Child Development: The Role of Parenting Beliefs

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Gaps in skills in early childhood

Hart and Risley (1995)

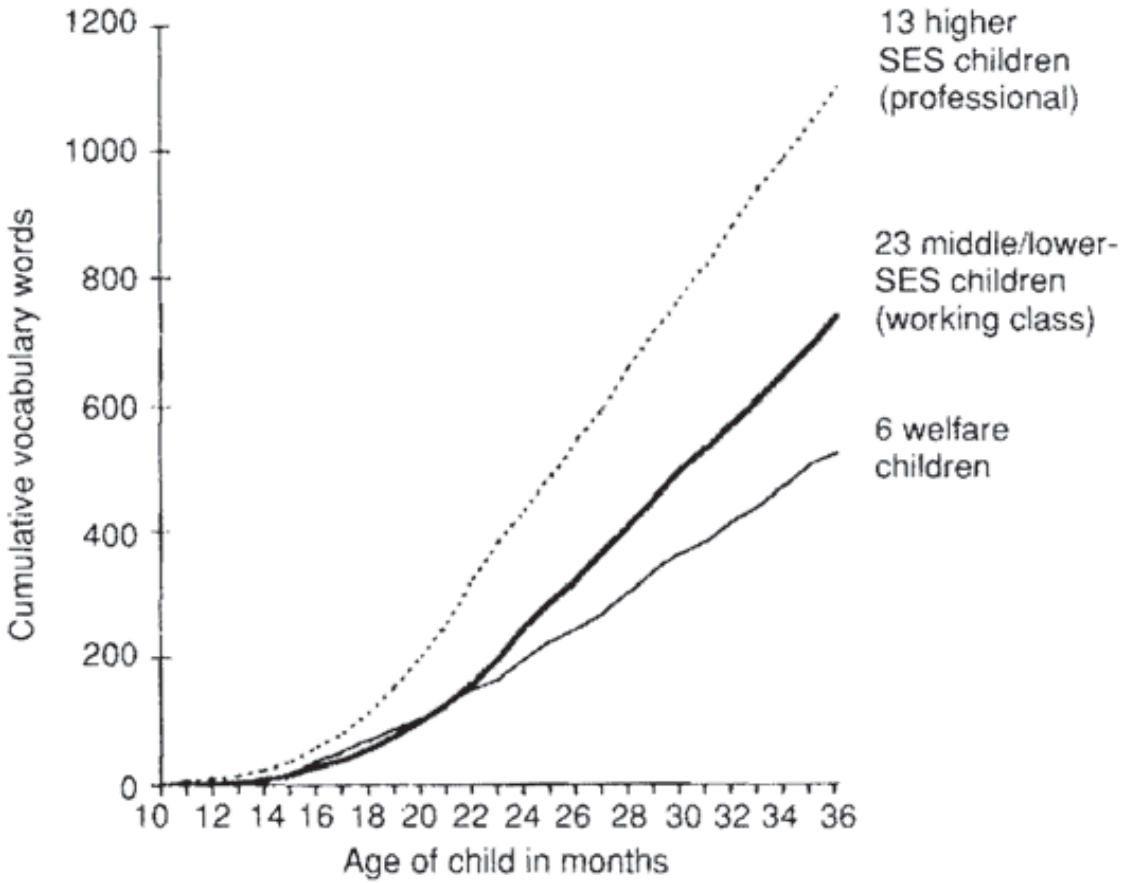
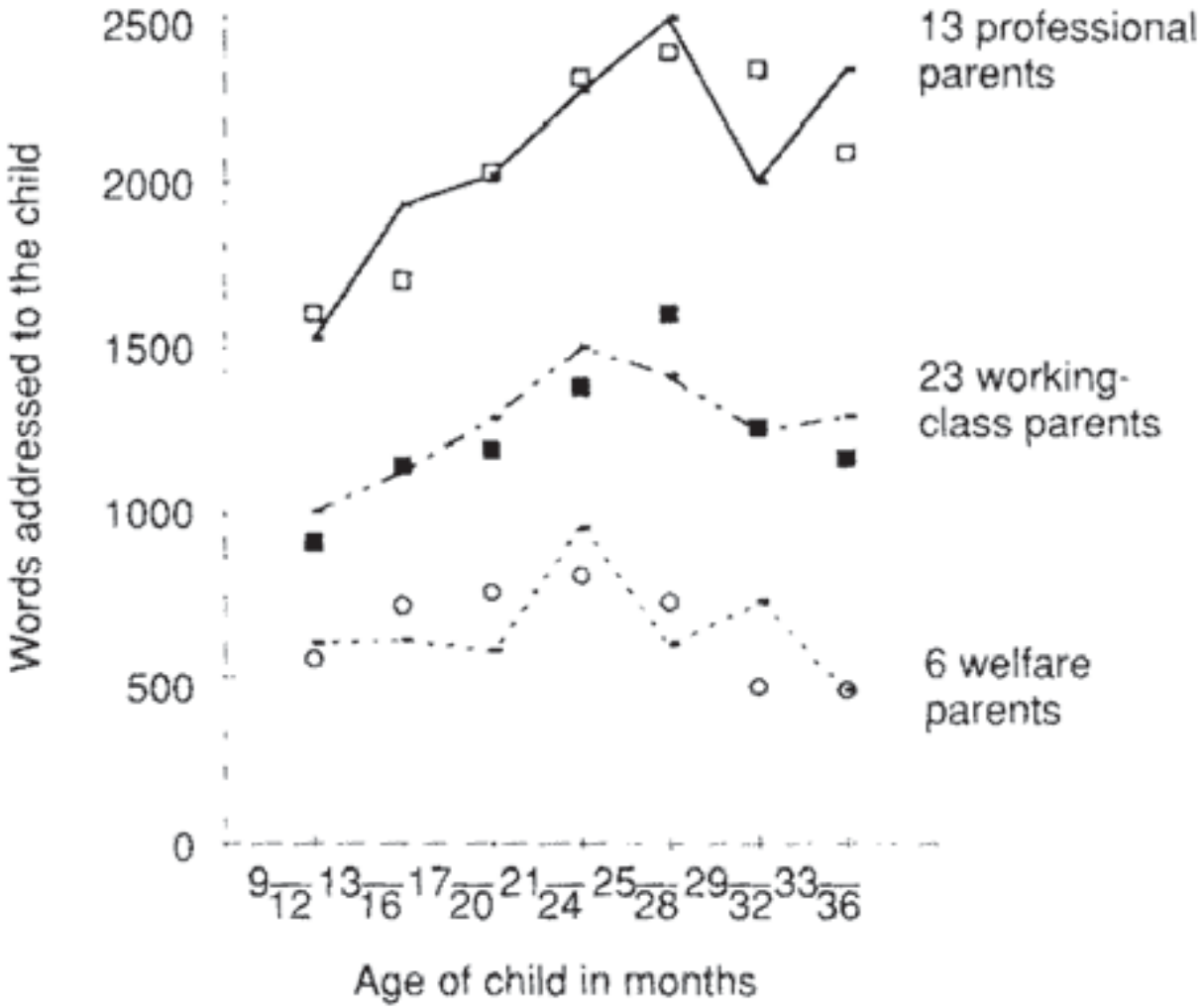


Figure 2. The widening gap we saw in the vocabulary growth of children from professional, working-class, and welfare families across their first 3 years of life. (See Appendix B for a detailed explanation of this figure.)

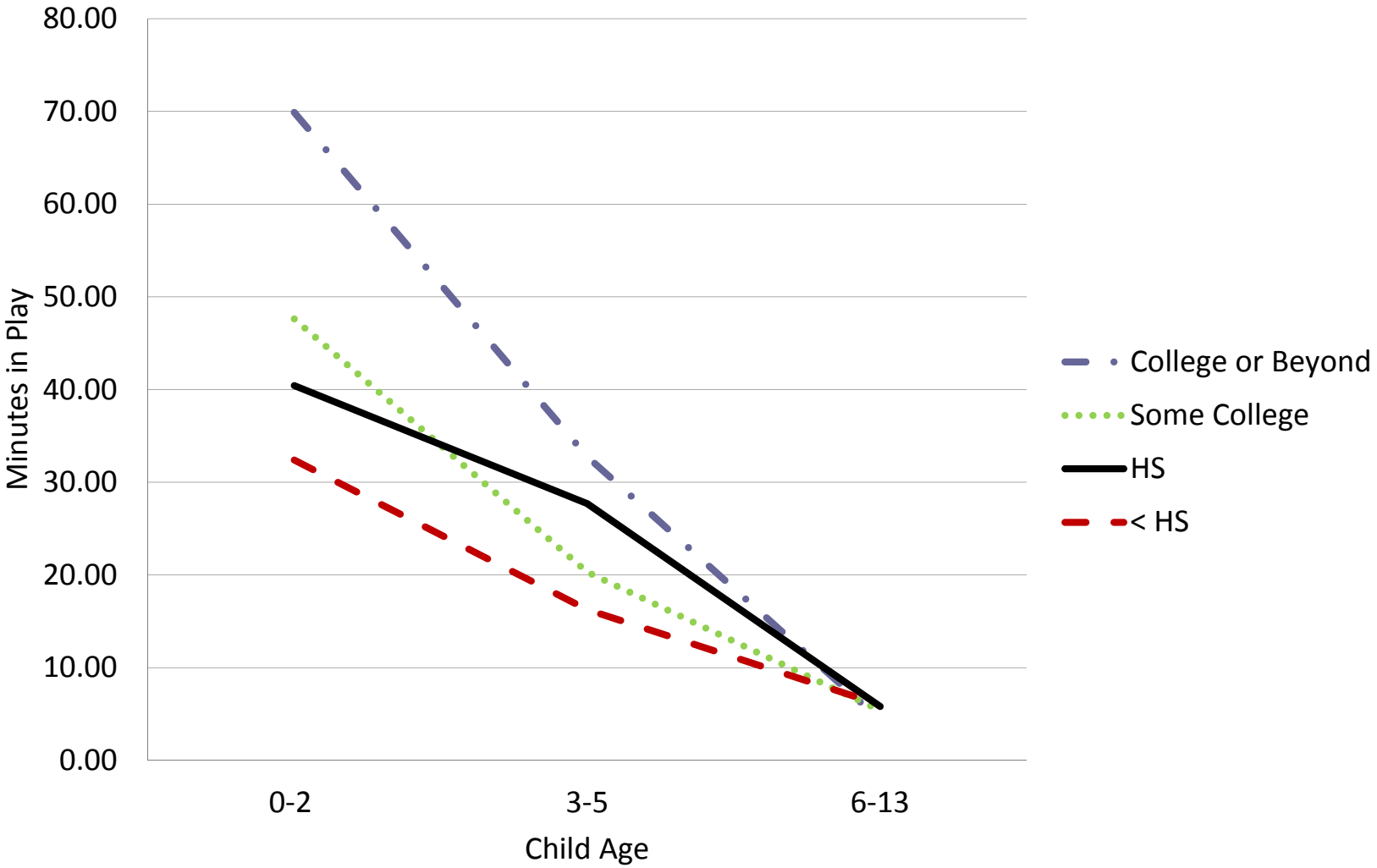
Gaps in investments in early childhood

Hart and Risley (1995)



Gaps in investments in early childhood

Kalil, Ryan, and Corey (2012)



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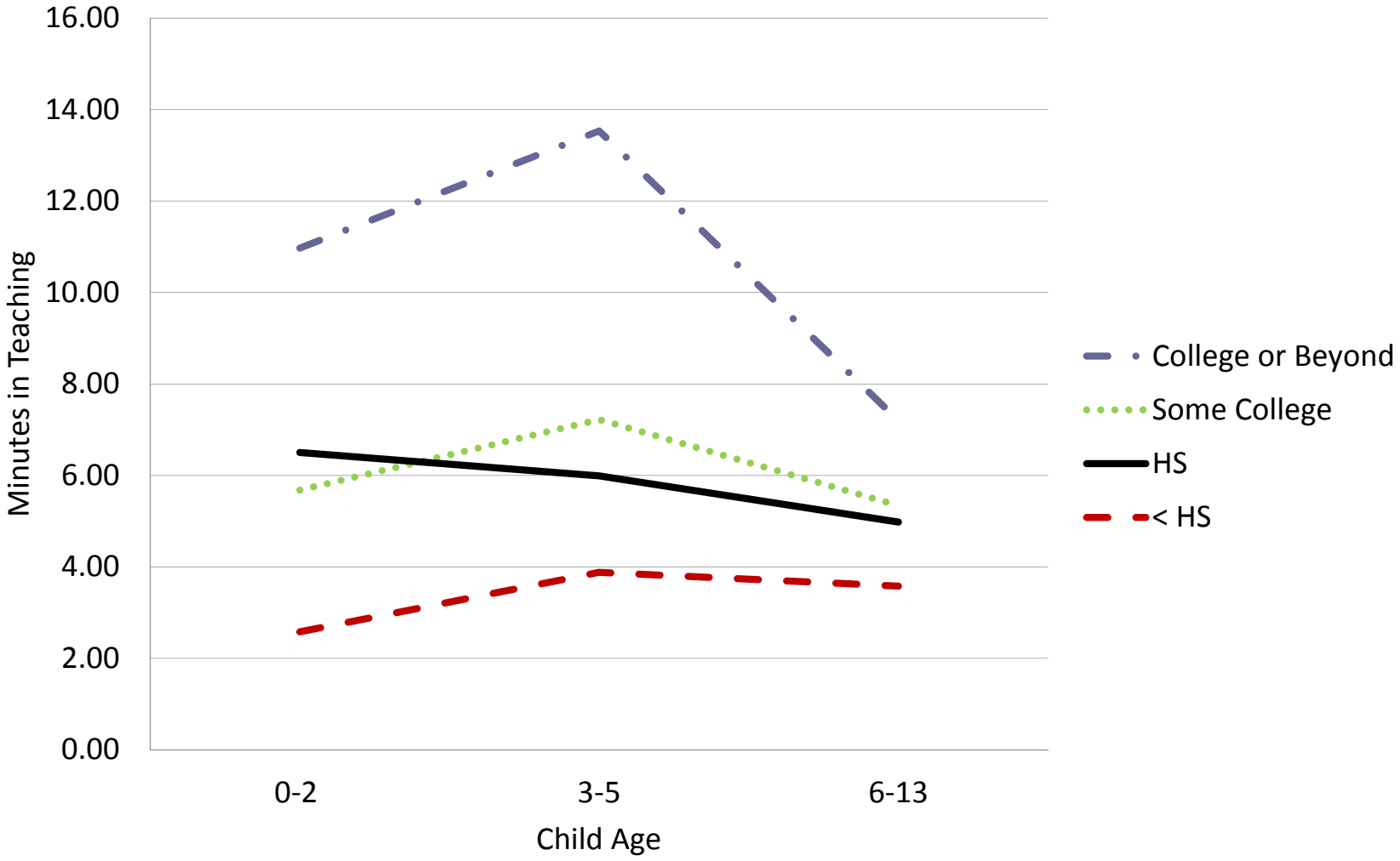


Heterogeneity in beliefs and Parenting Programs

- Home visitation programs on parenting:
  - Nurse-Family Partnership (Olds et al, 2012).
  - Jamaican Nutrition Supplementation and Cognitive Stimulation Program (Gertler et al, 2014; Attanasio et al, 2014).
  - PADIN Program (Ceara, Brazil; with Rita Almeida, Leando Costa, and Jimmy Oliveira)
  - JumpStart Program (Houston, USA; with Ken Wolpin)
  - LENA Start Program (Philadelphia, USA; with Marsha Gerdes)

Model: The technology of skill formation

- The technology of skill formation is:

$$\ln h_{i,1} = \psi_0 + \psi_1 \ln h_{0,i} + \psi_2 \ln x_i + \psi_3 \ln h_{0,i} \ln x_i + v_i$$

Model: The mother's information set

- Let Ψ_i denote the mother's information set.
- Let $E\left(\psi_j \middle| h_{0,i}, x_i, \Psi_i\right) = \mu_{i,j}$ and assume that $E\left(\nu_i \middle| \Psi_i\right) = 0$.
- From the point of view of the mother:

$$E\left(\ln h_{i,1} \middle| h_{0,i}, x_i, \Psi_i\right) = \mu_{i,0} + \mu_{i,1} \ln h_{0,i} + \mu_{i,2} \ln x_i + \mu_{i,3} \ln h_{0,i} \ln x_i$$

Model: Preferences and budget constraint

- Consider a simple static model. Parent's utility is:

$$u\left(c_i, h_{i,1}; \alpha_{i,1}, \alpha_{i,2}\right) = \ln c_i + \alpha_{i,1} \ln h_{i,1} + \alpha_{i,2} \ln x_i$$

- Budget constraint is:

$$c_i + p x_i = y_i .$$

Model

- The problem of the mother is to maximize expected utility subject to the mother's information set, the budget constraint, and the technology of skill formation.
- The solution is

$$x_i = \left[\frac{\alpha_{i,1} \left(\mu_{i,2} + \mu_{i,3} \ln h_{0,i} \right) + \alpha_{i,2}}{1 + \alpha_{i,1} \left(\mu_{i,2} + \mu_{i,3} \ln h_{0,i} \right) + \alpha_{i,2}} \right] \frac{y_i}{p}$$

- Clearly, we cannot separately identify α_i from $\mu_{i,\gamma}$ if we only observe x_i, y_i, and p.

Eliciting beliefs: Steps

- Measure actual child development: MSD and Item Response Theory (IRT).
- Develop the survey instrument to elicit beliefs $E\left[\ln h_{i,1} \mid h_0, x, \psi_i\right]$:
  - Reword MSD items.
  - Create hypothetical scenarios of h_0 and x.
- Estimate beliefs from answers allowing for error in responses.

SECTION 3: MOTOR AND SOCIAL DEVELOPMENT

PART H: (22 MONTHS - 3 YEARS, 11 MONTHS)

MOTHER/GUARDIAN:

If _____ is **at least 22 months** old, but **not yet 4 years** old, please answer these 15 questions.
Child's Name

1.	Has your child ever let someone know, without crying, that wearing wet (soiled) pants or diapers bothered him/her?	YES.... 1 NO..... 0	72/
2.	Has your child ever spoken a partial sentence of 3 words or more?	YES.... 1 NO..... 0	73/
3.	Has your child ever walked upstairs by himself/herself without holding on to a rail?	YES.... 1 NO..... 0	74/
4.	Has your child ever washed and dried his/her hands without any help except for turning the water on and off?	YES.... 1 NO..... 0	75/
5.	Has your child ever counted 3 objects correctly?	YES.... 1 NO..... 0	76/

Eliciting beliefs: Changing Wording of the MSD Instrument

- In order to measure $E\left[\ln h_{i,1} \middle| h_0, x, \psi_i\right]$, we take the tasks from the MSD Scale, but instead of asking: *"Has your child ever spoken a partial sentence with three words or more?"*, we ask:
- **Method 1**: **How likely is it that a baby will speak a partial sentence with three words or more by age 24 months?**
- **Method 2: What is the youngest and oldest age a baby learns to speak a partial sentence with three words or more?**

Eliciting beliefs: Scenarios of human capital and investments

- We consider four scenarios:
  - Scenario 1: Child is healthy at birth (e.g., normal gestation, birth weight, and birth length) and investment is high (e.g., six hours per day).
  - Scenario 2: Child is healthy at birth and investment is low (e.g., two hours per day).
  - Scenario 3: Child is not healthy at birth (e.g., premature, low birth weight, and small at birth) and investment is high.
  - Scenario 4: Child is not healthy at birth and investment is low.
- Scenarios are described to survey respondents through a video.

Eliciting beliefs: Intuitive Explanation

- Let $E\left[\ln h_{i,1} \middle| h_0, h, \Psi_i\right]$ denote maternal expectation of child development at age 24 months conditional on the child's intial level of human capital, investments, and the mother's information set.
- Assume, for now, technology is Cobb-Douglas.
- Suppose we measure $E\left[\ln h_{i,1} \middle| h_0, x, \Psi_i\right]$ at two different levels of investments:

$$E\left[\ln h_{i,1} \middle| h_0, \overline{x}, \Psi_i\right] = \mu_{i,0} + \mu_{i,1} \ln h_0 + \mu_{i,2} \ln \overline{x}$$

$$E\left[\ln h_{i,1} \middle| h_0, \underline{x}, \Psi_i\right] = \mu_{i,0} + \mu_{i,1} \ln h_0 + \mu_{i,2} \ln \underline{x}$$

- Subtracting and re-organizing terms:

$$\mu_{i,2} = \frac{E\left[\ln h_{i,1} \middle| h_0, \overline{x}, \Psi_i\right] - E\left[\ln h_{i,1} \middle| h_0, \underline{x}, \Psi_i\right]}{\ln \overline{x} - \ln \underline{x}}$$

Table 3

Maternal Beliefs about the Technology of Skill Formation

	25th percentile	Median	75th percentile	Mean	Variance
$\mu_{\psi,0}$	-0.015	0.101	0.236	0.115	0.035
	(0.009)	(0.008)	(0.009)	(0.007)	(0.002)
$\mu_{\psi,1}$	0.077	0.296	0.554	0.365	0.204
	(0.011)	(0.016)	(0.022)	(0.016)	(0.026)
$\mu_{\psi,2}$	0.065	0.166	0.285	0.192	0.046
	(0.006)	(0.007)	(0.010)	(0.008)	(0.005)
$\mu_{\psi,3}$	-0.008	0.094	0.335	0.190	0.320
	(0.007)	(0.010)	(0.024)	(0.020)	(0.051)

Note: Standard errors in parenthesis.

Table 5

Maternal Beliefs about the Technology of Skill Formation

	25th percentile	Median	75th percentile	Mean	Variance
$\alpha_{i,1}$	0.0261	0.0312	0.0400	0.0313	0.0002
	(0.0004)	(0.0002)	(0.0007)	(0.0004)	(0.0000)
$\alpha_{i,2}$	0.0669	0.0777	0.0942	0.0795	0.0003
	(0.0005)	(0.0008)	(0.0007)	(0.0005)	(0.0000)

Note: Standard errors in parenthesis.

Table 8

Maternal Beliefs and Technology

Cases	Factual investment	Counterfactual investment	% Change	Effect size
$\mu_{\psi,2} = 0.267$ $\mu_{\psi,3} = 0.000$	1.84	1.92	4.4%	10.3%
$\mu_{\psi,2} = 0.454$ $\mu_{\psi,3} = 0.000$	1.84	2.05	11.7%	26.9%

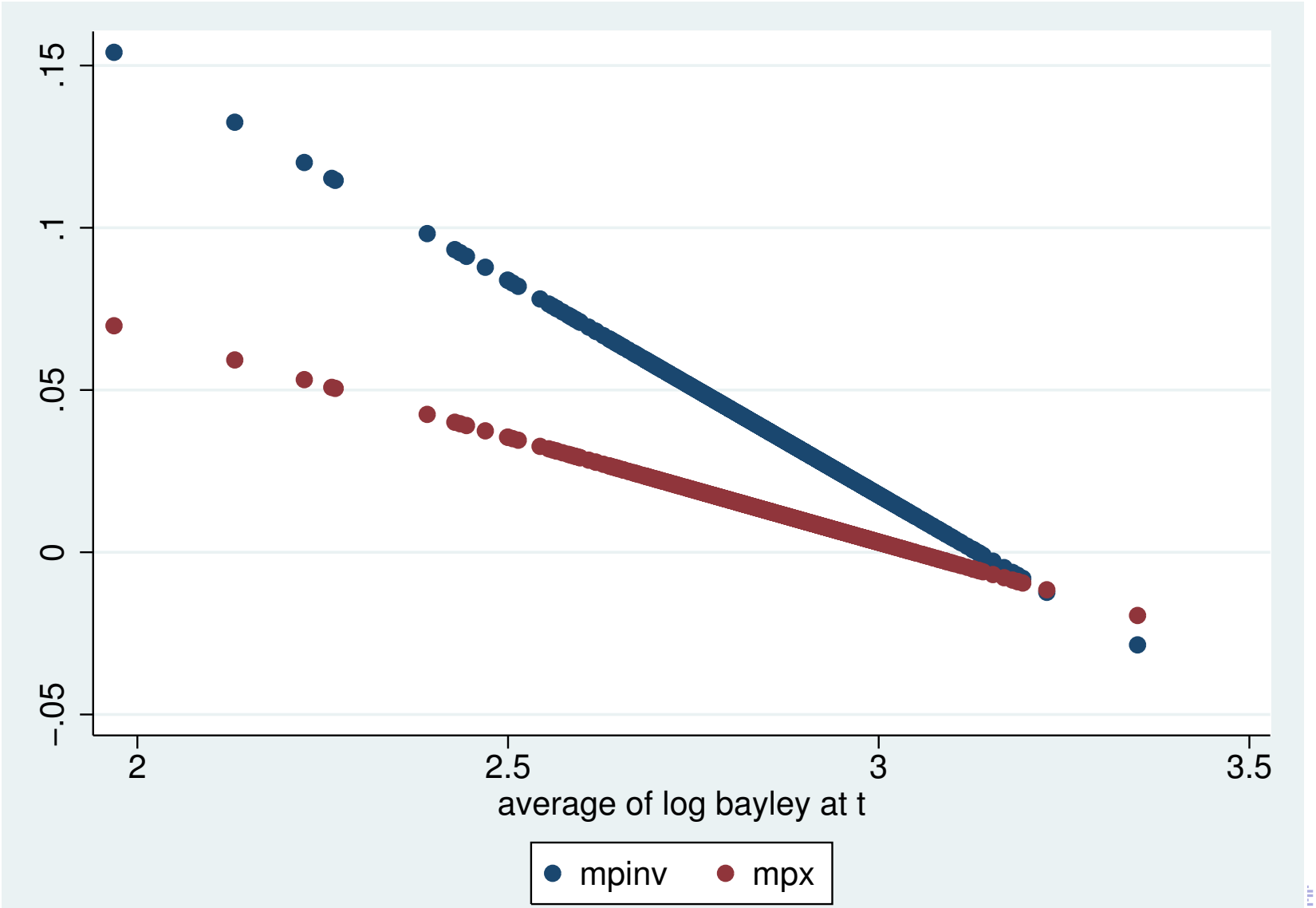
Colombia NS&CS Program (Attanasio, Cunha, and Jervis, 2016)

Table: Production Function Estimates: Perceived Median and "True"

	Perceived		"True"
μ_0	2.433	δ_0	2.362
			(0.107)
μ_1	0.454	δ_1	0.418
			(0.037)
μ_2	0.197	δ_2	0.414
			(0.132)
μ_3	-0.065	δ_3	-0.132
			(0.047)

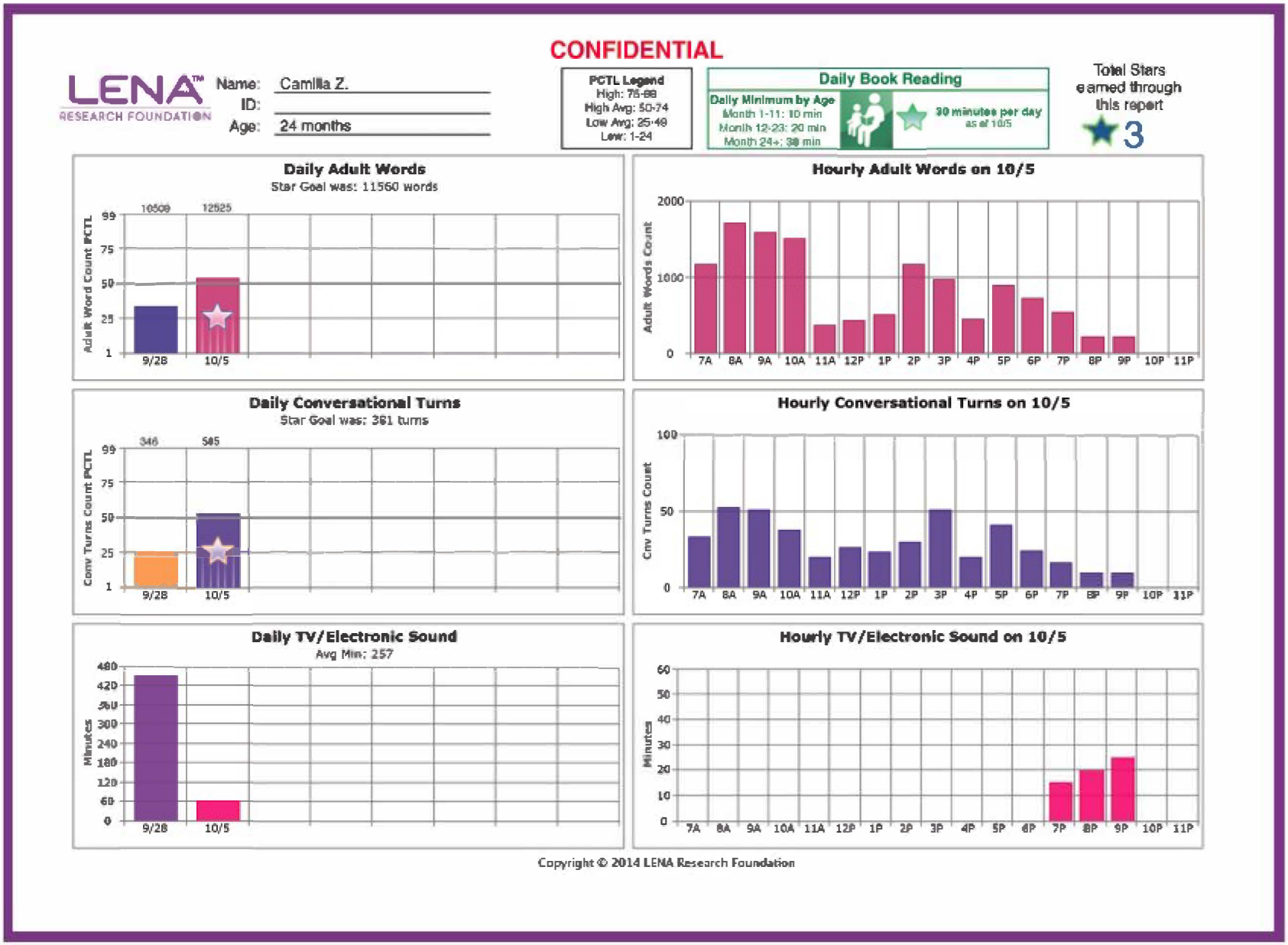
Standard errors (in parentheses) are clustered at municipality level

Colombia NS&CS Program (Attanasio, Cunha, and Jervis, 2016)



LENA Start Program (Gerdes and Cunha, 2017)

Parental Reports for Feedback



Parenting and Child Development

- Parents have large influence on the development of their children:
- Parents choose:
  - Who interacts with their children.
  - How often interactions take place.
  - The quality of the interaction.
- Parents influence continues as children grow because they choose
  - The neighborhood in which the family will live.
  - The schools their children will attend.
  - And, to some extent, the peers their children will have.

Parenting and Child Development

- Unfortunately, little is known about the forces that determine parental choices.
- It is difficult to improve public policy if we don't understand mechanisms.
- The research presented today focuses on one aspect of this problem: parental beliefs.
- We find that parents tend to underestimate the importance of investments on child development.
- Ongoing research (Philadelphia, USA; Houston, USA; Brazil, Colombia, India):
  - Can parenting programs affect these beliefs?
  - Do changes in belief lead to changes in parental investments?
  - Are these changes sustained over time?
  - Are the policies cost effective?