The Digital Promise: Harnessing Technology and Innovation in Two-Generation Education Investment Strategies

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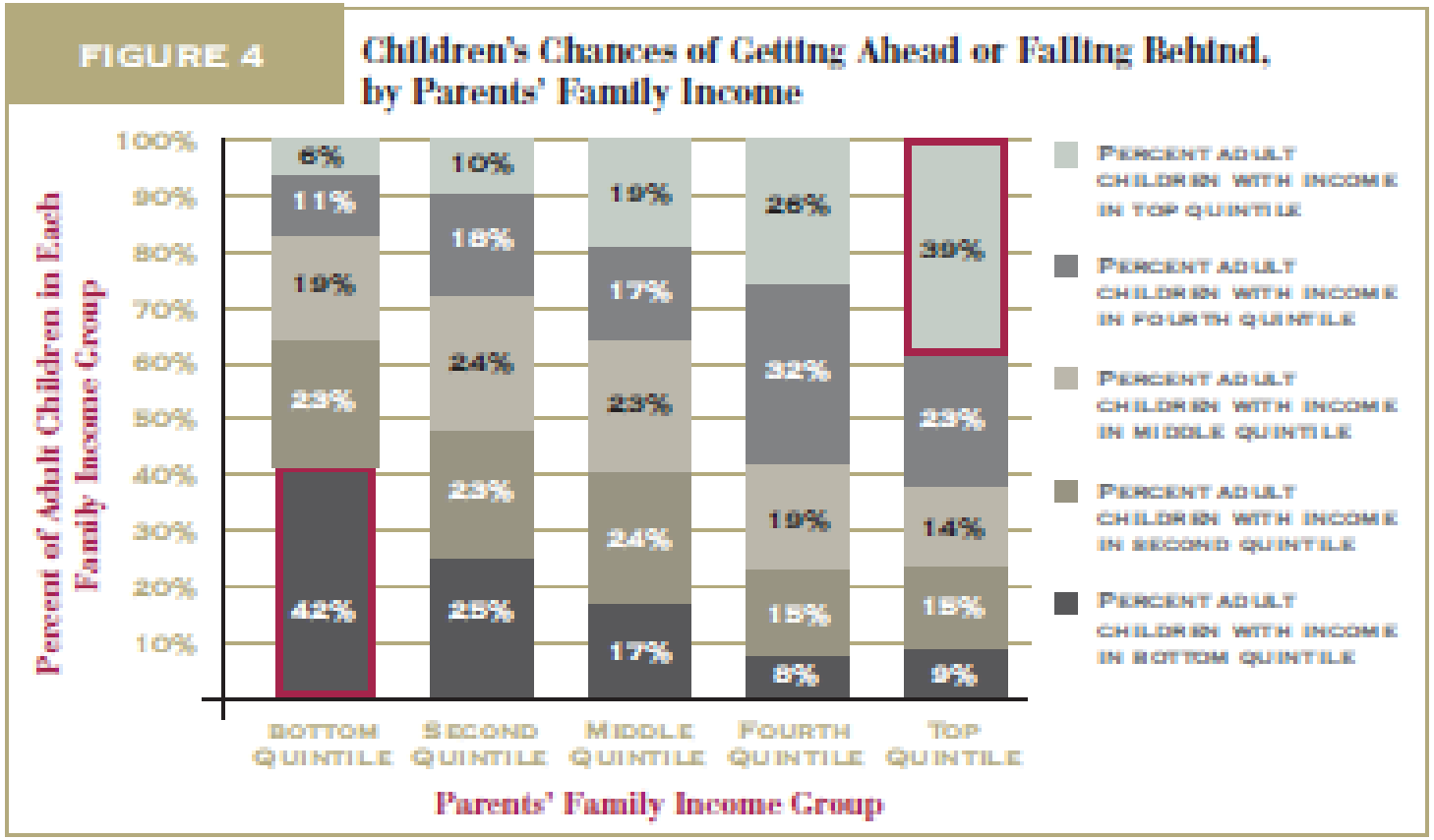
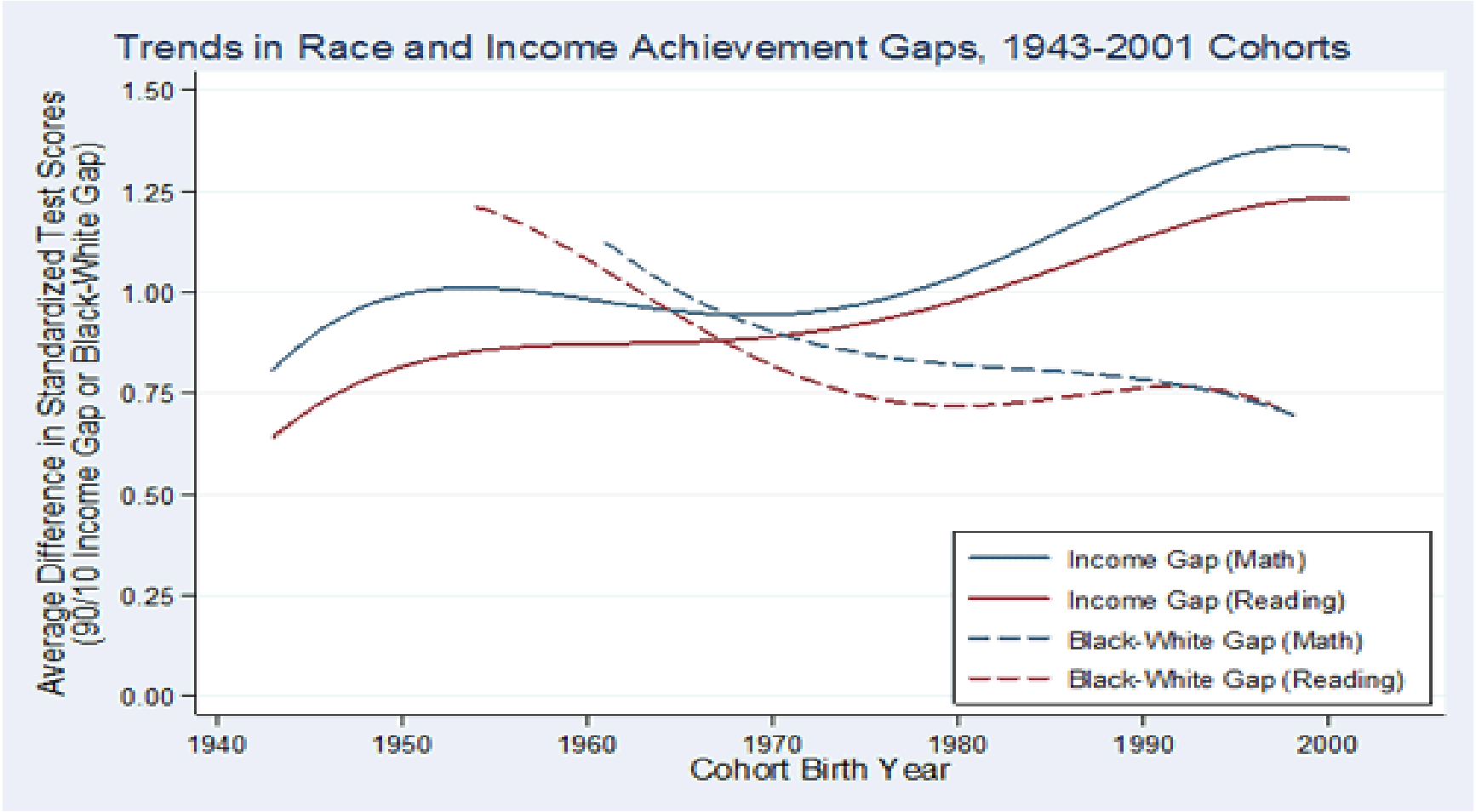
Mobility in America: All Children Do Not Have an Equal Chance at Getting Ahead



Achievement Gaps by Race and Income, Over Time



Early Intervention Improves the Life Circumstances of Disadvantaged Children

(A. Perry Preschool)(B. Abecedarian Program)

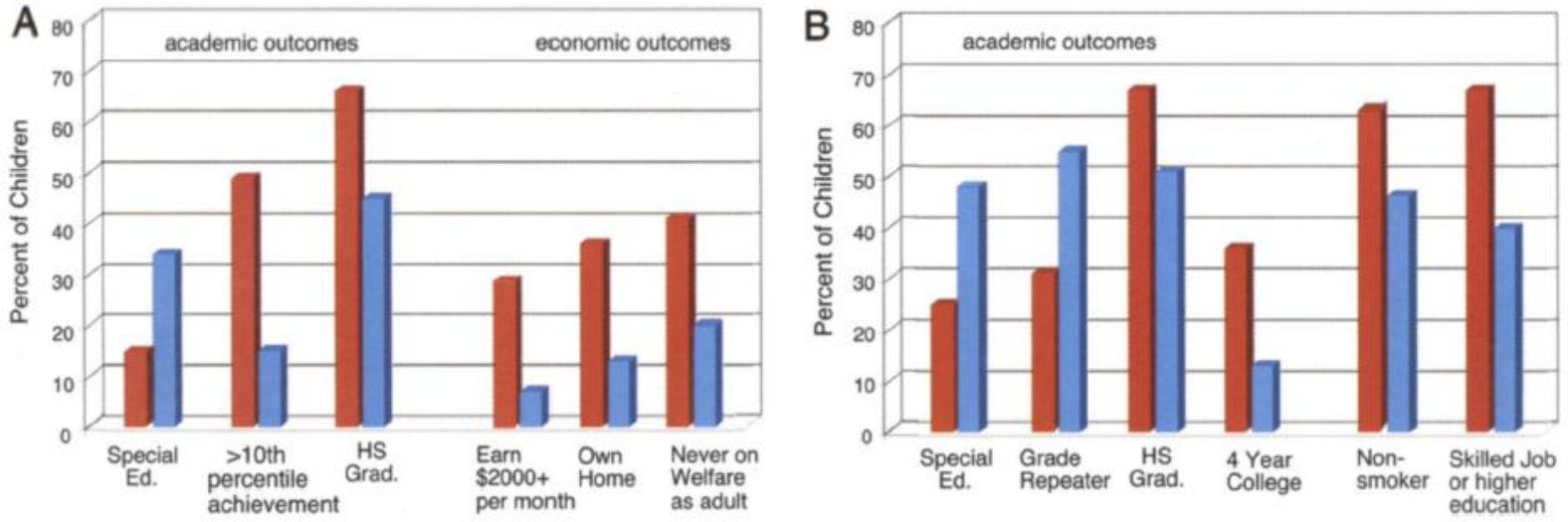


Fig. 2. Academic, economic, and social outcomes for the Perry Preschool and Abecedarian Programs. (*A*) Data from the Perry Program collected when the individuals were 27 years old (High/Scope). >10th percentile achievement, children who scored above the lowest 10% on the California Achievement Test (1970) at age 14; HS Grad, number of children who graduated high school on time. (*B*) Data from the Abecedarian Program collected when the individuals were 21 years old (Carolina Abecedarian Project and the Carolina Approach to Responsive Education, 1972–1992). Red bars, intervention group; blue bars, control group.

Increasing Maternal Education Can Also Break the Cycle of Poverty

- Strategy has long been promoted in international aid and development (Deaton, 2002)
- Maternal literacy skills are single most important factor in closing the achievement gap between children in affluent and low-income neighborhoods in Los Angeles (Sastry & Pebley, 2010)

- Mounting causal evidence that increasing mothers' education improves children's health, cognition, and schooling (Black et al., 2005; Carneiro et al. 2007; Gennetian et al. 2008)
  - associations persist even when employment and earnings are held constant, suggesting that the mechanism driving the linkages is not increased labor market opportunities
  - underscores potential importance of home environment

Skills Gaps and the Home Environment

- A rich and supportive home learning environment helps children succeed in school.

- Early childhood intervention effects often fade out over time due to poor subsequent schooling and home environments.

The Track Record on Parental Educational Interventions

- Large-scale educational interventions with parents (e.g., Even Start, Parents as Teachers) have yielded fewer positive impacts on children's achievement than hoped for.
- What can we learn from this?
- How can we fix what didn't work?

The Argument for Technology

- Technology is not a substitute for a nurturing family environment or public investments in children's health and achievement

- But, it may help to increase parental education and narrow the achievement gap by providing a cost-effective intervention

What Could a Technology-based Two-generation Intervention Accomplish?

- Reduce the gap in math and literacy skills between kids from rich and poor households – using text to speech, speech recognition, mobile devices, etc.
- Develop educational software that is as effective as a personal tutor, compelling as the best video game, and improves the more people use it.
- Use Web 2.0 interface (social media) to promote social interaction and partnership among parents.
- Increase within-family synergies that reinforce educational motivation, persistence, and interest

Dual-Generation Technology-Based Intervention: What are the Right Goals for Young Children and their Parents?

- Letter recognition, sophistication and size of vocabulary, numeracy, increased parent-child interaction on reading and math, improvements in parent and family literacy.
- Increase motivation and perseverance, attention and executive function
- Lay the foundation for learning "21st Century skills" (e.g., independent research; complex problem solving, digital and media use)

What Advances in Science and Technology May be Relevant to Achieve These Goals?

- Low-cost devices such as smart phones, portable game consoles, e-book readers, interactive toys, etc.
- Speech recognition and text-to-speech, including speech synthesis that can reproduce the sounds, inflections and intonations of a particular person.
- Intelligent tutoring systems that provide personalized instruction, model the interventions of an expert tutor, and improve over time.
- Cloud computing, which can expand the computational resources that a low-cost device can access.
- Digital libraries of engaging, age-appropriate material.
- Elements of game design that increase attentive time on task.

How Could a Technology-based Intervention Improve Upon Prior Efforts?

- Cost-effectiveness
- Take-up and Retention
- Program Intensity
- Parent-child Interaction
- Quality and Content of Instruction

Program Models: "Computers for Youth"

- Provides low-income families with a computer-based home learning center, including a suite of highly engaging educational software, and training on how to use the computer to enhance learning and positive family interactions around learning
- Focus on "family computing"
- Family computing boosts 6th grade children's academic engagement, confidence, interest and effort, and self-regulated learning (Tsikalas and Huerta, 2006)
- Could develop similar program model for families with younger children

What Policy Instruments Could Support Research, Development, Demonstration and Deployment of this Initiative?

- Development of a research agenda and a "technology roadmap."
- Support for research and development and prototype development.
- Incentives for parents – such as those provided by Conditional Cash Transfer programs.
- Rigorous evaluation, including, where appropriate, randomized controlled trials.
- Support for large-scale deployment if a cost-effective intervention can be demonstrated and validated.

The Digital Promise Initiative

- New national center created by Congress with bipartisan support to advance technologies that can transform teaching and learning.
- Will work with leading educators, researchers, technology firms, and entrepreneurs to:
    - Identify breakthrough technologies
    - Learn faster what's working and what's not
    - Transform the market for learning technologies
- Supporting the goals of Digital Promise, the Urban Education Lab at the University of Chicago's Urban Education Institute has launched a new national alliance of education-policy researchers; research in the "lab" aims to help improve the educational outcomes of America's most disadvantaged children