Which combination of high quality infant-toddler and preschool care best promotes school readiness?

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Acknowledgements

- The research reported here is supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305A090467 to the University of California, Irvine (PI: George Farkas). The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.
Introduction

- The Head Start / pre-kindergarten programs cannot fully eliminate early gaps
  - Ludwig & Phillips, 2007; Magnuson, Ruhm, & Waldfogel, 2007

- Programs for infants & toddlers, e.g. the Early Head Start, produce positive effects

--> What about combinations of these two?
Research question

High Quality Infant Care × High Quality Preschool \( \rightarrow \) School Readiness
Hypothesis 1

Cognitive outcome @ 24 month

High quality infant care produces immediate impacts.
Hypothesis 2

Cognitive & Academic outcomes @ 54 month

High quality preschool produces immediate impacts.

High quality

Low quality
Hypothesis 3

Cognitive & Academic outcomes @ 54 month

Fade-out effect of high quality infant care
Hypothesis 3 (cont.)

Cognitive & Academic outcomes @ 54 month

High quality at both infant care & preschool produces higher outcomes than high quality preschool but low quality infant care.
Hypothesis 3 (cont.)

Cognitive & Academic outcomes @ 54 month

High-High
Low-High
High-Low
Low-Low

High quality at both stages produces higher outcomes than high quality infant care but low quality preschool.
Hypothesis 3 (cont.)

Cognitive & Academic outcomes @ 54 month

High-High  Low-High  High-Low  Low-Low

Infant care - Preschool quality

High quality at both stages produces higher outcomes than low quality at both stages.
Hypothesis 3 (cont.)

Cognitive & Academic outcomes @ 54 month

- High-High: High quality at both stages; the best combination
Method - the dataset

- The NICHD Study of Early Child Care
  - Sampled in 1991
  - 1,364 newborns
  - 10 sites
  - Longitudinal
Method - the dataset (cont.)

- Child care quality: ORCE (*The Observational Record of the Caregiving Environment*)
- Observed at 6, 15, 24, 36, 54 months of age
  - Infant care quality = mean(6, 15, 24)
  - Preschool quality = mean(36, 54)
- Scale: 0 - 4.0
  - Cutoff score for high quality child care: 3.0
Method - the dataset (cont.)

Sample distribution

Infant care - Preschool quality

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-High</td>
<td>25.2%</td>
</tr>
<tr>
<td>Low-High</td>
<td>18.8%</td>
</tr>
<tr>
<td>High-Low</td>
<td>22.0%</td>
</tr>
<tr>
<td>Low-Low</td>
<td>34.0%</td>
</tr>
</tbody>
</table>
Method - the dataset (cont.)

- **Cognitive development**
  - 24 month: Bayley Mental Developmental Index
  - 54 month: Woodcock-Johnson Picture Vocabulary
    - Woodcock-Johnson Memory for Sentences Tests
    - Preschool Language Scale Expressive and Receptive tests

- **Academic achievement**
  - 54 month: Woodcock-Johnson Applied Problems
    - Woodcock-Johnson Letter-Word Identification
    - Woodcock-Johnson Incomplete Words Scales
Method - the dataset (cont.)

- **Controls**
  - **Family:** site; maternal age, education, paid leave, child-rearing attitudes, employment status, separation anxiety; paternal education; family income and structure.
  - **Child:** race, gender, birth order, temperament, health.
Method - propensity score analysis

Why propensity score analysis?

- Observational study --> selection bias
- Normal regression estimates: extrapolate results
Method - propensity score analysis (cont.)

• Step 1: 3 sets of exclusive groups
  • H1: infant-high vs. infant-low
  • H2: preschool-high vs. preschool-low
  • H3: high-low vs. low-low
    high-high vs. high-low
    high-high vs. low-high
    high-high vs. low-low
Method - propensity score analysis (cont.)

- Step 2: propensity score analysis
  - Logistic regression --> propensity scores
  - Within site matching
  - Balance checking
  - Standardized mean difference
  - Propensity score adjusted regression (with weighted balance checking)
Results - cognitive

Cognitive outcome @ 24 month

High quality infant care produces immediate impacts.

High

Low

.16 SD

(p < .05)

Infant care quality
Results - cognitive (cont.)

High quality preschool produces immediate impacts.

Cognitive outcome @ 54 month

\[ \text{High quality} \]
\[ \text{Low quality} \]

.18 SD \((p < .001)\)
Results - cognitive (cont.)

Fade-out effect of high quality infant care

Cognitive outcome @ 54 month

High-High
Low-High
High-Low
Low-Low

Infant care - Preschool quality
Cognitive outcome @ 54 month

High quality at both stages produces higher outcomes than high quality preschool but low quality infant care.

High-High  Low-High  High-Low  Low-Low

Infant care - Preschool quality

.19 SD (p < .05)
Results - cognitive (cont.)

Cognitive outcome @ 54 month

High-High > Low-High > High-Low > Low-Low

High quality at both stages does not produce higher cognitive scores than high quality infant care but low quality preschool.
High quality at both stages produces higher outcomes than low quality at both stages.

Cognitive outcome @ 54 month

Results - cognitive (cont.)
Results - academic achievement

Academic achievement @ 54 month

High quality preschool produces immediate impacts.

.15 SD (p < .01)

High

Low

Preschool quality
Results - academic achievement (cont.)

Academic achievement @ 54 month

Fade-out effect of high quality infant care

Infant care - Preschool quality

High-High | Low-High | High-Low | Low-Low

NS
Results - academic achievement (cont.)

High quality at both stages produces higher outcomes than high quality preschool but low quality infant care.
High quality at both stages produces higher academic achievement than high quality infant care but low quality preschool.
High-quality at both stages produces higher outcomes than low quality at both stages.

.30 SD ($p < .01$)

Academic achievement @ 54 month

Infant care - Preschool quality

High-High
Low-High
High-Low
Low-Low
Robustness check

- Propensity score adjusted regression based on multinomial model for the whole sample.
- Propensity score adjusted regression with site fixed-effect.
- Results are similar.
Conclusions

- High quality infant care does not affect school readiness without subsequent high quality preschool.

- Investments in high quality preschool are accentuated when children also experienced high quality infant care.

- --> Spreading investment across early childhood periods.
Thank you!

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