

# Parenting Promotes Social Mobility Within and Across Generations

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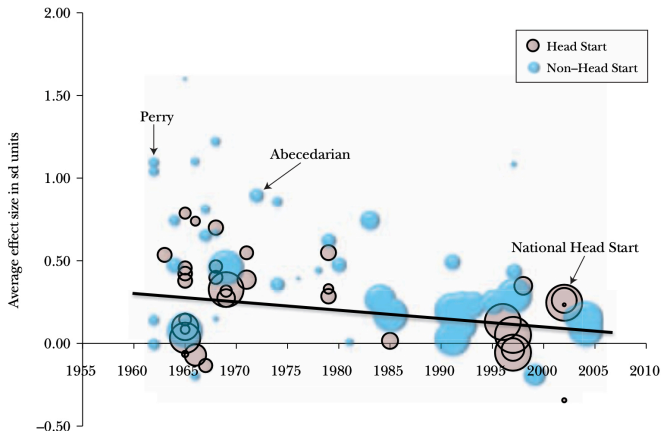
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Figure 1: Average Impact of Early Childcare Programs at End of Treatment



Source: ?

**Note:** This figure shows the distribution of 84 program-average treatment effect sizes for cognitive and achievement outcomes, measured at the end of each program's treatment period, by the calendar year in which the program began. Reflecting their approximate contribution to weighted results, "bubble" sizes are proportional to the inverse of the squared standard error of the estimated program impact. There is a weighted regression line of the effect size by calendar year.

# **A Framework for Interpreting Impacts of Policies Promoting Social Mobility**

- Following the literature, we use the technology of skill formation (Cunha and Heckman, 2007) to organize ideas and interpret evidence.
- At age  $\alpha$ ,  $\mathbf{S}_\alpha$ , enhances the productivity of other investments.
- The stock of skills at age  $\alpha + 1$  is generated by the following relationship

$$\mathbf{S}_{\alpha+1} = \mathbf{F}^{(\alpha)} (\mathbf{S}_\alpha, \mathbf{I}_\alpha, \mathbf{N}_\alpha, \mathbf{P}_\alpha, \mathbf{G}_\alpha) . \quad (1)$$

- The technology is often joined with a model of measurements of skills:

$$\mathbf{M}_\alpha = \Phi^\alpha (\mathbf{S}_\alpha, \boldsymbol{\tau}_\alpha), \quad (2)$$

where  $\boldsymbol{\tau}_\alpha$  are other factors that explain measurements  $\mathbf{M}_\alpha$ .

- Behaviors,  $\mathbf{B}_\alpha$  (e.g., attending school, showing up on time), depend on skills and incentives,  $\mathbf{R}_\alpha$ :

$$\mathbf{B}_\alpha = \Psi^\alpha (\mathbf{S}_\alpha, \mathbf{E}_\alpha (\mathbf{R}_\alpha)), \quad (3)$$

where  $\mathbf{E}_\alpha$  are factors like effort that affect behaviors and are affected by incentives (e.g., desire to please).

- One can think of behaviors as a special class of measurements because they are manifestations of  $\mathbf{S}_\alpha$ , among other factors.
- Systems (2) and (3) facilitate comparisons of outcomes and behaviors across environments.
- Conditioning on  $\boldsymbol{\tau}_\alpha$  and  $\mathbf{E}_\alpha (\mathbf{R}_\alpha)$  allows for meaningful comparisons across individuals, studies, and time.

# **Two Early Childhood Education Programs that Promote Social Mobility**

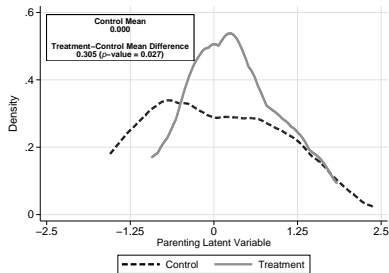
**Table 1:** Baseline Characteristics, Outcomes, and Fertility: Original Participants of Perry and ABC

|   | Perry        |                      |              | ABC          |                      |              |
|---|--------------|----------------------|--------------|--------------|----------------------|--------------|
|   | Control Mean | Mean Difference (MD) | MD p-value   | Control Mean | Mean Difference (MD) | MD p-value   |
| <b>Panel a. Baseline</b>                                  |              |                      |              |              |                      |              |
| IQ (Perry) or Mother's IQ (ABC)                           | 78.54        | 1.03                 | 0.387        | 83.49        | 1.83                 | 0.399        |
| Socioeconomic Index                                       | 8.62         | 0.17                 | 0.530        | 21.82        | -1.93                | <b>0.089</b> |
| Mother Does not Work <sup>§</sup>                         | 0.69         | 0.22                 | <b>0.002</b> | 0.39         | -0.22                | <b>0.010</b> |
| Mother's Year of Birth                                    | 1959.97      | 0.03                 | 0.950        | 1974.35      | -0.15                | 0.674        |
| <b>Panel b. Midlife Skills<sup>†</sup></b>                |              |                      |              |              |                      |              |
| Cognitive   | 0.00         | 0.48                 | <b>0.005</b> | 0.00         | 0.34                 | <b>0.031</b> |
| Non-Cognitive   | 0.00         | 0.50                 | <b>0.011</b> | 0.00         | 0.47                 | <b>0.031</b> |
| <b>Panel c. Midlife Education<sup>†</sup></b>             |              |                      |              |              |                      |              |
| High-School Graduate                                      | 0.52         | 0.20                 | <b>0.021</b> | 0.53         | 0.20                 | <b>0.025</b> |
| College Graduate  | 0.05         | 0.02                 | 0.453        | 0.09         | 0.21                 | <b>0.007</b> |
| <b>Panel d. Midlife Outcomes</b>                          |              |                      |              |              |                      |              |
| Married   | 0.25         | 0.09                 | <b>0.082</b> | 0.42         | 0.01                 | 0.486        |
| Labor Income (2021 USD)                                   | 16,298.91    | 7,826.94             | <b>0.018</b> | 37,527.95    | 13,044.70            | <b>0.098</b> |
| Household Labor Income (2021 USD)                         | 25,121.43    | 13,243.21            | <b>0.007</b> | 37,247.62    | 14,632.67            | <b>0.071</b> |
| Accumulated Days (Perry) or Times (ABC) in Jail or Prison | 1,326.71     | -380.83              | 0.237        | 0.14         | -0.12                | <b>0.027</b> |
| Never Arrested (Perry) or Accumulated Arrests (ABC)       | 0.46         | 0.18                 | <b>0.039</b> | 0.61         | 0.26                 | 0.151        |
| Physical Health   | 0.00         | -0.02                | 0.553        | 0.00         | 0.28                 | <b>0.096</b> |
| Mental Health   | 0.00         | 0.31                 | <b>0.072</b> | 0.00         | 0.20                 | 0.111        |
| <b>Panel e. Midlife Fertility<sup>†</sup></b>             |              |                      |              |              |                      |              |
| Any Children  | 0.80         | -0.01                | 0.878        | 0.89         | -0.03                | 0.748        |
| Age at Onset  | 22.63        | 0.87                 | 0.469        | 21.93        | 2.23                 | 0.122        |
| Number of Children  | 2.42         | 0.15                 | 0.727        | 2.31         | -0.19                | 0.524        |
| > 5 Children  | 0.07         | 0.02                 | 0.727        | 0.00         | 0.02                 | 0.928        |
| <b>Panel f. Sample Sizes</b>                              |              |                      |              |              |                      |              |
| Original Participants at Baseline                         | 65           | -7                   |              | 57           | 2                    |              |
| Original Participants at Midlife Follow-up                | 50           | 2                    |              | 45           | 6                    |              |

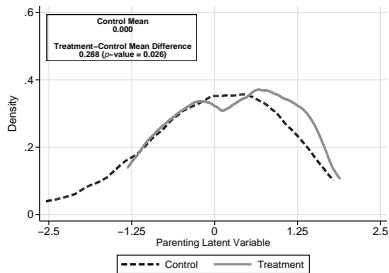


## Figure 2: Parenting Received by the Original Participants of the Perry and ABC

(a) Parenting Distribution, Perry



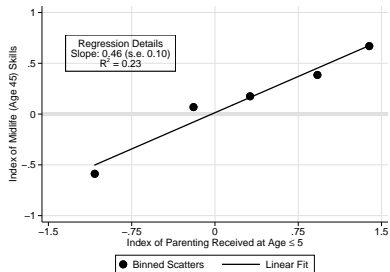
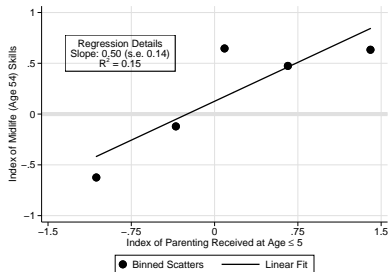
(b) Parenting Distribution, ABC



**Note:** Panel (a) shows the probability density function of a latent variable describing the parental investment (parenting) received by the original participants of the Perry Preschool Project (Perry) by treatment status. We also display the control-group mean and the treatment-control mean difference in the index together with the permutation  $p$ -value for this difference. The null hypothesis for the difference is that it is less than or equal to 0. Panel (b) is analogous in format to Panel (a) for the parental investment received by the original participants of the Carolina Abecedarian Project (ABC).

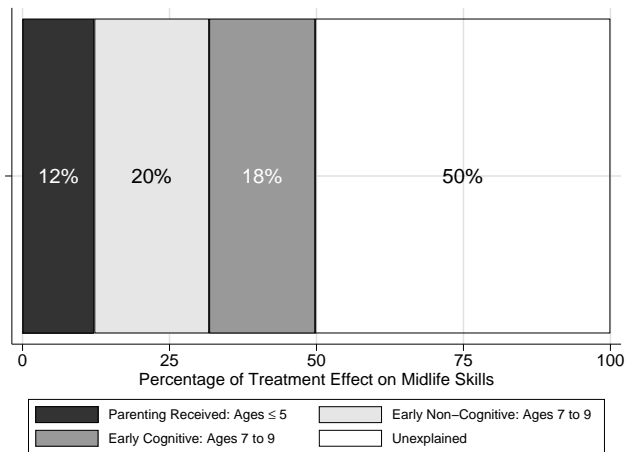
Figure 3: Parenting Received by the Original Participants of Perry and ABC and their Adult Skills

(a) Midlife Skills and Parenting, Perry (b) Midlife Skills and Parenting, ABC



**Note:** Panel (a) displays the linear relationship between the latent variable of parental investment received by the original participants of the Perry Preschool Project summarized in Figure ?? and an average of their midlife cognitive and non-cognitive skills measured at age 54, together with the corresponding description of the linear-regression. Panel (b) is analogous in format to Panel (a) for the original participants of Carolina Abecedarian Project, whose midlife skills are measured at age 45. The number of bins in the scatterplots is calculated using the procedure in ?.

Figure 4: Decomposition of Treatment Effect on Midlife Skills into Treatment Effects on Parenting Received and Early-Life Skills, Perry

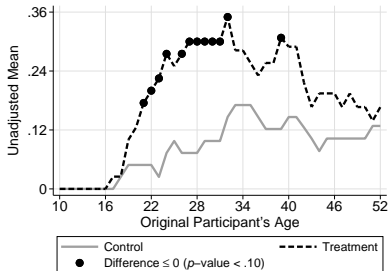


## Table 2: Definitions of Welfare Indicators

|   | Male Children |                      |              | Female Children |                      |              |
|---|---------------|----------------------|--------------|-----------------|----------------------|--------------|
|   | Control Mean  | Mean Difference (MD) | MD p-value   | Control Mean    | Mean Difference (MD) | MD p-value   |
| <b>Panel a. Perry</b>                       |               |                      |              |                 |                      |              |
| High School Graduate (Age 18 or older)      | 0.67          | -0.01                | 0.582        | 0.74            | 0.13                 | <b>0.026</b> |
| College Graduate (Age 23 or older)          | 0.04          | 0.08                 | <b>0.063</b> | 0.31            | -0.09                | 0.846        |
| Employed (Age 23 or older)                  | 0.48          | 0.19                 | <b>0.040</b> | 0.41            | 0.09                 | 0.218        |
| Never Arrested (Age 18 or older)            | 0.37          | 0.14                 | <b>0.089</b> | 0.78            | 0.06                 | 0.210        |
| In Good Health (Age 18 or older)            | 0.82          | 0.12                 | <b>0.006</b> | 0.85            | 0.10                 | <b>0.030</b> |
| Not a Parent (Ages 14 to 22)                | 1.00          | 0.00                 | 1.000        | 0.83            | 0.12                 | 0.234        |
| Never Divorced (Age 23 or older)            | 0.93          | 0.07                 | <b>0.028</b> | 0.86            | 0.11                 | <b>0.016</b> |
| <hr style="border-top: 1px dashed black;"/> |               |                      |              |                 |                      |              |
| <b>Panel b. ABC</b>                         |               |                      |              |                 |                      |              |
| High School Graduate (Age 18 or older)      | 0.66          | -0.06                | 0.718        | 0.28            | 0.18                 | <b>0.067</b> |
| College Graduate (Age 23 or older)          | 0.55          | -0.08                | 0.683        | 0.18            | 0.25                 | <b>0.068</b> |
| Not Idle (Age 15 or older) <sup>†</sup>     | 0.91          | 0.06                 | <b>0.083</b> | 0.98            | 0.00                 | 0.572        |
| In Good Health (Age 18 or older)            | 0.83          | 0.18                 | <b>0.000</b> | 0.88            | 0.10                 | 0.133        |
| Not a Parent (Ages 14 to 22)                | 0.63          | 0.17                 | <b>0.069</b> | 0.94            | -0.01                | 0.584        |

Figure 5: Original-Participant Marriage, Earnings, and Crime by their Age and by their Children's Age, Perry [1]

(a) Married, by Participant's Age



(b) Earnings, by Participant's Age

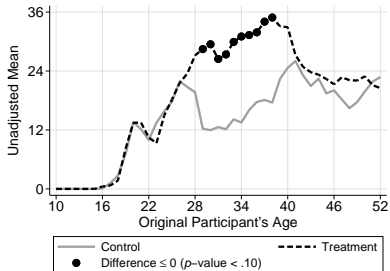


Figure 6: Original-Participant Marriage, Earnings, and Crime by their Age and by their Children's Age, Perry [1], Cont'd

(c) Cumulative Arrests, by Participant's Age

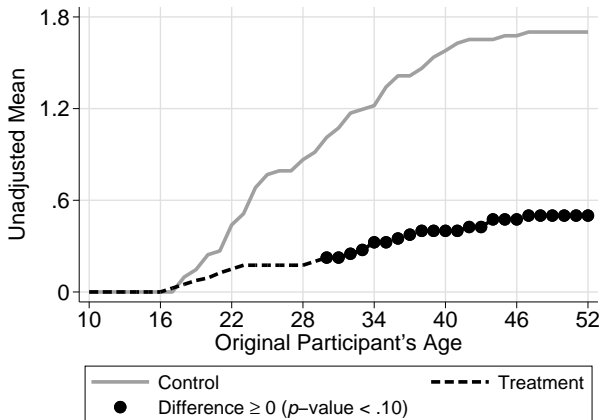


Figure 7: Original-Participant Marriage, Earnings, and Crime by their Age and by their Children's Age, Perry [2]

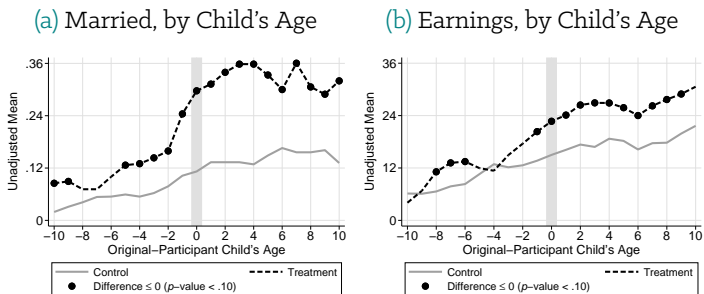


Figure 7: Original-Participant Marriage, Earnings, and Crime by their Age and by their Children's Age, Perry [2], Cont'd

(c) Cumulative Arrests, by Child's Age

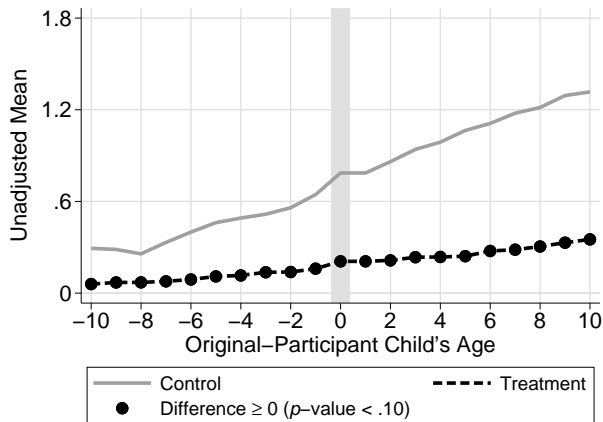
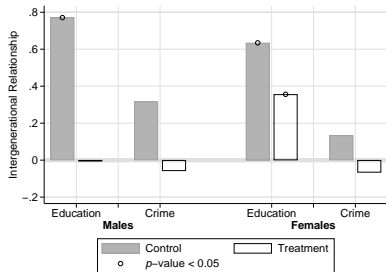


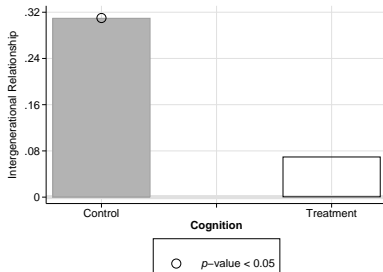


Figure 8: Intergenerational Outcome Relationships, Perry and Preparing for Life

(a) Participants and their Children, Perry



(b) Participants and their Parents, Preparing for Life



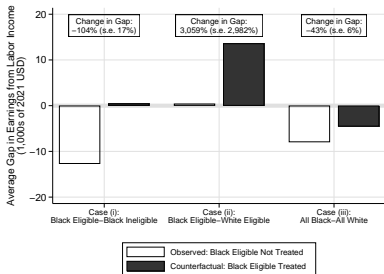
**Table 3:** Summary of Benefit-Cost Analysis of the Perry and ABC

|   | <b>Perry</b> | <b>ABC</b> |
|---|--------------|------------|
| <b>Benefits</b>                                 |              |            |
| Parental Income                                 | N/A          | 133,326    |
| Education                                       | 303          | -5,151     |
| Labor Income                                    | 68,348       | 146,672    |
| Crime   | 88,065       | 513,420    |
| Health  | 54,048       | 63,794     |
| Other   | N/A          | -21,408    |
| <b>Costs</b>                                    |              |            |
| Total Program Cost                              | 23,478       | 105,530    |
| <b>Net Social Benefit (Benefits Less Costs)</b> |              |            |
| Baseline Program Cost                           | 187,287      | 725,124    |
| Subtract Deadweight Loss                        | 175,548      | 672,359    |
| <b>Benefit-Cost Ratio</b>                       |              |            |
| Baseline Program Cost                           | 9.0          | 7.9        |
| Subtract Deadweight Loss                        | 6.0          | 5.2        |

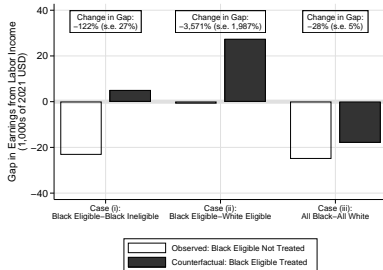
# **A Targeted National Implementation of Policies that Promote Social Mobility**

Figure 9: Gaps in Annual Earnings from Labor Income After National Implementations of Perry and ABC

(a) Earnings between Ages 20 and 40 after Implementing Perry



(b) Earnings at Age 45 after Implementing ABC



# **Isolating Components of Programs that Successfully Promote Social Mobility**

**Table 4:** Features of Omnibus and Original Home-Visiting Programs

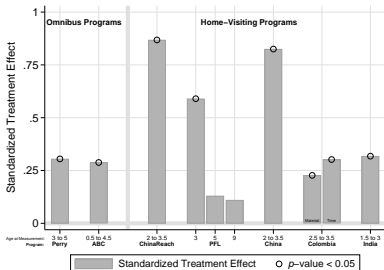
|  | Omnibus Programs  |   | Pioneering Home-Visiting Programs  |   |
|--|---|---|--|---|
|  | Perry   | ABC   | Jamaica  | Preparing for Life  |
| <b>Panel a. Features</b>                       |   |   |  |   |
| Setting  | Ypsilanti, Michigan   | Chapel Hill, North Carolina   | Poor neighborhoods in Kingston, Jamaica                                  | Disadvantaged neighborhoods of Dublin, Ireland  |
| Year of program start                          | 1982  | 1972  | 1986-1987  | 2008  |
| Annual cost per child participant              | 9,391 (2021 USD)  | 21,106 (2021 USD)   | 862 (2021 USD)   | 2,363 (2021 USD)  |
| Sample at baseline                             | 65 control; 58 treatment  | 56 control; 58 treatment  | 65 control; 64 treatment   | 118 control; 115 treatment  |
| Socioeconomic characteristics of participants  | Disadvantage by several measures, which determined eligibility  | Disadvantage by several measures, which determined eligibility  | Generally disadvantaged; all child participants were stunted at baseline | Generally disadvantaged (high unemployment, low levels of education)  |
| Child age at start of program                  | 3 years   | 0 (program started at birth)  | 9 to 24 months   | When mothers pregnant   |
| Program duration                               | 2 years   | 5 years   | 2 years  | 5 years   |
| Education of home visitors                     | College or teaching degree                                      | No visits were implemented. Staff in childcare centers were a mix of HS graduates and education-certified staff | All had at least secondary education                                     | All had a college degree  |
| Experience required for home visitors          | Most staff had certification or experience in education         | Education-certified staff was present in childcare centers  | None, received 8 weeks of mandatory training on child development        | Intensive two-day initial training on program manual and child-development matters. Follow-up to this training throughout the following six months. |
| Education of mothers at baseline               | Most mothers did not have high school completed                 | Most mothers did not have high school completed   | Only 24% had more than 9 years of education                              | Relatively low; 30% had less than 16 years  |
| Frequency of home visits                       | Weekly during the school year; one-hour per session             | No visits were implemented  | Weekly; one-hour per session   | Fortnightly; one-hour per session   |
| <b>Panel b. Home-Environment Measures</b>      |   |   |  |   |
| Child age at measurement                       | 0.5 to 4.5  | 3 to 5  | Not available  | 3, 5, and 9   |
| Measures available                             | Parental Attitude Research Instrument                           | HOME Inventory  |  | Age 3: HOME inventory; Age 5: home learning-environment index; Age 9: parent-involvement index  |
| <b>Panel c. Very Early-Life Skill Measures</b> |   |   |  |   |
| Child age at measurement                       | 5   | 5   | 3 to 4   | 3 and 5   |
| Measures available                             | Cognition: Stanford-Binet IQ Test; Non-cognitive: not available | Cognition: Stanford-Binet IQ Test; Non-cognitive: not available   | Cognitive: Griffith Mental Development Scale (performance scale)         | Cognitive (5): BAS (spatial, pictorial, verbal sections) . Non-cognitive (3 and 5): internalizing, externalizing, social and                        |

**Table 5: Features and Available Skill Measures for Home-Visiting Programs Patterned after Jamaica**

|  | ChinaReach   | China  | Colombia  | India  |
|--|--|--|---|--|
| <b>Panel a. Features</b>                       |  |  |   |  |
| Setting  | Villages in Huachi County of Gansu, China  | Villages Shaanxi, China  | Semi-urban municipalities in central Colombia   | Urban disadvantaged neighborhoods in Cuttack County of Odisha, India                           |
| Year of program start                          | 2015   | 2014   | 2010  | 2013   |
| Annual cost per child participant              | 602 (2021 USD)   | Not available  | 380 (2021 USD)  | 175 (2021 USD)   |
| Sample at baseline                             | 852 control; 715 treatment   | 296 control; 212 treatment   | 626 control; 635 treatment  | 212 control; 209 treatment   |
| Socioeconomic characteristics of participants  | Generally disadvantaged; > 70% of household participants living in cave dwelling   | Generally disadvantaged; ~26% participant households qualified for minimum-living standards  | Eligible for a social programs targeting households belonging to the poorest 20% in the population        | Generally disadvantaged; ~50% of participant households below the poverty line                 |
| Child age at start of program                  | 0 to 20 months   | 18 to 30 months  | 12 to 24 months   | 10 to 20 months  |
| Program duration                               | ~22 months   | 6 months   | 18 months   | 18 months  |
| Education of home visitors                     | 10 years (average)   | Most completed at least community college; 29% completed college   | 8.5 years (average)   | 26% did not have high-school; 74% had at least high-school                                     |
| Experience required for home visitors          | None   | None   | None  | None   |
| Education of mothers at baseline               | 10 years (average)   | ~27% had less than 9 years of education; ~73% had more than 9 years of education or more   | 7.5 years (average)   | 6.7 years control (average); 8.1 years treatment (average)                                     |
| Frequency of home visits                       | Weekly; one-hour per session   | Weekly; one-hour per session   | Weekly; one-hour per session  | Weekly; one-hour per session   |
| <b>Panel b. Home-Environment Measures</b>      |  |  |   |  |
| Child age at measurement                       | 2 to 3.5   | 2 to 3.5   | 2.5 to 3.5  | 1.5 to 3   |
| Measures available                             | HOME inventory   | Items similar to those observed in the HOME inventory  | Items similar to those observed in the HOME inventory, classified as either time or material resources    | Items similar to those observed in the HOME inventory  |
| <b>Panel c. Very Early-Life Skill Measures</b> |  |  |   |  |
| Child age at measurement                       | 2 to 3.5   | 2 to 3.5   | 2.5 to 3.5  | 1.5 to 3   |
| Measures available                             | Cognitive: Denver Developmental Screening Test (language and cognition sections). Non-cognitive: Denver Developmental Screening Test (socio-emotional section) | Cognitive: Bayley Mental Developmental Index (cognitive section) for cohort 1; Griffith Mental Developmental Scale (performance scale) for cohort 2. Non-cognitive: ASQ social problems inventory for both cohorts | Cognitive: Bayley Mental Developmental Index (cognitive section). Non-cognitive: IQQ and ECBQ inventories | Cognitive: Bayley Mental Developmental Index (cognitive section). Non-Cognitive: not available |

Figure 10: Impacts on the Home Environment and Very Early-Life Skills, Omnibus and Home-Visiting Programs

(a) Home Environment



(b) Cognitive Skills

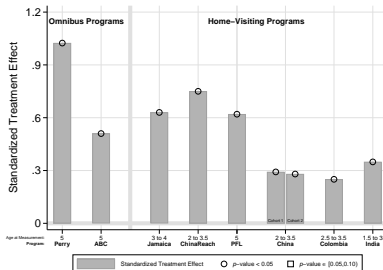




Figure 10: Impacts on the Home Environment and Very Early-Life Skills, Omnibus and Home-Visiting Programs, Cont'd

(c) Non-Cognitive Skills

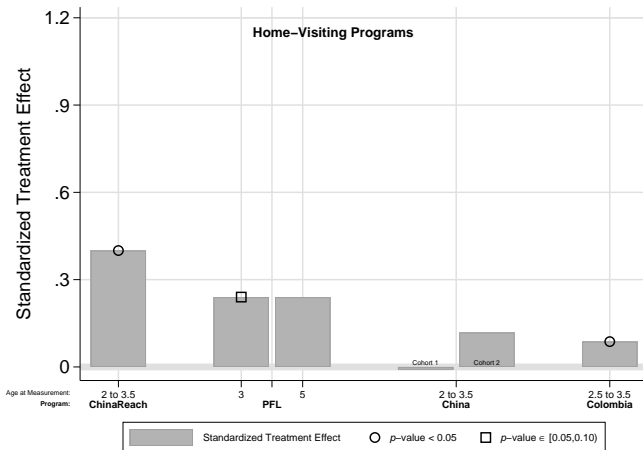


Figure 11: Impacts on Early-Life Skills and Achievement, Omnibus and Home-Visiting Programs

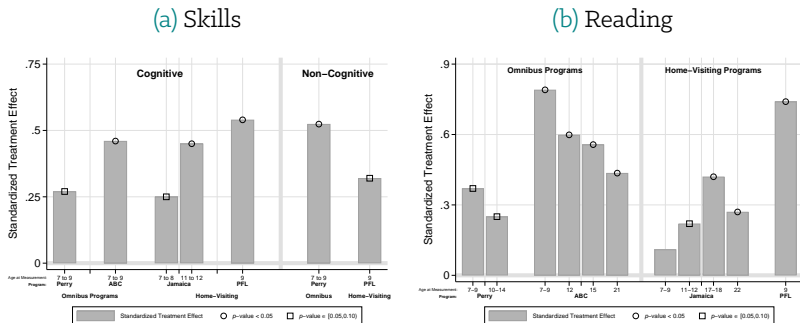
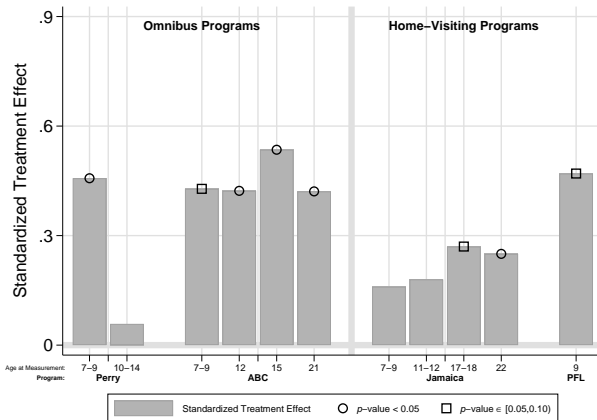


Figure 11: Impacts on Early-Life Skills and Achievement, Omnibus and Home-Visiting Programs, Cont'd

(c) Mathematics

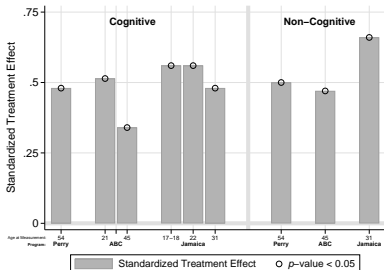


**Table 6: Available Adult Skill Measures and Outcomes for Omnibus and Original Home-Visiting Programs**

|   | Omnibus Programs  |   | Pioneering Home-Visiting Programs  |  |
|---|---|---|--|--|
|   | Perry   | ABC   | Jamaica  | Preparing for Life                       |
| <b>Panel a. Achievement Measures</b>    |   |   |  |  |
| Child age at measurement                | 7 to 9 and 10 to 14   | 7 to 9, 12, 15, 21  | 7 to 9, 11 to 12, 17 to 18, and 22   | 9  |
| Measures available                      | California Achievement Test (reading and math sections)   | Woodcock Johnson Test (reading and math sections)   | Wide Range Achievement Test (reading and math sections)  | Reading and math achievement inventories |
| <b>Panel b. Adult Skill Measures</b>    |   |   |  |  |
| Child age at measurement                | 5 <sup>4</sup>  | 21 and 45   | 17, 22, and 31   | Not available                            |
| Measures available                      | Cognition: Raven and Stroop Tests combined items. Non-cognitive: inventories of positive personality, including conscientiousness   | Cognition: Wechsler Adult Intelligence Scale (21) and Raven and Stroop Tests combined items (45). Non-cognitive: inventories of positive personality, including conscientiousness (45)  | Cognitive: Wechsler Adult Intelligence Scale IQ Test. Non-cognitive: Conscientiousness inventory   |  |
| <b>Panel c. Adult Outcomes Observed</b> |   |   |  |  |
| Child age at measurement                | 21 to 40  | 21 to 40  | 22 and 31  | Not available                            |
| Measures available                      | Education (40): years of education. Employment (40): employed in any job at age 22; employed in high-skill job at age 31. Violence (21-40): reverse-coded variables indicating engagement in fights and other violent behaviors. Alcohol/Marijuana (21-40): reverse-coded variables describing frequency and intensity of alcohol/marijuana use | Education (30): years of education. Employment (30): employed in any job at age 22; employed in high-skill job at age 31. Violence (21-30): reverse-coded variables indicating engagement in fights and other violent behaviors. Alcohol/Marijuana (21-30): reverse-coded variables describing frequency and intensity of alcohol/marijuana use | Education (31): years of education. Employment: employed in any job at age 22; employed in high-skill job at age 31. Violence (31): reverse-coded variables indicating engagement in fights and other violent behaviors. Alcohol/Marijuana (31): reverse-coded variables describing frequency and intensity of alcohol/marijuana use |  |

Figure 12: Impacts on Adult Skills and Outcomes for Omnibus Programs and Jamaica

(a) Skills



(b) Outcomes

