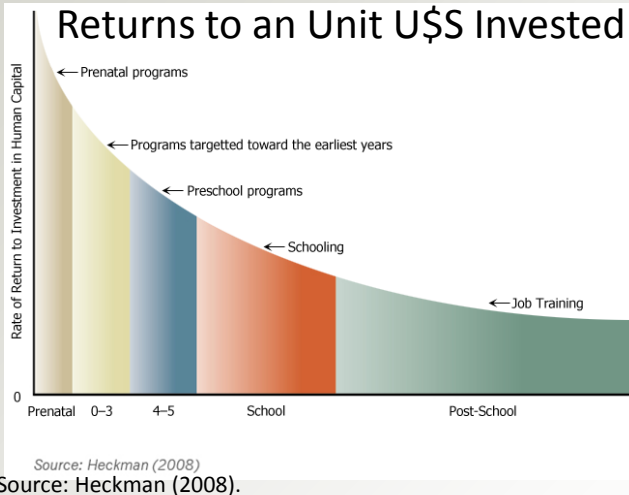


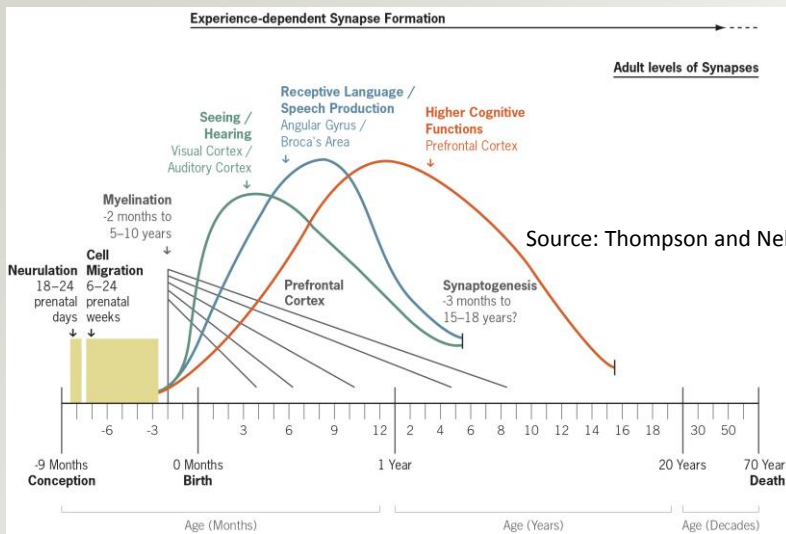
# \*Early Childhood Education

What is the optimal time of intervention for promoting different capacities?



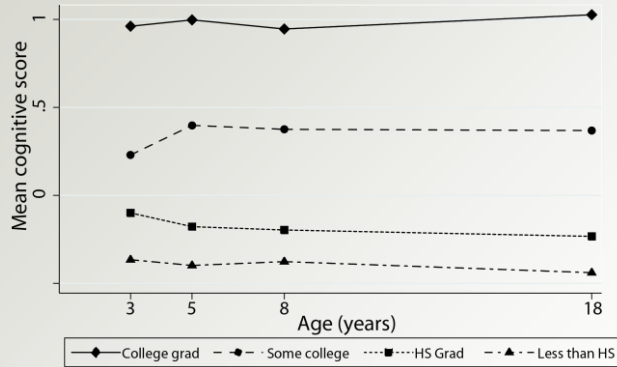
## Human Brain Development

HCEO hceconor



current research in developmental neuroscience that is pertinent to the central claims of media accounts of early brain development, (a) scientific understanding of formative early experiences, (b) whether critical periods are typical for brain development, (c) brain development as a lifelong process, (d) **biological hazards to early brain growth,**

## Trend in cognitive scores by age by maternal education



Each score standardized within observed sample. Using all observations and assuming data missing at random. Source: Brooks-Gunn et al. (2006).

Intercept at early ages is the key determinant



## Hart & Risley, 1995

### Meaningful Differences

**By the time the children were 3 years old**, parents in less economically favored circumstances had said fewer different words in their cumulative monthly vocabularies than the children in the most economically advantaged families in the same period of time.

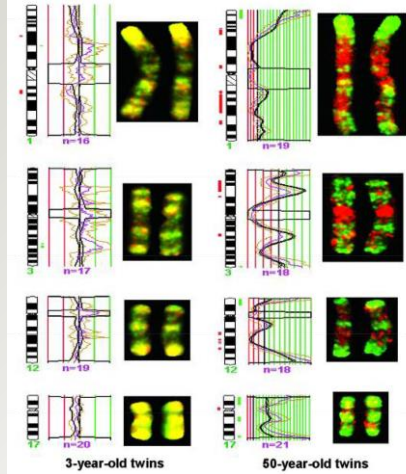
Cumulative Vocabulary	
Children from welfare families:	500 words
Children from working class families:	700 words
Children from professional families:	1,100 words



## Adversity Gets Under the Skin. Evidence on gene-environment interactions



DNA methylation and histone acetylation patterns in young and old twins

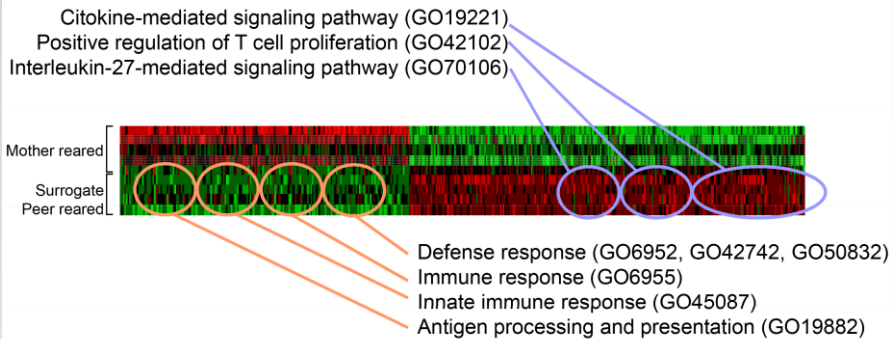


We found that, although twins are epigenetically indistinguishable during the early years of life, older monozygous twins exhibited remarkable differences in their overall content

Source: Fraga, Ballestar et al. (2005)

## Early Life Experiences Change The Way Genes Express Themselves Up- and Down-Regulated Genes in Rhesus Monkeys

**Differential gene expression (GO annotations, biological functions),  
SPR vs. MR monkeys**

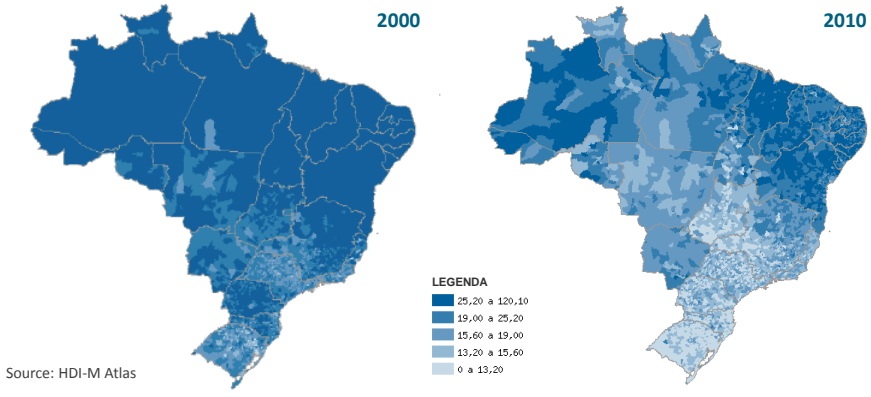


Source: Cole, Conti, Heckman and Suomi (2012)

analyze changes gene expression profiles in 4-mo-old animals reared under adverse social conditions.

# 1. The Brazilian Progress

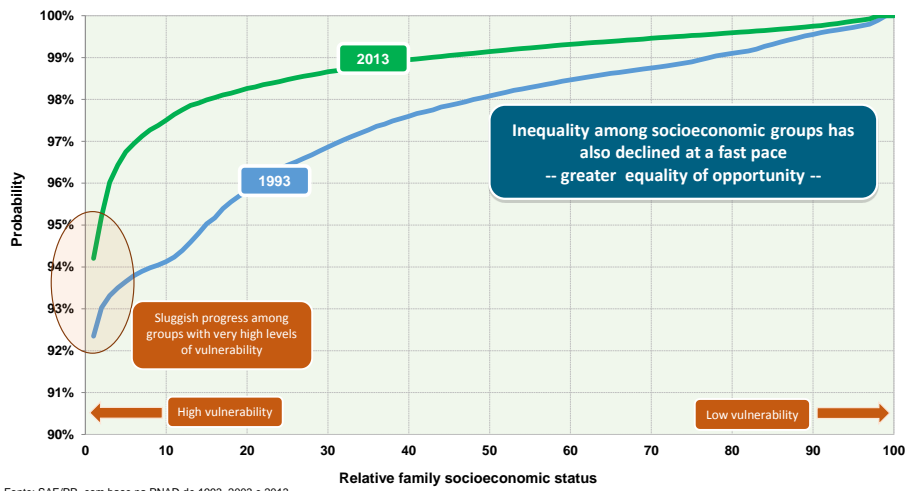
## Child (up to 5 years old) mortality rate in Brazilian Municipalities

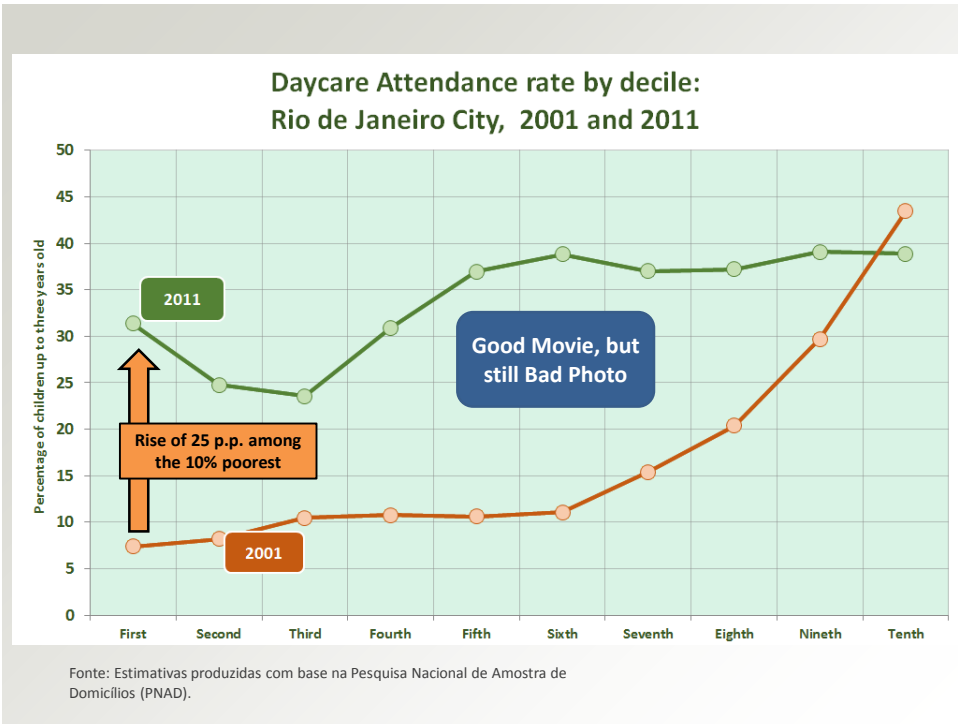


7

# The Brazilian Progress 1993-2013

## Probability of survival, children born last year: Brazil, 1993 e 2013



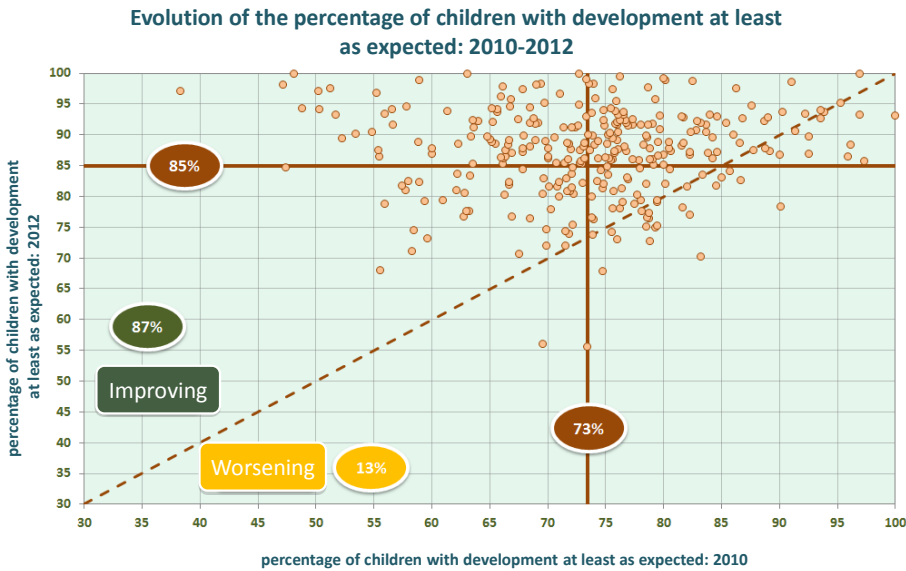


### Monitoring child development in Rio

Scale	Communication						Gross Motor						Fine Motor						Problem Solving						Personal-Social					
	Q1	Q2	Q3	Q4	Q5	Q6	Q1	Q2	Q3	Q4	Q5	Q6	Q1	Q2	Q3	Q4	Q5	Q6	Q1	Q2	Q3	Q4	Q5	Q6	Q1	Q2	Q3	Q4	Q5	Q6
8 meses	↔	↔	↔	↑	↔	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↔	↔	↔	↓
9 meses	↔	↑	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↓	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↓	↔	↔	↔	
10 meses	↔	↑	↑	↑	↑	↑	↔	↔	↔	↔	↔	↔	↔	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	
12 meses	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↓	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	
14 meses	↑	↑	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	
16 meses	↔	↑	↔	↑	↑	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	
18 meses	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↓	↔	↑	↔	
20 meses	↑	↔	↑	↑	↔	↑	↔	↔	↔	↔	↔	↔	↔	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	
22 meses	↑	↔	↑	↑	↑	↑	↔	↑	↔	↑	↑	↔	↔	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	
24 meses	↔	↔	↔	↑	↑	↔	↔	↔	↔	↔	↔	↔	↔	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	
27 meses	↔	↔	↔	↔	↑	↔	↔	↔	↔	↑	↑	↔	↔	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	
30 meses	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	
33 meses	↔	↔	↔	↑	↑	↔	↔	↔	↔	↔	↔	↔	↔	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	
36 meses	↔	↔	↔	↔	↑	↔	↔	↔	↔	↔	↔	↔	↔	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	
42 meses	↔	↔	↔	↑	↑	↔	↔	↔	↔	↔	↔	↔	↔	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	
48 meses	↔	↔	↔	↑	↑	↔	↔	↔	↔	↔	↔	↔	↔	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	
54 meses	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	

**510 milestones**

## 4. Monitoring child development



### \* New Generation of Early Childhood Initiatives

#### Policy Choices:

- **Fulltime versus part-time daycare centers and other partial approaches** (EX: Criança Feliz (Federal), PIM (Programa Infância Melhor in the State of Rio Grande do Sul) and PIC (Programa Infância Carioca in Rio de Janeiro City))
- **From an approach based on negative rights to an approach based on positive rights** (UN new Approach)
- **Importance of Non-Cognitive abilities & Evaluation**