early child development intervention implemented in Colombia aimed at disadvantaged children aged 12 to 24 months at the start of the study.[6]

To measure the developmental outcomes of children, Attanasio et al. (2014, 2020) collected data based on maternal reports and direct assessment of the child. We use the following baseline measures of child development collected in the home setting via maternal report: (i) language development (the number of words the child can say) using the vocabulary checklists in the Spanish Short-Form of the MacArthur–Bates Communicative Development Inventories (MacArthur, Jackson-Maldonado et al. 2013); and (ii) child temperament using the Infant Characteristics Questionnaire (ICQ, Bates et al. 1979), which relies on caregivers' reports/perceptions (17 items in total) that were used to obtain indicators related to the following constructs: difficult, unadaptable, unstoppable, and unsociable.

In addition to these assessments via maternal reports, we also use the Bayley Scales of Infant and Toddler Development, third edition (Bayley III) —in particular, the cognition, receptive language, expressive language, and fine motor subscales — that trained psychologists administered in community centers (Bayley, 2006; Del Rosario et al., 2021).

Dominican Republic. We use data collected by the Inter-American Development Bank to provide the authorities with technical assistance on the potential expansion of Quisqueya Empieza Contigo, a multifaceted intervention aimed at fostering the development of disadvantaged children up to 5 years old in the Dominican Republic. Baseline data collection was carried out between March and August 2017 and focused on a random sample of households with children between 12 and 48 months of age and their families. Households were located in areas were the program was considered for expansion.

The Denver Developmental Screening Test (Denver II, Frankenburg et al. 1992, López Bóo et al. 2020)—including the fine motor-adaptive, gross motor, language, and personal–social scales—was collected to assess children's development.[7]

Ecuador. We use information from waves 0 (collected in 2003, children aged 0–5) and 1 (collected in 2005) from the Ecuador Longitudinal Survey of Child Health and Development (ELSCHD) (Araujo and Schady, 2020; Paxson and Schady, 2007, 2010). This dataset has a longitudinal structure, commencing in 2003 (wave 0) with the primary aim of assessing the impact of the Ecuadorian conditional cash transfer program Bono de Desarrollo Humano (BDH). During the initial wave in 2003, data was gathered from a sample of 5081 households, both rural and urban, eligible to participate in BDH. All households in the original sample included children aged 0–5 years with no children beyond that age.

We rely on the following measures of children's development: (i) the PPVT (Dunn et al., 1986) applied to children aged 3–5 in wave 0; (ii) the aggression subscore of the Behavioral Problem Index (BPI), created by Peterson and Zill (1986) to measure the frequency and type of childhood behavior problems as reported by their mother, which was administered to children aged 3–7 in wave 1. Since our focus is on preschool children, we only include children younger than 6 in the sample.

Nicaragua. We use information from a baseline survey collected in April–May 2005 by Macours et al. (2012) in order to evaluate the impact of the Atención a Crisis Pilot program, a conditional cash transfer intervention implemented in 6 municipalities in rural Nicaragua between November 2005 and December 2006 by the Ministry of the Family.[8] In their baseline survey, collected in April–May 2005, Macours et al. (2012) administered the PPVT to children under 6 years of age and older than 36 months.

Peru. We use information from Round 2 (collected in 2006–2007) of Young Lives, an international research project that tracked the development of two cohorts of children in several countries including Peru (Boyden, 2022). In particular, in Round 2 of Young Lives the

[5] The internalization scale allows for the integration of issues related to internal difficulties in children (those that do not have a connection with the socioemotional interaction that the child establishes with other individuals), while the externalization scale groups problems of attention and aggressive behaviors, all of which are related to how the child manages or interacts with the external environment.

[6] The subjects of the intervention were drawn from the conditional cash transfer (CCT) program Familias en Acción, which covers the poorest 20 percent of the Colombian population. See Attanasio et al. (2010) for a description and evaluation of Familias en Acción.

[7] The Spanish version of the Peabody Picture Vocabulary Test (PPVT), a receptive language test (Dunn et al., 1986) designed for children aged 2.5 years and older, was administered to a subsample of children aged 30 to 48 months. Given that the Denver language scale already assesses the language developmental domain, we chose not to include it in our final analyses to avoid the sample drop that its inclusion would imply. However, our results for language development in the Dominican Republic are robust when restricting the sample to children aged 30 to 48 months and including both the PPVT and the Denver language scale.

[8] Among all communities in the 6 municipalities, baseline data were collected on 106 communities that were randomly selected. Baseline data were then used to define program eligibility based on a proxy means test.

following tests were administered to children in the younger cohort (aged between 4.5 and under 6 years old at the time of Round 2): the Cognitive Developmental Assessment (CDA) and the PPVT (Cueto et al., 2012).

Uruguay. We use information from the second wave of the Encuesta de Nutrición, Desarrollo Infantil y Salud (ENDIS). ENDIS target population included all children who, at the time of the first round of the survey (in 2013), were between 0 and 3 years and 11 months old and resided in private households in urban areas with 5000 or more inhabitants nationwide.

We use data from the second wave of ENDIS (collected in 2015, children aged 2–6 years old)[9] and, in order to measure children's development we rely on the third edition of the Ages and Stages Questionnaires (ASQ-3), a developmental screening tool that pinpoints developmental progress in children between the ages of one month to 5.5 years. In its second wave, ENDIS administered this test to children aged 2–5.5 years old. The ASQ-3 is a parent self-report questionnaire that assesses performance in five areas: gross motor, fine motor, communication, problem-solving, and socio-individual skills appropriate to the developmental stage of children (Squires et al., 1997, 2009). ENDIS only reports a discrete variable categorizing results into three groups: the normal range (scores obtained above −1 standard deviation), the monitoring range (scores obtained between −1 and −2 standard deviations), and the risk range (scores obtained below −2 standard deviations). Consequently, for Uruguay, we create dummy variables to identify children whose scores in each of the ASQ-3 domains fall within the normal range, in contrast to those whose scores fall within the monitoring and delay ranges.

Since the rest of the child development indicators used are continuous and have not been standardized for the LAC countries analyzed, we follow Rubio-Codina et al. (2015) and Rubio-Codina et al. (2016) and, after removing interviewer fixed effects (when they are available), we internally standardize the residuals of the raw scores over age using children's age-conditional means and standard deviations using non-parametric methods. All indicators have been inverted when necessary so that higher values represent more desirable outcomes to facilitate the interpretation of the results and ensure consistency with the interpretation of the magnitude of all the estimated associations.

2.2. Aggregating early childhood development measures into developmental domains

To facilitate cross-country comparisons and identify common patterns, we group the available developmental indicators described in Section 2.1 according to the classification proposed by Fernald et al. (2017) (see their Table 3.1). Specifically, the indicators are categorized into the following developmental domains:

Language skills: TEPSI language scale and PPVT in Chile; MacArthur–Bates number of words and Bayley expressive and receptive language scales in Colombia; Denver language scale in the Dominican Republic; PPVT in Ecuador, Nicaragua, and Perú; ASQ-3 communication scale in Uruguay.

Cognitive skills: Bayley cognition scale in Colombia; ACD in Peru; and ASQ-3 problem solving scale in Uruguay.

Motor skills: TEPSI motor and coordination domains in Chile; Bayley fine motor scale in Colombia; Denver fine motor-adaptative and gross-motor scales in the Dominican Republic; and ASQ-3 fine motor and gross motor scales in Uruguay.

Social-emotional skills: CBCL externalization and internalization scales in Chile; ICQ unsociable and unadaptable domains in Colombia; Denver personal–social scale in the Dominican Republic; BPI anxiety and aggression subscores in Ecuador; ASQ-3 socio-individual scale in Uruguay.

Executive function and self-regulation: ICQ difficult and unstoppable domains in Colombia.

To group individual indicators into these categories, we perform principal component analysis (PCA), extract the first principal component, and then standardize it to have a mean of 0 and a standard deviation of 1. For example, in the language domain, we perform PCA using the TEPSI and PPVT in Chile, while in Colombia, we use the MacArthur–Bates number of words and the Bayley expressive and receptive language scales. We do this for all countries, except Uruguay, because the developmental indicators we use for this country are dichotomous.

2.3. Indicators of family socioeconomic advantage

We used information on household characteristics from our datasets to construct summary indexes of household socioeconomic status (SES). The final SES indices are the first principal components of various characteristics of the household. Subsequently, we standardize them to have a mean of 0 and a standard deviation of 1, facilitating the evaluation and comparability of the magnitude of the estimated coefficients.[10] The components of the SES indicators for each country are detailed in Appendix A.

Note that the datasets we use, listed in Section 2.1, vary in nature. Some are closer to being nationally representative, while others focus more strongly on vulnerable groups.[11] The most disadvantaged samples in our analysis, in terms of maternal education, are Ecuador and Nicaragua. Other proxies for socioeconomic status, such as paternal presence in the household or maternal age at birth, tend to be more balanced.[12]

Socioeconomic gradients in early childhood development have been documented in the United States (Heckman, 2008), across Latin America and the Caribbean (LAC) (Attanasio et al., 2024; Schady et al., 2015), and in various low- and middle-income countries (Fernald et al., 2011; López Bóo, 2016). Our data are no exception to this pattern. Specifically, when we aggregate developmental domains using PCA and pool data across all countries, we find that a one standard deviation increase in family SES is significantly associated with a 0.18-standard deviation increase in children's development (p-value < 0.001). Although we cannot pool data for Uruguay due to the binary nature of its developmental indicators, we have verified that this positive association is also present in that country.[13]

[9] We do not use data from the first wave of ENDIS (collected in 2013, children aged 0–4) because this wave did not include the HOME inventory described in Section 2.4.

[10] In the case of Colombia, we use the index constructed by Rubio-Codina et al. (2015)

[11] The Chilean dataset is nationally representative for households with children aged 5 years and younger, while the first wave of the Uruguayan dataset focuses on households with children up to 4 years old in urban areas with at least 5000 inhabitants nationwide. In contrast, the Peruvian dataset focuses more heavily on poorer groups and excludes the wealthiest 5% of districts, reflecting the study's emphasis on poverty. The remaining datasets focus on disadvantaged families, such as those in Colombia, the Dominican Republic, and Nicaragua.

[12] These statistics, omitted for the sake of brevity, are available from the authors upon request.

[13] A one standard deviation increase in family SES in Uruguay is significantly associated with increases of 7.9, 3.7, 1.8, and 1.1 percentage points in the probability of falling within the normal range (as opposed to the delay or monitoring ranges) for cognitive, language, motor, and socio-emotional skills, respectively.

2.4. Measuring children's nurturing environment

Four of the datasets we utilize—those for Chile, the Dominican Republic, Ecuador, and Uruguay—have the additional advantage of including indicators that assess the nurturing environment in which a child is raised. In particular, they include the Home Observation for Measurement of the Environment (HOME). This instrument measures, through observation and interviews, the level of stimulation and support, both in terms of quality and quantity, that is accessible to a child in their home environment (Caldwell et al., 2003; Totsika and Sylva, 2004). The full version of the HOME is only available for the Dominican Republic, while shorter versions are available in Chile, Ecuador and Uruguay. The full version consists of 45 items divided into six subscales that assess: (i) parental responsiveness (emotional and verbal responsiveness of the primary caregiver, i.e., the communicative and affective interactions between the caregiver and the child); (ii) parental acceptance (avoidance of restriction and punishment, i.e., how the primary caregiver disciplines the child and handles his/her behavior); (iii) household organization (organization of the physical and temporal environment, i.e., how the child's time is organized outside the family house and how the child's personal space looks like); (iv) materials (provision of appropriate play materials, i.e., presence of several types of toys available to the child and appropriate for his/her age); (v) parental involvement (how the primary caregiver interacts physically with the child); and (vi) variety in stimulation (opportunities for variety in daily stimulation, i.e., the way the child's daily routine is designed to incorporate social meetings with people other than the mother). The complete list of items available for each country is detailed in Appendix B as well as the subscales to which they belong. Each item is scored as a dichotomous variable, and they are subsequently aggregated yielding a total score such that higher scores indicate a more favorable home environment.

As noted by López Bóo et al. (2019), the primary drawback of the HOME lies in the challenge of implementing the complete 45-item inventory, as it requires an average administration time of 45 to 60 min and the participation of highly trained interviewers. This is why the versions of the HOME administered in Chile, Ecuador, and Uruguay are less comprehensive. In the dataset employed for Chile, the ELPI, the HOME was adapted to contain 31 items, as detailed in Appendix B. For the ENDIS dataset utilized in Uruguay, 11 items (listed in Appendix B) from the HOME caregiver responsiveness and acceptance subscales were administered. Specifically, six items are part of the caregiver responsiveness subscale, while the remaining five items correspond to the acceptance subscale (López Bóo et al., 2019). In the case of the ELSCHSD dataset used in Ecuador (Paxson and Schady, 2007, 2010), the same 11 HOME items were administered as in ENDIS.[14,15]

Family SES and the nurturing environment parents provide to children are generally, and as expected, positively correlated (López Bóo et al., 2019). Our data align with this pattern. When pooling data from countries where both SES and the HOME inventory are available (Chile, the Dominican Republic, Ecuador, and Uruguay), we find that a one standard deviation increase in the HOME indicator is significantly associated with a 0.14-standard deviation increase in family SES (p-value < 0.001).

Similarly, the HOME inventory is positively and significantly associated with developmental outcomes (López Bóo et al., 2019). Using PCA to aggregate developmental domains and pooling data across countries where the HOME indicator is available, we observe that a one standard deviation increase in the HOME score corresponds to a 0.24-standard deviation increase in children's development (p-value < 0.001). Although we cannot pool data for Uruguay due to the binary nature of its developmental indicators, we have confirmed that the positive association with the HOME inventory holds in that country as well.[16]

3. Results

3.1. Pooled gender gaps in early childhood development in LAC

We begin by presenting a general overview of the raw gender gap patterns in our sample of LAC countries. To this end, we pool data from all countries and developmental domains and estimate the following equation:

$$y_{ic} = \alpha + \beta Female_{ic} + \rho_c + \varepsilon_{ic}, \quad (1)$$

where y_{ic} is a summary indicator of early childhood development for child i in country c, $Female_{ic}$ is an indicator for a female child, and ρ_c are country fixed effects.

The dependent variable is a summary measure for each child, encompassing the available developmental domains discussed in Section 2.2. To construct this measure, we perform a principal component analysis (PCA) on all the available developmental domains and extract the first principal component. Finally, to facilitate the interpretation of the magnitudes of the estimated coefficients, we standardize this component to have a mean of 0 and a standard deviation of 1. Uruguay is excluded from this pooled analysis because the developmental indicators that we use for this country are dichotomous.

We first estimate by OLS the raw mean gender gap for the pool of all countries but Uruguay. Next, we follow (Autor et al., 2023) and use the unconditional quantile regression (UQR) estimator proposed by Firpo et al. (2009) to characterize the raw gender gaps throughout the outcomes' distributions. The estimated gender gaps along the outcomes' distributions are computed for percentiles 10, 25, 50, 75, and 90, and their associated bootstrapped standard errors are obtained with 1000 replications.

The results of this analysis are presented in Table 2 and yield two clear conclusions. First, pre-school girls perform significantly better than boys in our sample of LAC countries both on average and across the developmental outcomes' distribution. In particular, girls' mean and median performance surpass that of boys by 0.190 and 0.195 standard deviations, respectively. Second, the female–male gaps remains relatively stable across the distribution, as indicated by the two-sided p-values from pairwise tests for the equality of unconditional quantile coefficients, reported in the footnote of Table 2.[17]

[14] In Nicaragua, a shortened version of the HOME score was administered in their two follow-up surveys, but we opted not to use it for two reasons. First, by the time the follow-up surveys were conducted, most children for whom the PPVT was administered at baseline were well above the age of 5, whereas our primary focus is on early childhood. Second, the evaluated intervention could potentially have different effects on the PPVT of boys and girls and could also impact their home environment.

[15] In Colombia, according to the Online Appendix in Attanasio et al. (2020), the quality of the home environment was assessed using items in the Family Care Indicators (FCI) developed by UNICEF (Kariger et al., 2012). However, these items are not included among the baseline variables in the publicly available dataset accessible here.

[16] A one standard deviation increase in family SES in Uruguay is significantly associated with increases of 8.5, 5.4, 0.7, and 3.1 percentage points in the probability of falling within the normal range (as opposed to the delay or monitoring ranges) for cognitive, language, motor, and socio-emotional skills, respectively.

[17] We also performed these estimations using weights that account for variation in both the number of observations and the available developmental domain indicators across countries. However, the results are very similar, so we do not report them here for the sake of brevity. For example, the estimated mean female advantage using these weights is approximately 0.158, and we cannot reject the null hypothesis that the unweighted and weighted gender gaps are equal (p-value = 0.283).

3.2. Gender gaps in early childhood development in LAC: A country-by-country analysis by developmental domain

We delve further into our exploration of gender gaps by conducting country-specific analyses and distinguishing between developmental domains within each country. As explained in Section 2.2, we group the available indicators outlined in Section 2.1 into the developmental categories proposed by Fernald et al. (2017) by performing principal component analysis (PCA), extracting the first principal component, and standardizing it to have a mean of 0 and a standard deviation of 1. This procedure is applied to all countries except Uruguay, as the developmental indicators available for this country are dichotomous.

For each country and developmental domain, we first estimate the raw mean gender gap using ordinary least squares (OLS). We then apply the unconditional quantile regression (UQR) estimator proposed by Firpo et al. (2009) to characterize the raw gender gap across the distribution of each outcome. Gender gaps along the outcomes' distributions are estimated at the 10th, 25th, 50th, 75th, and 90th percentiles, with associated bootstrapped standard errors calculated using 1000 replications. This distributional analysis cannot be conducted for Uruguay, as the developmental indicators available for this country are discrete.

We now turn to the mean gender gaps estimated across developmental domains, followed by an analysis of their distributional patterns. We begin with language skills, as this is the only skill domain measured by at least one indicator in all the countries analyzed. Subsequently, we examine other developmental domains in order of decreasing data availability across countries.

Preschool girls' **language skills** (Table 3) are significantly better than boys' in Chile, Colombia, Dominican Republic, and Uruguay. In these countries, the estimated mean gender gaps are sizeable and amount to 0.186, 0.262, and 0.171 standard deviations in Chile, Colombia, and the Dominican Republic, respectively. The female–male gap estimated for Uruguay, where all measures are dummies identifying children whose scores in each domain fall within the normal range (in contrast to those whose scores fall within the monitoring or delay range), is measured in percentage points, and it is also statistically significant. It amounts to 5.8 percentage points (p.p.), which represent 6.3% of the share of children whose language skills fall within the normal range. In contrast, raw mean gender gaps in language skills are small and far from statistically significant in Ecuador, Nicaragua, and Peru (−0.030 standard deviations with $p - value = 0.546$ in Ecuador; 0.026 standard deviations with $p - value = 0.670$ in Nicaragua; and −0.044 with $p - value = 0.339$ in Peru).

Socio-emotional skills (Table 4) are measured in all countries in our sample except Nicaragua and Peru. The average female–male gap in socio-emotional skills is positive in all the countries where this type of skills are measured, amounting to 0.104 (p-value < 0.001), 0.137 ($p - value = 0.010$), 0.217 (p-value < 0.001), and 0.159 (p-value < 0.001) standard deviations in Chile, Colombia, the Dominican Republic, and Ecuador, respectively, and 5.1 p.p. in Uruguay (representing 5.6% of the mean of the socio-emotional skills indicator in our sample).

As for **motor skills** (Table 5), indicators are available for Chile, Colombia, the Dominican Republic, and Uruguay. Girls significantly outperform boys in Chile and Colombia, with gender gaps of 0.260 and 0.145 standard deviations, respectively. In contrast, the female–male gender gap is small and not statistically significant in the Dominican Republic (0.035 standard deviations) and Uruguay (−0.004 percentage points).

Information on **cognitive skills** (Table 6) is available for Colombia, Peru, and Uruguay. The mean female–male gap is positive in all three countries but reaches statistical significance at conventional levels only in Uruguay, where it amounts to 9.3 percentage points (representing 11.54% of the mean prevalence of the cognitive skills indicator in our sample). Notably, the female–male gap is both larger and more statistically significant at the median than at the mean of the distribution in Colombia and Peru. Finally, indicators for **executive function and self-regulation** are available only for Colombia (Table C.1), and no discernible gender gap is observed.

In summary, the female advantage observed among children in elementary and middle school in high-income and LAC countries[18] is often evident among preschool children in our sample of LAC countries as well. When pooling our data, we estimate a significant female advantage, and in country-by-country analyses, we generally find either a female advantage or, in some countries and skill domains, no significant gender differences.

We now turn to our next question: Does the advantage of girls (or the disadvantage of boys), previously documented in several LAC countries across early childhood developmental domains, significantly vary across the distributions of developmental outcomes? The results are presented in rows 2–6 of Table 3 through Tables 6 and C.1. The estimated country-specific gender gaps for each domain's distribution are reported at the 10th, 25th, 50th, 75th, and 90th percentiles, with associated standard errors computed using 1000 bootstrap replications. This distributional analysis cannot be performed for Uruguay, as the developmental measures available for this country are discrete.

The general pattern emerging from this analysis is that the mean gender gaps previously identified do not mask considerable heterogeneity across the developmental domains' distributions. Instead, the gender gaps are generally stable and do not vary significantly along the distributions, as indicated by the pairwise tests of unconditional quantile coefficient equality and their corresponding two-sided p-values reported in the footnotes of Table 3 through Tables 6 and C.1. There are, however, two notable exceptions: (i) in Chile, girls' advantage

Table 2
Pooled gender gaps in early childhood development in LAC.

	Female–Male Gaps
Mean	0.193***
	(0.017)
P10	0.214***
	(0.031)
P25	0.201***
	(0.021)
P50	0.197***
	(0.020)
P75	0.192***
	(0.022)
P90	0.151***
	(0.028)
Observations	14344

Notes: The dependent variable is a summary measure of each child's development, encompassing the developmental domains discussed in Section 2.2. This measure is constructed using principal component analysis (PCA) on all available developmental domains, extracting the first principal component, which is then standardized to have a mean of 0 and a standard deviation of 1. Uruguay is excluded from the pooled analysis because its developmental indicators are dichotomous. The sample includes Chile, Colombia, the Dominican Republic, Ecuador, Nicaragua, and Peru. The first row reports the female–male mean gap, estimated via OLS from Eq. (1), including country fixed effects, with robust standard errors. Subsequent rows present unconditional quantile regression estimates (Firpo et al., 2009) at the 10th, 25th, 50th, 75th, and 90th percentiles of the children's developmental distribution, along with bootstrapped standard errors based on 1000 replications. ***$p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Two-sided p-values from pairwise tests for the equality of unconditional quantile coefficients are as follows: 10th = 90th (p-value = 0.108), 10th = 50th (p-value = 0.588), 50th = 90th (p-value = 0.109).

[18] See, for instance, Bertrand and Pan (2013), Autor et al. (2019, 2023), and DiPrete and Jennings (2012) for the U.S.; Brenøe and Lundberg (2018) for Denmark; and DeRose et al. (2018) for LAC.

Table 3
Gender gaps in early childhood language skills in LAC: By country.

Percentile	Chile	Colombia	Dominican Republic	Ecuador	Nicaragua	Peru	Uruguay
Mean	0.186***	0.262***	0.171***	−0.030	0.026	−0.044	0.058***
	(0.023)	(0.053)	(0.038)	(0.050)	(0.062)	(0.046)	(0.011)
P10	0.230***	0.199**	0.131***	−0.023	0.022	−0.020	NA
	(0.039)	(0.087)	(0.050)	(0.032)	(0.033)	(0.052)	NA
P25	0.257***	0.335***	0.117**	−0.036	−0.004	−0.097	NA
	(0.033)	(0.068)	(0.047)	(0.043)	(0.035)	(0.061)	NA
P50	0.161***	0.293***	0.165***	−0.085	−0.003	−0.062	NA
	(0.030)	(0.069)	(0.043)	(0.065)	(0.049)	(0.062)	NA
P75	0.159***	0.315***	0.255***	−0.084	0.003	−0.143*	NA
	(0.030)	(0.077)	(0.074)	(0.093)	(0.084)	(0.076)	NA
P90	0.140***	0.179*	0.151***	0.006	0.118	0.062	NA
	(0.038)	(0.105)	(0.057)	(0.131)	(0.156)	(0.088)	NA
Observations	7282	1408	2799	1566	1052	1831	2331

Notes: LAC stands for Latin America and the Caribbean. The dependent variable is a summary measure of each child's development in the language domain by country, encompassing all the language skills indicators outlined in Section 2.2 and described in Section 2.1. This measure is constructed using principal component analysis (PCA) on all available language indicators, extracting the first principal component, which is then standardized to have a mean of 0 and a standard deviation of 1. Uruguay is excluded from the distributional analysis because the developmental indicators available for this country are dichotomous. The first row reports the female–male mean gap, estimated by OLS, along with its associated robust standard error. Subsequent rows report unconditional quantile regression estimates (Firpo et al., 2009) at the 10th, 25th, 50th, 75th, and 90th percentiles of the children's language skills distribution, with their associated bootstrapped standard errors obtained from 1000 replications. ***$p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Two-sided p-values from pairwise tests for the equality of unconditional quantile coefficients are as follows: i) For Chile: 10th = 90th (p-value = 0.090), 10th = 50th (p-value = 0.091), 50th = 90th (p-value = 0.610); ii) For Colombia: 10th = 90th (p-value = 0.881), 10th = 50th (p-value = 0.320), 50th = 90th (p-value = 0.273); iii) For Dominican Republic: 10th = 90th (p-value = 0.783), 10th = 50th (p-value = 0.541), 50th = 90th (p-value = 0.818); iv) For Ecuador: 10th = 90th (p-value = 0.821), 10th = 50th (p-value = 0.320), 50th = 90th (p-value = 0.466); v) For Nicaragua: 10th = 90th (p-value = 0.543), 10th = 50th (p-value = 0.618), 50th = 90th (p-value = 0.411); vi) For Peru: 10th = 90th (p-value = 0.396), 10th = 50th (p-value = 0.519), 50th = 90th (p-value = 0.167).

Table 4
Gender gaps in early childhood socio-emotional skills in LAC: By country.

Percentile	Chile	Colombia	Dominican Republic	Ecuador	Nicaragua	Peru	Uruguay
Mean	0.104***	0.137***	0.217***	0.148*	NA	NA	0.051**
	(0.019)	(0.053)	(0.043)	(0.044)	NA	NA	(0.011)
P10	0.152***	0.125	0.271***	0.297***	NA	NA	NA
	(0.042)	(0.077)	(0.067)	(0.109)	NA	NA	NA
P25	0.117***	0.191***	0.251***	0.234***	NA	NA	NA
	(0.029)	(0.071)	(0.060)	(0.076)	NA	NA	NA
P50	0.098**	0.219***	0.176***	0.117**	NA	NA	NA
	(0.026)	(0.076)	(0.056)	(0.056)	NA	NA	NA
P75	0.076***	0.126	0.199***	0.94*	NA	NA	NA
	(0.022)	(0.084)	(0.055)	(0.051)	NA	NA	NA
P90	0.066***	0.067	0.164***	0.072	NA	NA	NA
	(0.023)	(0.099)	(0.050)	(0.055)	NA	NA	NA
Observations	11193	1423	2123	2029	NA	NA	2355

Notes: LAC stands for Latin America and the Caribbean. The dependent variable is a summary measure of each child's development in the socio-emotional domain by country, encompassing all the socio-emotional skills indicators outlined in Section 2.2 and described in Section 2.1. This measure is constructed using principal component analysis (PCA) on all available socio-emotional indicators, extracting the first principal component, which is then standardized to have a mean of 0 and a standard deviation of 1. Uruguay is excluded from the distributional analysis because the developmental indicators available for this country are dichotomous. The first row reports the female–male mean gap, estimated by OLS, along with its associated robust standard error. Subsequent rows report unconditional quantile regression estimates (Firpo et al., 2009) at the 10th, 25th, 50th, 75th, and 90th percentiles of the children's socio-emotional skills distribution, with their associated bootstrapped standard errors obtained from 1000 replications. ***$p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Two-sided p-values from pairwise tests for the equality of unconditional quantile coefficients are as follows: i) For Chile: 10th = 90th (p-value = 0.060), 10th = 50th (p-value = 0.183), 50th = 90th (p-value = 0.255); ii) For Colombia: 10th = 90th (p-value = 0.628), 10th = 50th (p-value = 0.305), 50th = 90th (p-value = 0.152); iii) For Dominican Republic: 10th = 90th (p-value = 0.188), 10th = 50th (p-value = 0.205), 50th = 90th (p-value = 0.848); iv) For Ecuador: 10th = 90th (p-value = 0.008), 10th = 50th (p-value = 0.005), 50th = 90th (p-value = 0.817).

Table 5
Gender gaps in early childhood motor skills in LAC: By country.

Percentile	Chile	Colombia	Dominican Republic	Ecuador	Nicaragua	Peru	Uruguay
Mean	0.260**	0.145**	0.035	NA	NA	NA	−0.004
	(0.021)	(0.056)	(0.041)	NA	NA	NA	(0.013)
P10	0.253***	0.155	−0.047	NA	NA	NA	NA
	(0.036)	(0.109)	(0.067)	NA	NA	NA	NA
P25	0.291***	0.068	0.015	NA	NA	NA	NA
	(0.031)	(0.078)	(0.053)	NA	NA	NA	NA
P50	0.253***	0.109	0.058	NA	NA	NA	NA
	(0.026)	(0.071)	(0.055)	NA	NA	NA	NA
P75	0.247**	0.143	0.086	NA	NA	NA	NA
	(0.026)	(0.075)	(0.066)	NA	NA	NA	NA
P90	0.260**	0.191*	0.083	NA	NA	NA	NA
	(0.031)	(0.086)	(0.057)	NA	NA	NA	NA
Observations	9167	1414	2412	NA	NA	NA	2611

Notes: LAC stands for Latin America and the Caribbean. The dependent variable is a summary measure of each child's development in the motor skills domain by country, encompassing all the motor skills indicators outlined in Section 2.2 and described in Section 2.1. This measure is constructed using principal component analysis (PCA) on all available motor skills indicators, extracting the first principal component, which is then standardized to have a mean of 0 and a standard deviation of 1. Uruguay is excluded from the distributional analysis because the developmental indicators available for this country are dichotomous. The first row reports the female–male mean gap, estimated by OLS, along with its associated robust standard error. Subsequent rows report unconditional quantile regression estimates (Firpo et al., 2009) at the 10th, 25th, 50th, 75th, and 90th percentiles of the children's motor skills distribution, with their associated bootstrapped standard errors obtained from 1000 replications. ***$p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Two-sided p-values from pairwise tests for the equality of unconditional quantile coefficients are as follows: i) For Chile: 10th = 90th (p-value = 0.871), 10th = 50th (p-value = 0.998), 50th = 90th (p-value = 0.840); ii) For Colombia: 10th = 90th (p-value = 0.782), 10th = 50th (p-value = 0.677), 50th = 90th (p-value = 0.374); iii) For Dominican Republic: 10th = 90th (p-value = 0.120), 10th = 50th (p-value = 0.142), 50th = 90th (p-value = 0.706).

Table 6
Gender gaps in early childhood cognitive skills in LAC: By country.

Percentile	Chile	Colombia	Dominican Republic	Ecuador	Nicaragua	Peru	Uruguay
Mean	NA	0.085	NA	NA	NA	0.063	0.093***
	NA	(0.055)	NA	NA	NA	(0.046)	(0.016)
P10	NA	−0.042	NA	NA	NA	0.078	NA
	NA	(0.122)	NA	NA	NA	(0.093)	NA
P25	NA	0.118	NA	NA	NA	−0.010	NA
	NA	(0.074)	NA	NA	NA	(0.067)	NA
P50	NA	0.161**	NA	NA	NA	0.099*	NA
	NA	(0.068)	NA	NA	NA	(0.056)	NA
P75	NA	0.120*	NA	NA	NA	0.055	NA
	NA	(0.071)	NA	NA	NA	(0.055)	NA
P90	NA	0.049	NA	NA	NA	−0.015	NA
	NA	(0.079)	NA	NA	NA	(0.063)	NA
Observations	NA	1415	NA	NA	NA	1877	2355

Notes: LAC stands for Latin America and the Caribbean. The dependent variable is a summary measure of each child's development in the cognitive skills domain by country, encompassing all the cognitive skills indicators outlined in Section 2.2 and described in Section 2.1. This measure is constructed using principal component analysis (PCA) on all available cognitive skills indicators, extracting the first principal component, which is then standardized to have a mean of 0 and a standard deviation of 1. Uruguay is excluded from the distributional analysis because the developmental indicators available for this country are dichotomous. The first row reports the female–male mean gap, estimated by OLS, along with its associated robust standard error. Subsequent rows report unconditional quantile regression estimates (Firpo et al., 2009) at the 10th, 25th, 50th, 75th, and 90th percentiles of the children's cognitive skills distribution, with their associated bootstrapped standard errors obtained from 1000 replications. ***$p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Two-sided p-values from pairwise tests for the equality of unconditional quantile coefficients are as follows: i) For Colombia: 10th = 90th (p-value = 0.515), 10th = 50th (p-value = 0.096), 50th = 90th (p-value = 0.190); ii) For Peru: 10th = 90th (p-value = 0.383), 10th = 50th (p-value = 0.818), 50th = 90th (p-value = 0.107).

in language skills is significantly larger at the 1st decile compared to the median and the 9th decile of the skills distribution. (ii) in Ecuador, girls' advantage in socio-emotional skills is significantly larger at the 1st decile compared to the median and the 9th decile of the socio-emotional skills distribution.

3.3. Mediation analysis: The role of family inputs

Previous studies have emphasized, both empirically and theoretically, the importance of family inputs during early childhood (Berlinski and Vera-Hernández, 2019; Jenkins and Handa, 2019). Take, for example, the conceptual framework proposed by Jenkins and Handa (2019), which highlights the role of family inputs in the child development production function, particularly emphasizing the significance of parent–child interactions—characterized by sensitivity and engagement—which are amenable to policy interventions, as parenting skills can be taught. Moreover, socioeconomic status (SES) plays a pivotal role in shaping the availability and quality of these inputs, as higher-SES families are better positioned to provide resources that support cognitive and socio-emotional development. Consistent with these perspectives, both prior studies and our data show that family SES and the HOME inventory are positively correlated with children's development (Heckman, 2008; Attanasio et al., 2024; Schady et al., 2015; Fernald et al., 2011; López Bóo, 2016; López Bóo et al., 2019) and also positively correlated with each other (López Bóo et al., 2019), as detailed in Sections 2.3 and 2.4.

Applying these ideas to our exploration of gender gaps, one potential explanation for the female advantage we frequently observe among LAC preschoolers is that girls' rearing environments may be more conducive to their development. To investigate this, we leverage the availability of the HOME indicator in several countries within our sample to assess whether it serves as a relevant mediator. For

Table B.1
HOME inventory items per country.

		Chile	DR	Ecuador	Uruguay
Responsiveness	1. Parent allows child to engage in "messy" play		X		
	2. Parent spontaneously vocalizes to child at least twice during visit	X	X	X	X
	3. Parent responds verbally to child' verbalizations		X	X	X
	4. Parent tells child name of object/person during visit		X	X	X
	5. Parent's speech is distinct, clear and audible	X	X		
	6. Parent initiates verbal exchanges with visitor	X	X		
	7. Parent converses freely and easily	X	X		
	8. Parent spontaneously praises child at least twice	X	X	X	X
	9. Parent's voice conveys positive feelings towards child		X	X	X
	10. Parent caresses or kisses child at least once during visit	X	X	X	X
	11. Parent responds positively to praise of child offered by visitor	X	X		
Acceptance	12. No more than one instance of physical punishment occurred during the past week		X		
	13. Family has a pet	X	X		
	14. Parent does not shout at child during visit	X	X	X	X
	15. Parent does not express overt annoyance with or hostility about the child	X	X	X	X
	16. Parent neither slaps nor spanks child during visit	X	X	X	X
	17. Parent does not scold or criticize child during visit	X	X	X	X
	18. Parent does not interfere with or restrict the child more than three times during visit		X	X	X
	19. At least 10 books are present and visible	X	X		
Organisation	20. When the primary caregiver is away, care is provided by one of three regular substitutes		X		
	21. Child is taken to grocery store at least once a week		X		
	22. Child gets out of the house at least four times per week	X	X		
	23. Child is taken regularly to doctor's office or clinic	X	X		
	24. Child has special place for toys and treasures	X	X		
	25. The child's play environment appears safe and free of hazards		X		
Materials	26. Child has one or more large muscle activity toys or pieces of equipment	X	X		
	27. Push or pull toy activity	X	X		
	28. Stroller or walker, kiddie car, scooter, or tricycle available	X	X		
	29. Stuff dolls or role toys	X	X		
	30. Parent provides equipment appropriate to age e.g. infant seat, infant rocker, playpen	X	X		
	31. Simple eye-hand coordination toys		X		
	32. Complex eye-hand coordination toys		X		
	33. Availability of literary and musical play materials	X	X		
	34. Parent provides children toys to play during the visit		X		
Involvement	35. Parent talks to child while doing household work		X		
	36. Parent consciously encourages developmental progress	X	X		
	37. Parent invests in maturing toys through personal attention	X	X		
	38. Parent structures child's play periods	X	X		
	39. Parent provides toys that challenge child to develop new skills	X	X		
	40. Parent tends to keep child within visual range and looks at him/her often	X	X		
Variety	41. Father provides some care-giving every day	X	X		
	42. Parent reads stories to child at least three times weekly	X	X		
	43. Child eats at least one meal per way with mother and father	X	X		
	44. Family visits or receives visits from relatives approximately once a month		X		
	45. Child has three or more books of his or her own	X	X		

this purpose, we estimate the following equation using both OLS and unconditional quantile regression analyses:

$$HOME_i = \alpha + \gamma_1 Female_i + \mathbf{X_i'}\delta + \varepsilon_i, \quad (2)$$

where $HOME_i$ denotes the HOME inventory score for child i in each of the analyzed countries where it is available, $Female_i$ is an indicator for a female child, and $\mathbf{X_i'}$ is a vector of basic household composition[19] and regional controls. A higher HOME score indicates a more favorable home environment. All HOME scores have been standardized to have a mean of 0 and a standard deviation of 1 to facilitate the interpretation of the size of the estimated gender gaps, reported in Table C.2.

The results reported in Table C.2 suggest a more favorable rearing environment for girls in Chile and Uruguay. The results for the Dominican Republic and Ecuador are far less conclusive and we are not able to detect a clear pattern of female advantage in these countries.

However, it is also possible that boys and girls respond differently to the same quantity and quality of parental inputs. In fact, a common finding in previous studies of grade-school children in high-income countries[20] is that boys benefit more from a more advantaged family socioeconomic status. To investigate whether this holds true for children in early childhood in our sample of LAC countries, we regress children's developmental indicators on a female dummy, family SES, our HOME measures of children's nurturing environment, and their interactions with the $Female$ dummy. Specifically, we estimate the following equation by OLS:

$$y_i = \alpha + \beta_1 Female_i + \beta_2 SES_i + \beta_3(Female_i \times SES_i) + \beta_4 HOME_i + \quad (3)$$
$$\beta_5(Female_i \times HOME_i) + \mathbf{X_i'}\delta + \varepsilon_i,$$

where y_i is a standardized summary measure of children's developmental domains, when available; $HOME_i$ and SES_i denote the standardized measures of the HOME inventory and family socioeconomic status, for child i in each of the analyzed countries where the HOME inventory is available; $Female_i$ is an indicator for a female child, and $\mathbf{X_i'}$ is the same vector of basic household composition variables and regional controls used in Eq. (2).

The results of these estimations are reported in Tables C.3–C.6. Given that family SES and the nurturing environment are positively

[19] This set of household composition variables, listed in the footnote to Table C.2 for each country, varies slightly by country but generally contains information on the number of children in the household and their ages.

[20] See, for instance, Bertrand and Pan (2013), Brenøe and Lundberg (2018), and Autor et al. (2019).

Table C.1
Gender gaps in early childhood executive function and self-regulation skills in LAC: By country.

Percentile	Chile	Colombia	Dominican Republic	Ecuador	Nicaragua	Peru	Uruguay
Mean	NA	−0.064	NA	NA	NA	NA	NA
	NA	(0.053)	NA	NA	NA	NA	NA
P10	NA	−0.112	NA	NA	NA	NA	NA
	NA	(0.088)	NA	NA	NA	NA	NA
P25	NA	−0.008	NA	NA	NA	NA	NA
	NA	(0.075)	NA	NA	NA	NA	NA
P50	NA	−0.075	NA	NA	NA	NA	NA
	NA	(0.072)	NA	NA	NA	NA	NA
P75	NA	−0.058	NA	NA	NA	NA	NA
	NA	(0.073)	NA	NA	NA	NA	NA
P90	NA	−0.038	NA	NA	NA	NA	NA
	NA	(0.101)	NA	NA	NA	NA	NA
Observations	NA	1423	NA	NA	NA	NA	NA

Notes: LAC stands for Latin America and the Caribbean. The dependent variable is a summary measure of each child's development in the executive function domain by country, encompassing all the executive skills indicators outlined in Section 2.2 and described in Section 2.1. This measure is constructed using principal component analysis (PCA) on all available executive function and self-regulation skills indicators, extracting the first principal component, which is then standardized to have a mean of 0 and a standard deviation of 1. The first row reports the female–male mean gap, estimated by OLS, along with its associated robust standard error. Subsequent rows report unconditional quantile regression estimates (Firpo et al., 2009) at the 10th, 25th, 50th, 75th, and 90th percentiles of the children's executive function and self-regulation skills distribution, with their associated bootstrapped standard errors obtained from 1000 replications. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. Two-sided p-values from pairwise tests for the equality of unconditional quantile coefficients are as follows: i) For Colombia: 10th = 90th (p-value = 0.552), 10th = 50th (p-value = 0.701), 50th = 90th (p-value = 0.712).

Table C.2
HOME gender gaps.

	Chile	Dominican Republic	Ecuador	Uruguay
Mean	0.039**	0.046	0.044	0.200***
	(0.017)	(0.036)	(0.037)	(0.038)
P10	0.053**	−0.034	0.011	0.312***
	(0.021)	(0.070)	(0.069)	(0.091)
P25	0.051***	−0.021	−0.015	0.254***
	(0.016)	(0.059)	(0.067)	(0.051)
P50	0.037***	0.013	0.122*	0.157***
	(0.014)	(0.029)	(0.063)	(0.044)
P75	0.036**	0.102	0.025	0.103***
	(0.015)	(0.067)	(0.026)	(0.035)
P90	0.026	0.202**	−0.002	0.047**
	(0.023)	(0.083)	(0.018)	(0.023)
Observations	14161	2837	2721	2608

Notes: The dependent variable, standardized to have a mean of 0 and a standard deviation of 1, is the Home Observation for Measurement of the Environment (HOME), an instrument that assesses the nurturing environment in which a child is raised (see Section 2.4 for a detailed description and Appendix B for a list of the specific HOME items available in each country). A higher HOME score indicates a more favorable home environment. The first row reports the female–male mean gap, estimated using OLS from Eq. (2), along with its associated robust standard error. Subsequent rows present unconditional quantile regression estimates (Firpo et al., 2009) at the 10th, 25th, 50th, 75th, and 90th percentiles of the HOME distribution, with bootstrapped standard errors obtained from 1000 replications. The model includes the following control variables in addition to the female dummy: children's age and region dummies, number of siblings in the household, and a rural vs. urban area dummy (Chile); mother's nationality, children's year of birth dummies, number of siblings younger than 9 in the household, and region dummies (Dominican Republic); mother's race, number of children younger than 14 in the household, children's age and region dummies (Ecuador); children's age and region dummies (Uruguay). $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. Two-sided p-values from pairwise tests for the equality of unconditional quantile coefficients are as follows: i) for Chile: 10th = 90th (p-value = 0.349), 10th = 50th (p-value = 0.446), 50th = 90th (p-value = 0.634); ii) For Dominican Republic: 10th = 90th (p-value = 0.024), 10th = 50th (p-value = 0.489), 50th = 90th (p-value = 0.028); iii) For Ecuador: 10th = 90th (p-value = 0.855), 10th = 50th (p-value = 0.161), 50th = 90th (p-value = 0.040); iv) For Uruguay: 10th = 90th (p-value = 0.004), 10th = 50th (p-value = 0.085), 50th = 90th (p-value = 0.011).

Table C.3
Associations between family SES and HOME and the gender gaps by developmental domain. Chile. OLS.

	Language skills	Motor skills	Socio-emotional skills
Female	0.193***	0.267***	0.099***
	[0.022]	[0.021]	[0.019]
SES index	0.229***	0.064***	0.249***
	[0.016]	[0.015]	[0.013]
Female * SES index	0.016	0.016	−0.027
	[0.023]	[0.021]	[0.019]
Home total score	0.076***	0.098***	0.091***
	[0.024]	[0.025]	[0.014]
Female x HOME total score	−0.008	0.009	−0.052**
	[0.035]	[0.032]	[0.024]
Observations	7,020	8,827	10,797

Notes: The dependent variables are summary measures of children's developmental domains, encompassing the corresponding skill indicators outlined in Section 2.2 and described in Section 2.1. These measures are constructed using principal component analysis (PCA) on all domain-specific indicators, extracting the first principal component. This component, as well as the SES (family socioeconomic status) and HOME (Home Observation for Measurement of the Environment) variables, is then standardized to have a mean of 0 and a standard deviation of 1. The table reports OLS estimates from Eq. (3), along with the associated robust standard errors. In addition to the variables indicated in the table, the model includes the following control variables: children's age and region dummies, number of siblings in the household, and a rural vs. urban area dummy. $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$."

correlated, the estimated associations of SES and $HOME$ with children's development sometimes lack precision when both are included as covariates, as in Eq. (3). This is because both SES and the HOME inventory are positively and significantly associated with developmental outcomes in our data, as previously documented. Besides that observation, the message that these analyses convey is clear: the OLS estimates of β_3 and β_5 are generally very small and far from statistically significant. That is, boys and girls do not respond differently to family SES or to their nurturing environment (as measured by the HOME inventory). The only case in which $\hat{\beta}_5$ is negative and significant is for socio-emotional skills in Chile (Table C.2), suggesting that in this instance, a more nurturing environment is more strongly and positively associated with socio-emotional skills for boys than for girls.

4. Conclusion

Our study analyzes early childhood gender gaps in cognitive, social, and behavioral skills across several countries in Latin America and the Caribbean (LAC). We focus on the preschool period, a critical phase in human capital formation. Our findings reveal that the female advantage observed in both high-income and LAC countries in school-aged children's achievement, high school completion, and enrollment extends to early childhood in several LAC countries. On average, girls generally outperform boys in various developmental measures and exhibit fewer

Table C.4
Associations between family SES and HOME and the gender gaps by developmental domain. Dominican Republic. OLS.

	Language skills	Motor skills	Socio-emotional skills
Female	0.154***	0.021	0.202***
	[0.037]	[0.041]	[0.043]
SES index	0.036	0.020	−0.037
	[0.031]	[0.032]	[0.037]
Female * SES index	−0.015	0.047	0.052
	[0.042]	[0.047]	[0.049]
Home total score	0.139***	0.012	0.075*
	[0.030]	[0.034]	[0.038]
Female *x* HOME total score	0.044	0.059	0.004
	[0.040]	[0.047]	[0.052]
Observations	2,744	2,365	2,078

Notes: The dependent variables are summary measures of children's developmental domains, encompassing the corresponding skill indicators outlined in Section 2.2 and described in Section 2.1. These measures are constructed using principal component analysis (PCA) on all domain-specific indicators, extracting the first principal component. This component, as well as the SES (family socioeconomic status) and HOME (Home Observation for Measurement of the Environment) variables, is then standardized to have a mean of 0 and a standard deviation of 1. The table reports OLS estimates from Eq. (3), along with the associated robust standard errors. In addition to the variables indicated in the table, the model includes the following control variables: mother's nationality, children's year of birth dummies, number of siblings younger than 9 in the household, and region dummies (Dominican Republic). ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$."

Table C.5
Associations between Family SES and HOME and the gender gaps by developmental domain. Ecuador. OLS.

	Language skills	Socio-emotional skills
Female	−0.003	0.170***
	[0.047]	[0.049]
SES index	0.381***	0.167***
	[0.038]	[0.040]
Female * SES index	0.022	−0.059
	[0.049]	[0.049]
HOME	0.092***	0.022
	[0.031]	[0.034]
Female *x* HOME	0.015	0.005
	[0.047]	[0.049]
Observations	1,270	1,663

Notes: The dependent variables are summary measures of children's developmental domains, encompassing the corresponding skill indicators outlined in Section 2.2 and described in Section 2.1. These measures are constructed using principal component analysis (PCA) on all domain-specific indicators, extracting the first principal component. This component, as well as the SES (family socioeconomic status) and HOME (Home Observation for Measurement of the Environment) variables, is then standardized to have a mean of 0 and a standard deviation of 1. The table reports OLS estimates from Eq. (3), along with the associated robust standard errors. In addition to the variables indicated in the table, the model includes the following control variables: mother's race, number of children younger than 14 in the household. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$."

externalizing behaviors. Moreover, these gender gaps remain stable across the distributions of developmental outcomes.

The early childhood gender gaps in developmental outcomes persist even after controlling for key mediating factors, such as family socioeconomic status and the nurturing environment, with the latter tending to favor girls in some countries. Furthermore, contrary to previous findings for older children in high-income countries, we do not find that boys are more responsive than girls to family socioeconomic status during early childhood. It may be that boys' higher responsiveness to family socioeconomic status manifests later in life. For instance, Bertrand and Pan (2013) find that the effects of family socioeconomic status on gender gaps in externalizing behaviors in the U.S. are not evident in the fall of kindergarten but appear later and become particularly salient by grade 5. Alternatively, the way family socioeconomic status shapes gender gaps may differ between LAC and high-income countries. For example, DeRose et al. (2018) find that father absence in LAC does not compromise boys' on-time school progression at ages 9 to 14 more than it does for girls.

Consistent with our results for family socioeconomic status, we also find that preschool boys and girls do not generally exhibit differential benefits from a more favorable home environment, as measured by the HOME inventory. However, it is important to consider that factors not captured by standard measures of the nurturing environment may play a role. One potential candidate is the influence of parental and societal gendered beliefs on shaping children's cognitive and behavioral development (Pope and Sydnor, 2010; Nollenberger et al., 2016; Rodríguez-Planas and Nollenberger, 2018; Rodriguez-Planas et al., 2022; Nicoletti et al., 2022), which may not be accurately reflected in our measures of the home rearing environment. Supporting this idea, Mesman and Groeneveld (2018) stress that gendered parenting is rarely detected when analyzing broad and explicit parenting styles but becomes more evident in specific and implicit parenting practices. Future research should aim to understand the underlying causes of gender gaps in children's developmental indicators during early childhood.

CRediT authorship contribution statement

Samuel Berlinski: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Anna Sanz-de-Galdeano:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization. **Alba Sóñora-Noya:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Conceptualization.

Acknowledgments

We thank Pedro Albarrán, Marco Bertoni, Lola Collado, María Hernández-de-Benito, Julián Messina, Teresa Molina, Jenifer Ruiz-Valenzuela, Anastasia Terskaya and Alessandro Toppeta as well as seminar participants at the University of Alicante and the 2023 Symposium of the Spanish Economic Association for their comments. We also thank the editor and two anonymous referees for their invaluable comments. The opinions expressed in this publication are those of the authors and do not necessarily reflect the views of the Inter-American Development Bank, its Board of Directors, or the countries they represent.

Appendix A. Household SES indexes

Household Characteristics used to Construct Summary Indexes of Household Socioeconomic Status per Country

Chile: people per room, household income quintiles, maternal years of education, a dummy for whether the father is in the household and maternal age.

Colombia (Rubio-Codina et al., 2015): car, fridge, microwave, washing machine, boiler, computer, smartphone, fl at TV, home theater, DVD, stereo, games console, Internet, garage, whether the household shares the kitchen with other households, whether the household shares the bathroom, has more than one bathroom, has quality floors (tiles, carpet, or wood as opposed to gravel, cement, or dirt), has external windows, and people per room.

Dominican Republic: telephone, running water, electricity, cooker, refrigerator, blender, gas oven, electric oven, microwave, electric iron, washing machine, sewing machine, fan, power inverter, air conditioning, TV, radio, music stereo, DVD player, water heater, water pump, internet in the home, internet in the cellphone, cable TV, cellphone, computer, car, van, bus bicycle, motorbike, game console, tablet, electric plant, whether the house is shared with another household, whether the biological father lives in the household, the number of rooms, housing type, wall material, roof material, floor material, location of the kitchen in the household, main fuel used for cooking,

Table C.6
Associations between family SES and HOME and the gender gaps by developmental domain. Uruguay. OLS.

	Cognitive skills	Language skills	Motor skills	Socio-emotional skills
Female	0.077***	0.047***	−0.004	0.042***
	[0.016]	[0.011]	[0.012]	[0.011]
SES index (stand)	0.074***	0.034***	0.020**	−0.004
	[0.012]	[0.009]	[0.009]	[0.009]
Female * SES index	−0.012	−0.010	−0.009	0.016
	[0.015]	[0.011]	[0.012]	[0.011]
HOME	0.063***	0.049***	0.006	0.031***
	[0.012]	[0.010]	[0.009]	[0.010]
Female x HOME	0.002	−0.017	−0.013	−0.009
	[0.018]	[0.014]	[0.013]	[0.013]
Observations	2,304	2,280	2,548	2,304

Notes: The dependent variables are summary measures of children's developmental domains, encompassing the corresponding skill indicators outlined in Section 2.2 and described in Section 2.1. These measures are constructed using principal component analysis (PCA) on all domain-specific indicators, extracting the first principal component. This component, as well as the SES (family socioeconomic status) and HOME (Home Observation for Measurement of the Environment) variables, is then standardized to have a mean of 0 and a standard deviation of 1. The table reports OLS estimates from Eq. (3), along with the associated robust standard errors. In addition to the variables indicated in the table, the model includes the following control variables: mother's race, number of children younger than 14 in the household. ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$."

what is the main source of water used for consumption, type of toilet, garbage disposal method, lighting method most used in the household, people per room, household size, maternal education, and maternal age.

Ecuador: air conditioning, bicycle, blender, TV, car, computer, fan, refrigerator, iron, mixer, motorcycle, oven, radio, sewing machine, stereo, stove, kitchenette, typewriter, DVD player, waffle maker, washer, microwave, cellphone, water heater, type of garbage disposal, type of lightning, type of water source, type of shower, type of toilet, type of fuel for cooking, type of roof material, type of wall material, type of floor, housing type, type of home tenure, whether the dwelling is a farm, maternal education, maternal age, whether the mother is married, and household size.

Nicaragua: household size, number of rooms, water access, electricity access, whether the household owns the land, maternal education.

Peru: Number of rooms, main floor material, household size, main roof material, main wall material, whether the household owns the land, rents it, or borrows it, whether the household owned livestock in the past 12 months, whether the household owns the house, rents it, or borrows it, sewing machine, TV, radio, car, working motorbike, bike, phone, cellphone, fridge, electric oven, fan, water heater, computer, iron, blender, record player, washing machine, dryer, microwave, weaving/knitting machine, video games, floor polisher/hoover, source of drinking water, access to electricity, toilet facilities, fuel for cooking, mother's education level, mother's age, and total monthly expenditure per capita.

Uruguay: number of households sharing the dwelling, maternal education, maternal age, whether the father lives in the household, and quintiles of household income.

The final country-specific SES indexes are the first principal components of the household characteristics listed above. Subsequently, we standardize them to have a mean of 0 and a standard deviation of 1, facilitating the assessment and comparability of the magnitude of the estimated coefficients.

Appendix B. HOME inventory items per country

See Table B.1.

Appendix C. Additional tables

See Tables C.1–C.6

Data availability

Replication package available https://doi.org/10.7910/DVN/2T8MJS.

References

Achenbach, T.M., Rescorla, L., 2000. Manual for the ASEBA Preschool Forms & Profiles: An Integrated System of Multi-Informant Assessment. ASEBA, Burlington, Vt..

Araujo, M.C., Schady, N., 2020. Ecuador Longitudinal Survey of Child Health and Development, Rounds 1-5 (2003–2014). IADB: Inter-American Development Bank, Retrieved from https://publications.iadb.org/en/ecuador-longitudinal-survey-of-child-health-and-development-rounds-1-5-2003-2014.

Attanasio, O.P., 2015. The determinants of human capital formation during the early years of life: Theory, measurement, and policies. J. Eur. Econ. Assoc. 13 (6), 949–997.

Attanasio, O., Cattan, S., Fitzsimons, E., Meghir, C., Rubio-Codina, M., 2020. Estimating the production function for human capital: Results from a randomized controlled trial in Colombia. Am. Econ. Rev. 110 (1), 48–85.

Attanasio, O.P., Fernández, C., Fitzsimons, E.O.A., Grantham-McGregor, S.M., Meghir, C., Rubio-Codina, M., 2014. Using the infrastructure of a conditional cash transfer program to deliver a scalable integrated early child development program in Colombia: Cluster randomized controlled trial. Br. Med. J. 349.

Attanasio, O., Fitzsimons, E., Gomez, A., Gutierrez, M.I., Meghir, C., Mesnard, A., 2010. Children's schooling and work in the presence of a conditional cash transfer program in rural Colombia. Econ. Dev. Cult. Chang. 58 (2), 181–210.

Attanasio, O., Lopez-Boo, F., Perez-Lopez, D., Reynolds, S.A., 2024. Inequality in the Early Years in LAC: A Comparative Study of Size, Persistence, and Policies. LACIR III Working Paper 132, International Inequalities Institute, The London School of Economics and Political Science.

Autor, D., Figlio, D., Karbownik, K., Roth, J., Wasserman, M., 2019. Family disadvantage and the gender gap in behavioral and educational outcomes. Am. Econ. J.: Appl. Econ. 11 (3), 338–381.

Autor, D., Figlio, D., Karbownik, K., Roth, J., Wasserman, M., 2023. Males at the tails: How socioeconomic status shapes the gender gap. Econ. J. 133 (656), 3136–3152.

Baker, M., Milligan, K., 2016. Boy-girl differences in parental time investments: Evidence from three countries. J. Hum. Cap. 10 (4), 399–441.

Bates, J.E., Freeland, C.A.B., Lounsbury, M.L., 1979. Measurement of infant difficultness. Child Dev. 794–803.

Baulos, A., Heckman, J., 2022. The importance of investing in early childhood development and the role of families. In: Handbook of Research on Innovative Approaches to Early Childhood Development and School Readiness. IGI Global, pp. 38–54.

Bayley, N., 2006. Bayley Scales of Infant and Toddler Development, third ed. Har-court Assessment, San Antonio, TX.

Berlinski, S., Schady, N., 2015. The Early Years: Child Well-Being and the Role of Public Policy. Springer Nature.

Berlinski, S., Vera-Hernández, M., 2019. The economics of early interventions aimed at child development. Oxf. Res. Encycl. Econ. Financ..

Berniell, I., Fernández, R., Krutikova, S., 2024. Gender Inequality in Latin America and the Caribbean. Tech. Rep., National Bureau of Economic Research.

Bertrand, M., Pan, J., 2013. The trouble with boys: Social influences and the gender gap in disruptive behavior. Am. Econ. J: Appl. Econ. 5 (1), 32–64.

Bossavie, L., Kanninen, O., 2018. What explains the gender gap reversal in educational attainment? World Bank Policy Res. Work. Pap. (8303).

Boyden, J., 2022. Young lives: An international study of childhood poverty: Round 2, 2006. http://dx.doi.org/10.5255/UKDA-SN-6852-4, 4th Edition, UK Data Service. Available at: https://beta.ukdataservice.ac.uk/datacatalogue/studies/study?id=6852. (Accessed 30 October 2024).

Brenøe, A.A., Lundberg, S., 2018. Gender gaps in the effects of childhood family environment: Do they persist into adulthood? Eur. Econ. Rev. 109, 42–62.

Caldwell, B.M., Bradley, R.H., et al., 2003. Home Observation for Measurement of the Environment: Administration Manual. Family & Human Dynamics Research Institute, Arizona State University, Tempe, AZ.
Campbell, F., Conti, G., Heckman, J.J., Moon, S.H., Pinto, R., Pungello, E., Pan, Y., 2014. Early childhood investments substantially boost adult health. Science 343 (6178), 1478–1485.
Chaplin, T.M., Cole, P.M., Zahn-Waxler, C., 2005. Parental socialization of emotion expression: Gender differences and relations to child adjustment. Emotion 5 (1), 80.
Clements-Stephens, A.M., Rimrodt, S.L., Cutting, L.E., 2009. Developmental sex differences in basic visuospatial processing: Differences in strategy use? Neurosci. Lett. 449 (3), 155–160.
Conti, G., Heckman, J.J., Pinto, R., 2016. The effects of two influential early childhood interventions on health and healthy behaviour. Econ. J. 126 (596), F28–F65.
Cueto, S., Leon, J., Guerrero, G., Muñoz, I., 2012. Psychometric characteristics of cognitive development and achievement instruments in round 2 of Young lives. Young Lives.
Del Rosario, C., Slevin, M., Molloy, E.J., Quigley, J., Nixon, E., 2021. How to use the bayley scales of infant and toddler development. Arch. Dis. Childhood- Educ. Pr. 106 (2), 108–112.
Dercon, S., Singh, A., 2013. From nutrition to aspirations and self-efficacy: Gender bias over time among children in four countries. World Dev. 45, 31–50.
DeRose, L.F., Huarcaya, G., Salazar-Arango, A., 2018. Father absence and the reverse gender gap in Latin American education. J. Fam. Issues 39 (13), 3508–3534.
DiPrete, T.A., Jennings, J.L., 2012. Social and behavioral skills and the gender gap in early educational achievement. Soc. Sci. Res. 41 (1), 1–15.
Duncan, G.J., Dowsett, C.J., Claessens, A., Magnuson, K., Huston, A.C., Klebanov, P., Pagani, L.S., Feinstein, L., Engel, M., Brooks-Gunn, J., et al., 2007. School readiness and later achievement. Dev. Psychol. 43 (6), 1428.
Dunn, L.M., Lugo, D.E., Padilla, E.R., Dunn, L.M., 1986. Test de Vocabulario en Imagines Peabody. American Guidance Service, Circle Pines, MN.
Endendijk, J.J., Groeneveld, M.G., van der Pol, L.D., van Berkel, S.R., Hallers-Haalboom, E.T., Bakermans-Kranenburg, M.J., Mesman, J., 2017. Gender differences in child aggression: Relations with gender-differentiated parenting and parents' gender-role stereotypes. Child Dev. 88 (1), 299–316.
Fausto-Sterling, A., Coll, C.G., Lamarre, M., 2012. Sexing the baby: Part 1–what do we really know about sex differentiation in the first three years of life? Soc. Sci. Med. 74 (11), 1684–1692.
Fernald, L.C., Prado, E., Kariger, P., Raikes, A., 2017. A toolkit for measuring early childhood development in low and middle-income countries. World Bank..
Fernald, L.C., Weber, A., Galasso, E., Ratsifandrihamanana, L., 2011. Socioeconomic gradients and child development in a very low income population: Evidence from Madagascar. Dev. Sci. 14 (4), 832–847.
Firpo, S., Fortin, N.M., Lemieux, T., 2009. Unconditional quantile regressions. Econometrica 77 (3), 953–973.
Frankenburg, W.K., Dodds, J., Archer, P., Shapiro, H., Bresnick, B., 1992. The Denver II: A major revision and restandardization of the denver developmental screening test. Pediatrics 89 (1), 91–97.
García, J.L., Heckman, J.J., Ronda, V., 2023. The lasting effects of early-childhood education on promoting the skills and social mobility of disadvantaged African Americans and their children. J. Political Econ. 131 (6).
Haeussler, I.M., Marchant, T., 2003. TEPSI: Test de Desarrollo Psicomotor 2-5 Años. Ediciones Universidad Católica de Chile, Santiago.
Heckman, J.J., 2008. Schools, skills, and synapses. Econ. Inq. 46 (3), 289–324.
Heckman, J.J., 2013. Giving Kids a Fair Chance. MIT Press.
Heckman, J.J., Masterov, D.V., 2007. The productivity argument for investing in young children. Rev. Agric. Econ. 29 (3), 446–493.
Hervé, J., Mani, S., Behrman, J.R., Nandi, A., Lamkang, A.S., Laxminarayan, R., 2022. Gender gaps in cognitive and noncognitive skills among adolescents in India. J. Econ. Behav. Organ. 193, 66–97.
Ingalhalikar, M., Smith, A., Parker, D., Satterthwaite, T.D., Elliott, M.A., Ruparel, K., Hakonarson, H., Gur, R.E., Gur, R.C., Verma, R., 2014. Sex differences in the structural connectome of the human brain. Proc. Natl. Acad. Sci. 111 (2), 823–828.
Jackson-Maldonado, D., Marchman, V.A., Fernald, L.C., 2013. Short-form versions of the Spanish MacArthur–Bates communicative development inventories. Appl. Psycholinguist. 34 (4), 837–868.
Jenkins, J.M., Handa, S., 2019. Parenting skills and early childhood development: Production function estimates from longitudinal data. Rev. Econ. Househ. 17, 121–147.
Kariger, P., Frongillo, E.A., Engle, P., Britto, P.M.R., Sywulka, S.M., Menon, P., 2012. Indicators of family care for development for use in multicountry surveys. J. Heal. Popul. Nutr. 30 (4), 472.
Kheloui, S., Jacmin-Park, S., Larocque, O., Kerr, P., Rossi, M., Cartier, L., Juster, R.-P., 2023. Sex/gender differences in cognitive abilities. Neurosci. Biobehav. Rev. 105333.
Knudsen, E.I., 2004. Sensitive periods in the development of the brain and behavior. J. Cogn. Neurosci. 16 (8), 1412–1425.
Knudsen, E.I., Heckman, J.J., Cameron, J.L., Shonkoff, J.P., 2006. Economic, neurobiological, and behavioral perspectives on building America's future workforce. Proc. Natl. Acad. Sci. 103 (27), 10155–10162.
López Bóo, F., 2016. Socio-economic status and early childhood cognitive skills: A mediation analysis using the Young lives panel. Int. J. Behav. Dev. 40 (6), 500–508.
López Bóo, F., Cubides Mateus, M., Sorio, R., Garibotto, G., Berón, C., 2019. Measuring the quality of the home environment of young children in Uruguay: Socioeconomic gradients in the home inventory. IZA Discuss. Pap..
López Bóo, F., Mateus, M.C., Sabatés, A.L., 2020. Initial psychometric properties of the denver II in a sample from Northeast Brazil. Infant Behav. Dev. 58, 101391.
Macours, K., Schady, N., Vakis, R., 2012. Cash transfers, behavioral changes, and cognitive development in early childhood: Evidence from a randomized experiment. Am. Econ. J.: Appl. Econ. 4 (2), 247–273.
Mesman, J., Groeneveld, M.G., 2018. Gendered parenting in early childhood: Subtle but unmistakable if you know where to look. Child Dev. Perspect. 12 (1), 22–27.
Morawska, A., 2020. The effects of gendered parenting on child development outcomes: A systematic review. Clin. Child Fam. Psychol. Rev. 23 (4), 553–576.
National Research Council, et al., 2000. From neurons to neighborhoods: The science of early childhood development.
Nicoletti, C., Sevilla, A., Tonei, V., 2022. Gender stereotypes in the family. IZA Discuss. Pap..
Nollenberger, N., Rodríguez-Planas, N., Sevilla, A., 2016. The math gender gap: The role of culture. Am. Econ. Rev. 106 (5), 257–261.
Paxson, C., Schady, N., 2007. Cognitive development among young children in ecuador: The roles of wealth, health, and parenting. J. Hum. Resour. 42 (1), 49–84.
Paxson, C., Schady, N., 2010. Does money matter? The effects of cash transfers on child development in rural ecuador. Econ. Dev. Cult. Chang. 59 (1), 187–229.
Peterson, J.L., Zill, N., 1986. Marital disruption, parent-child relationships, and behavior problems in children. J. Marriage Fam. 295–307.
Pope, D.G., Sydnor, J.R., 2010. Geographic variation in the gender differences in test scores. J. Econ. Perspect. 24 (2), 95–108.
Ramos-Loyo, J., González-Garrido, A.A., Llamas-Alonso, L.A., Sequeira, H., 2022. Sex differences in cognitive processing: An integrative review of electrophysiological findings. Biol. Psychol. 172, 108370.
Riva, D., 2023. Sex and gender difference in cognitive and behavioral studies in developmental age: An introduction. J. Neurosci. Res. 101 (5), 543–552.
Rodriguez-Planas, N., Sanz-de Galdeano, A., Terskaya, A., 2022. Gender norms in high school: Impacts on risky behaviors from adolescence to adulthood. J. Econ. Behav. Organ. 196, 429–456.
Rodríguez-Planas, N., Nollenberger, N., 2018. Let the girls learn! it is not only about math… it's about gender social norms. Econ. Educ. Rev. 62, 230–253.
Rubio-Codina, M., Araujo, M.C., Attanasio, O., Muñoz, P., Grantham-McGregor, S., 2016. Concurrent validity and feasibility of short tests currently used to measure early childhood development in large scale studies. PLoS One 11 (8), e0160962.
Rubio-Codina, M., Attanasio, O., Meghir, C., Varela, N., Grantham-McGregor, S., 2015. The socioeconomic gradient of child development: Cross-sectional evidence from children 6–42 months in bogota. J. Hum. Resour. 50 (2), 464–483.
Sammons, P., Toth, K., Sylva, K., Melhuish, E., Siraj, I., Taggart, B., 2015. The long-term role of the home learning environment in shaping students' academic attainment in secondary school. J. Children's Serv. 10 (3), 189–201.
Schady, N., Behrman, J., Araujo, M.C., Azuero, R., Bernal, R., Bravo, D., Lopez-Boo, F., Macours, K., Marshall, D., Paxson, C., et al., 2015. Wealth gradients in early childhood cognitive development in five Latin American countries. J. Hum. Resour. 50 (2), 446–463.
Schmied, A., Soda, T., Gerig, G., Styner, M., Swanson, M.R., Elison, J.T., Shen, M.D., McKinstry, R.C., Pruett, Jr., J.R., Botteron, K.N., et al., 2020. Sex differences associated with corpus callosum development in human infants: A longitudinal multimodal imaging study. NeuroImage 215, 116821.
Shonkoff, J.P., 2010. Building a new biodevelopmental framework to guide the future of early childhood policy. Child Dev. 81 (1), 357–367.
Squires, J., Bricker, D., Potter, L., 1997. Revision of a parent-completed developmental screening tool: Ages and stages questionnaires. J. Pediatr. Psychol. 22 (3), 313–328.
Squires, J., Bricker, D., Twombly, E., Potter, L., 2009. Ages and Stages Questionnaires. ASQ-3 User's Guide: A Parent-completed, Child-monitoring System. Paul H. Brookes Baltimore.
Szadvári, I., Ostatníková, D., Durdiaková, J.B., 2023. Sex differences matter: Males and females are equal but not the same. Physiol. Behav. 259, 114038.
Totsika, V., Sylva, K., 2004. The home observation for measurement of the environment revisited. Child Adolesc. Ment. Heal. 9 (1), 25–35.
UN, 2015. The Millennium Development Goals Report. United Nations.
UNESCO, 2024. Educación Primaria. Panorama Regional. Tech. Rep., SITEAL, Educación Básica, Available at https://siteal.iiep.unesco.org/eje/pdf/1099. (Accessed 30 October 2024).
Wheelock, M.D., Hect, J.L., Hernandez-Andrade, E., Hassan, S.S., Romero, R., Eggebrecht, A.T., Thomason, M.E., 2019. Sex differences in functional connectivity during fetal brain development. Dev. Cogn. Neurosci. 36, 100632.