

Children's Early Literacy and Math Learning

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Why literacy
and math?

High School Dropout Rate Strongly
Linked to Third Grade Reading Level

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High School Completion Rate Differences for Persistent Reading or Math Problems in the Early Grades



Source: National Longitudinal Survey of Youth – Child Supplement

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**=> Literacy and math are
equally strong correlates
of high school
graduation**

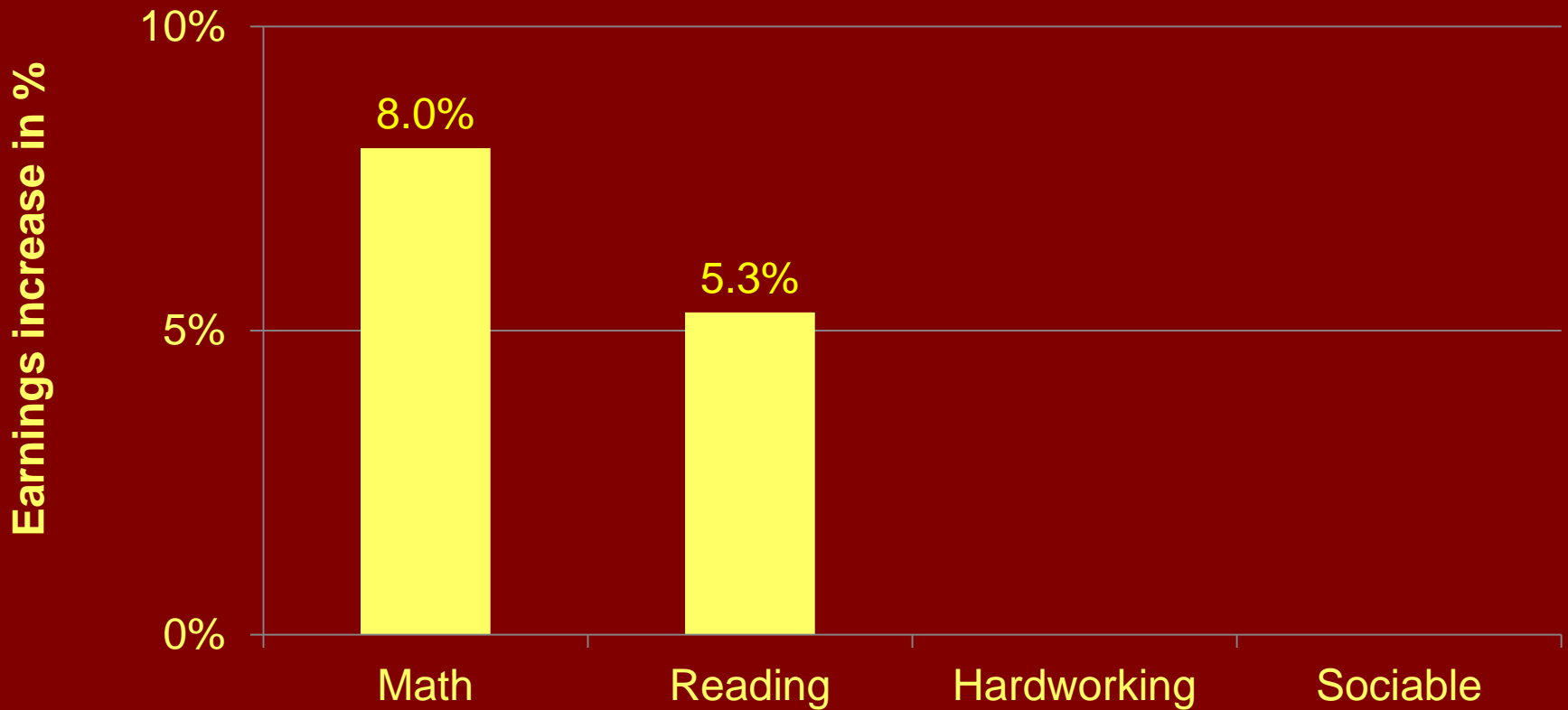
What about labor
market success
(as measured by
earnings)?

Associations between high school characteristics and mid-career earnings



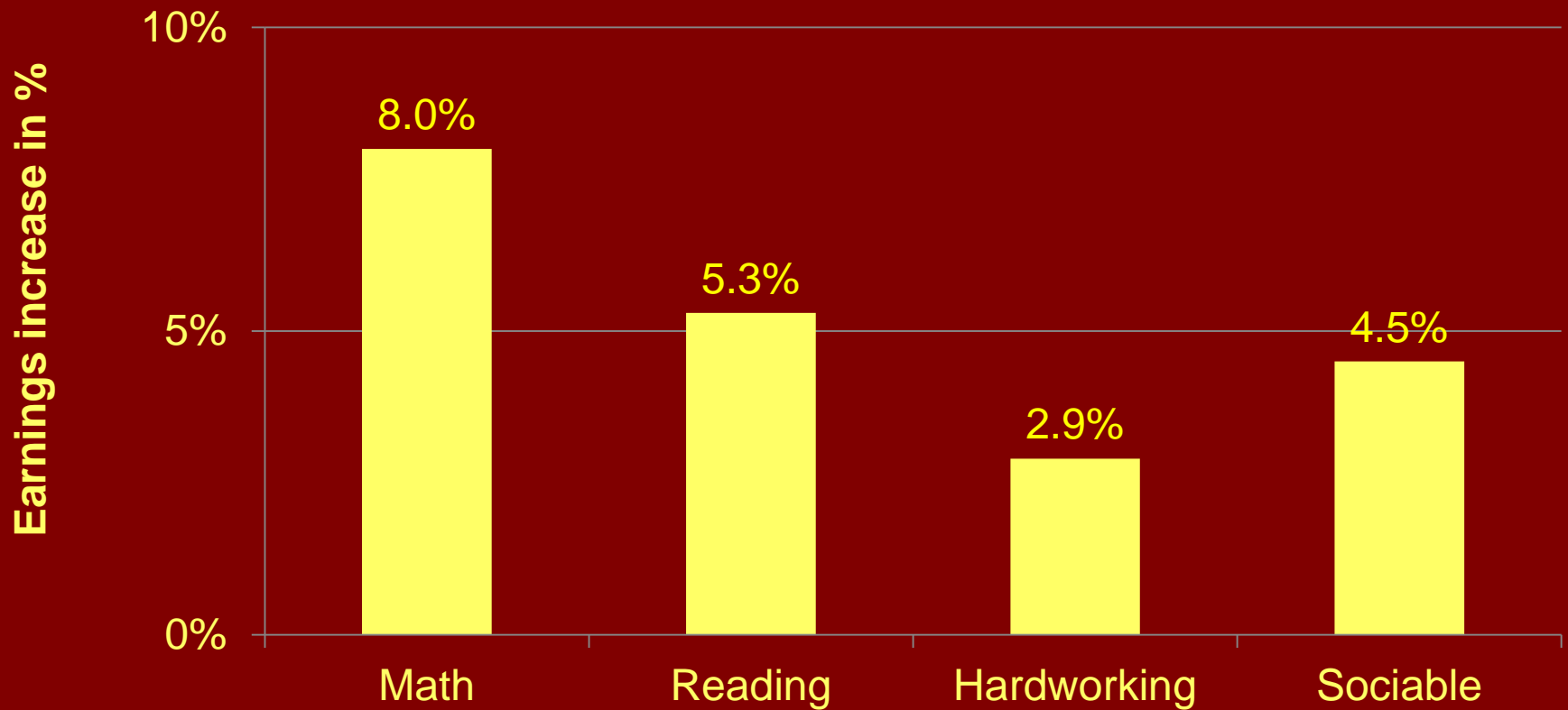
Source: Watts (2018). Estimates control for IQ and family background

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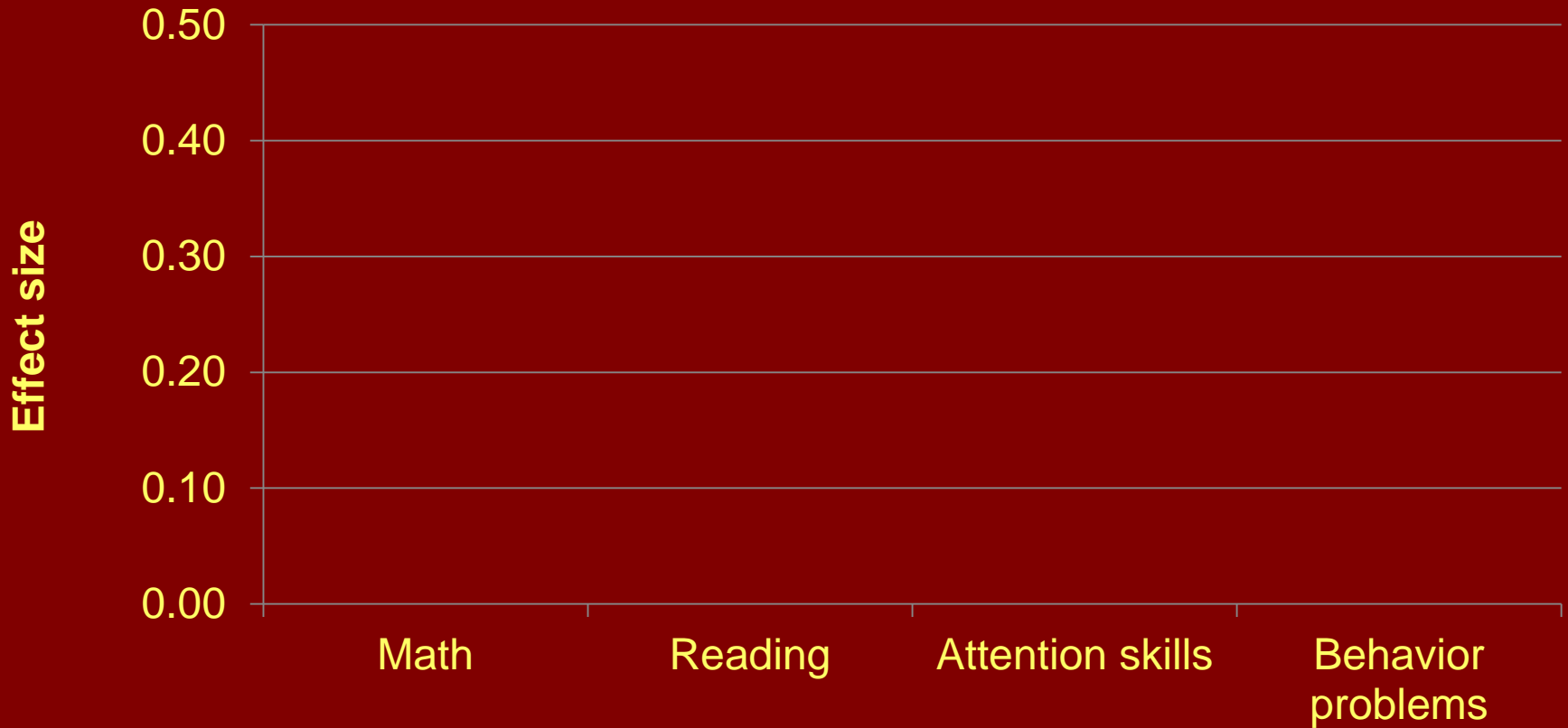


Source: Watts (2018). Estimates control for IQ and family background

**=> Math and literacy are
the strongest predictors
of labor market success**

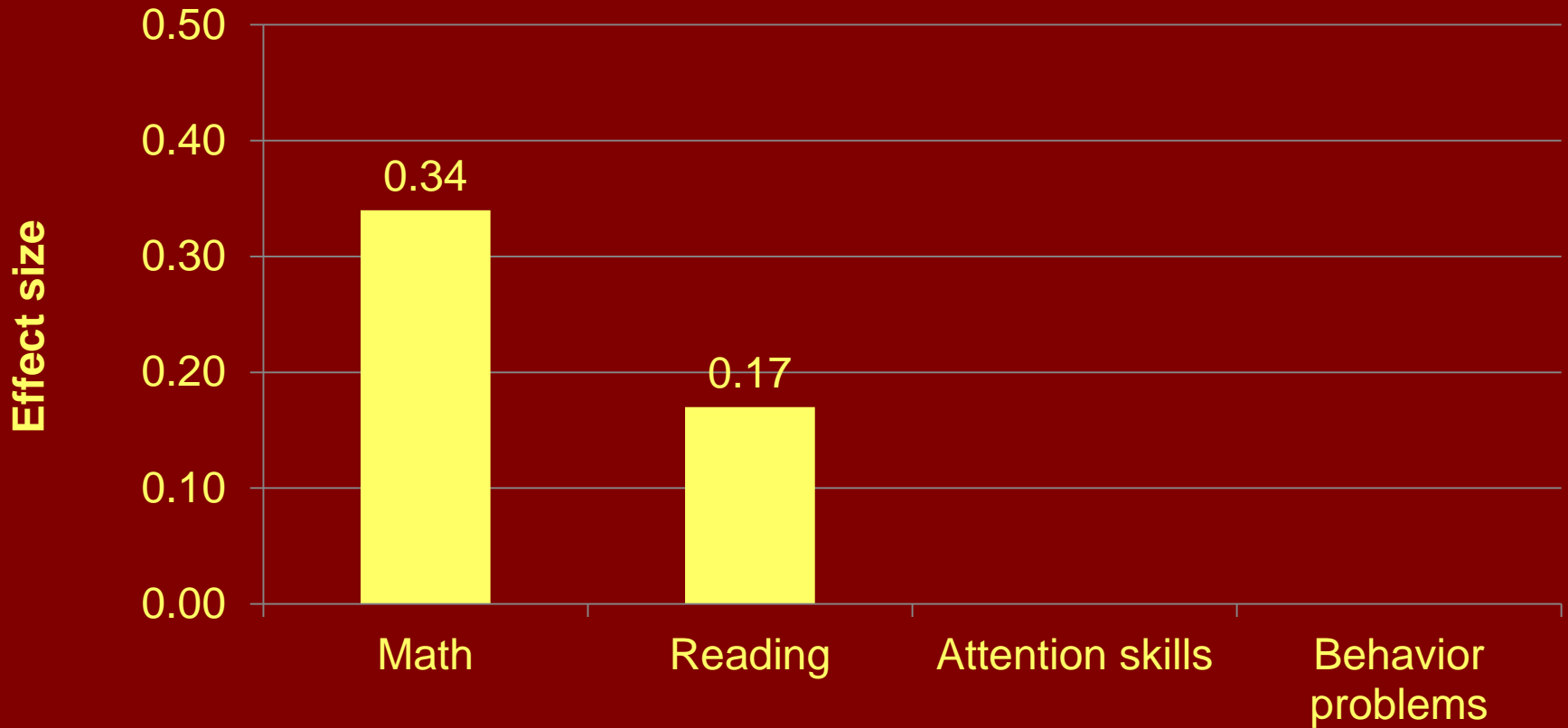
What about school
readiness?

Associations between school-entry skills and behaviors and grades 1-8 achievement



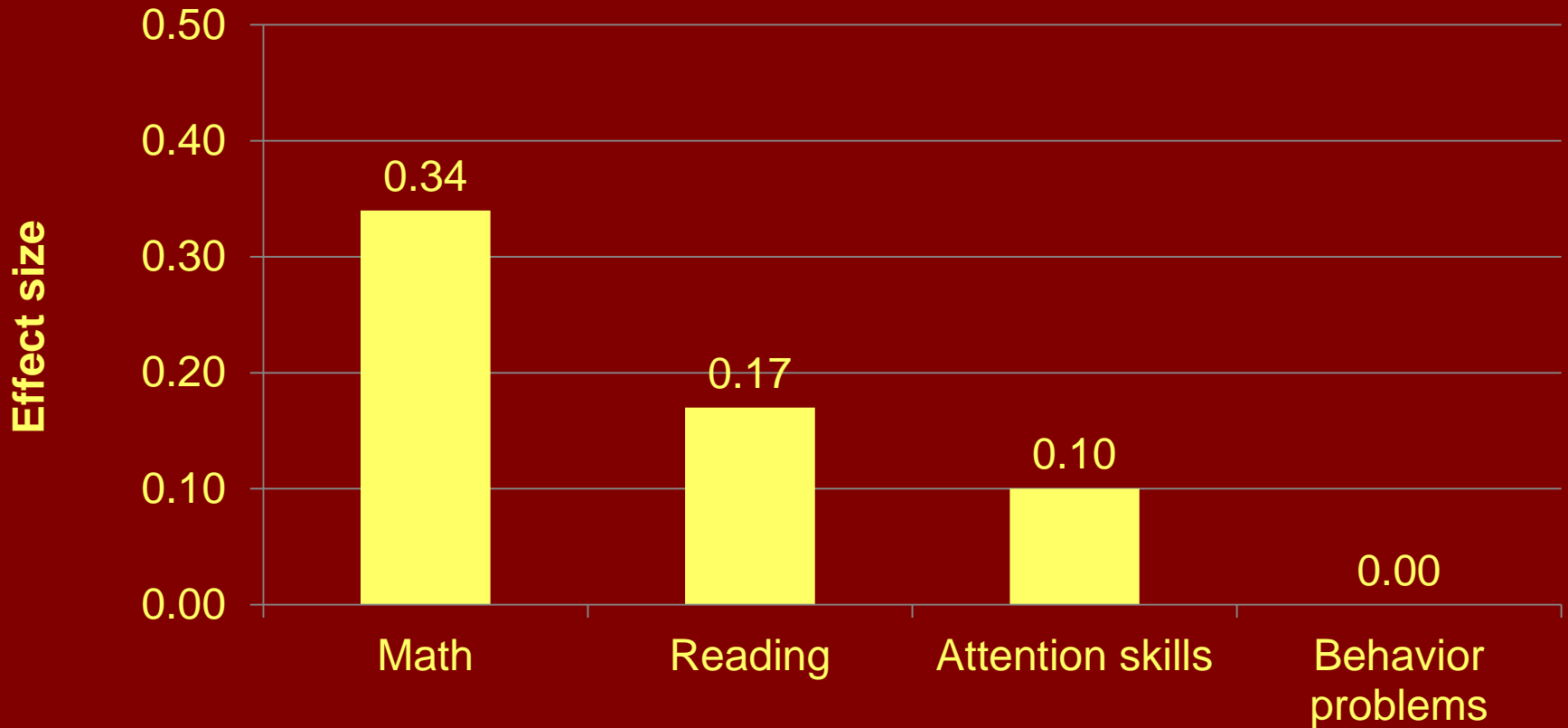
Source: Duncan et al (2007). Estimates control for IQ and family background

Associations between school-entry skills and behaviors and grades 1-8 achievement



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Associations between school-entry skills and behaviors and grades 1-8 achievement



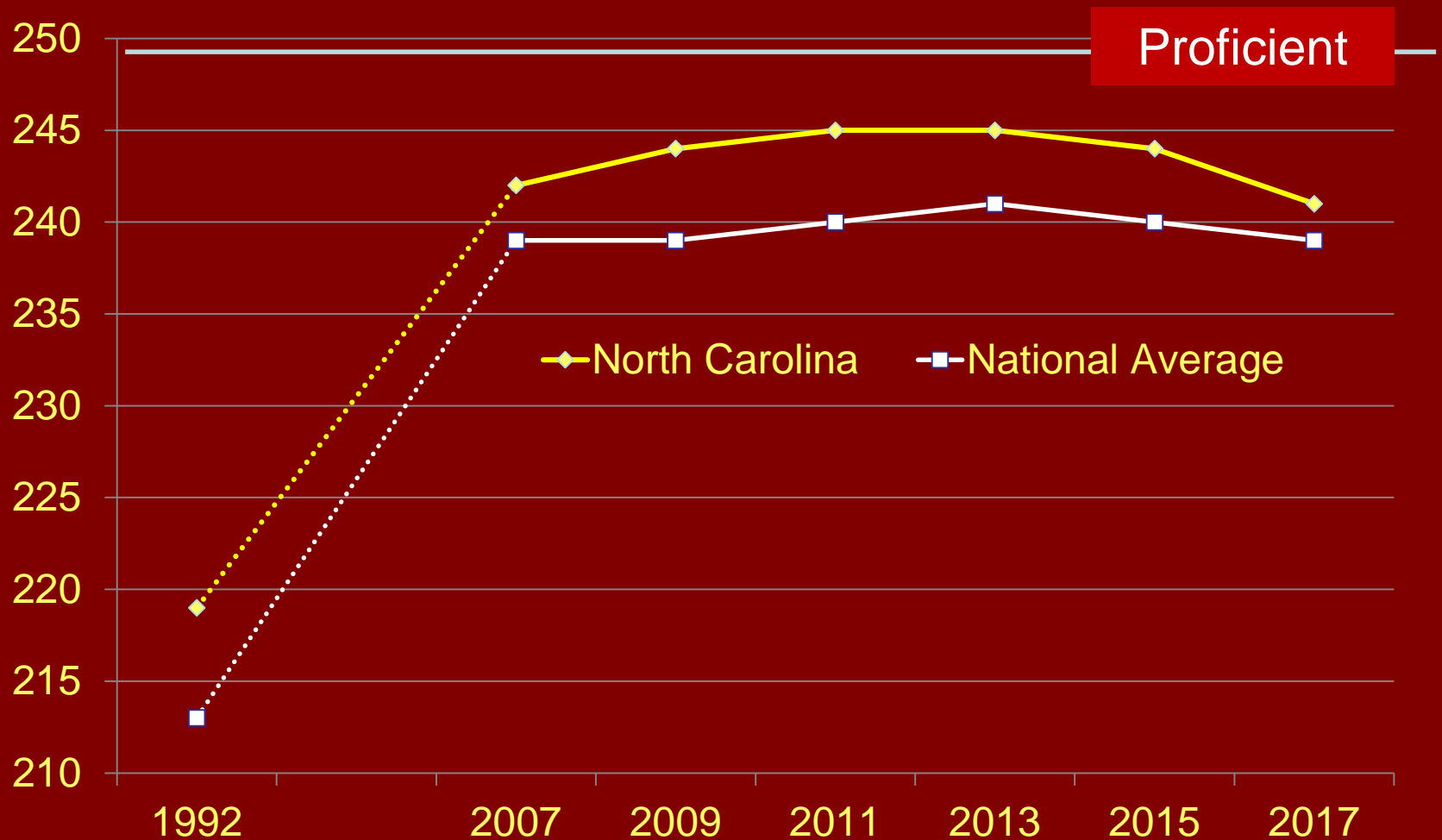
Source: Duncan et al (2007). Estimates control for IQ and family background

=> For *school-entry* skills,
math and literacy are the
strongest predictors of
later school success

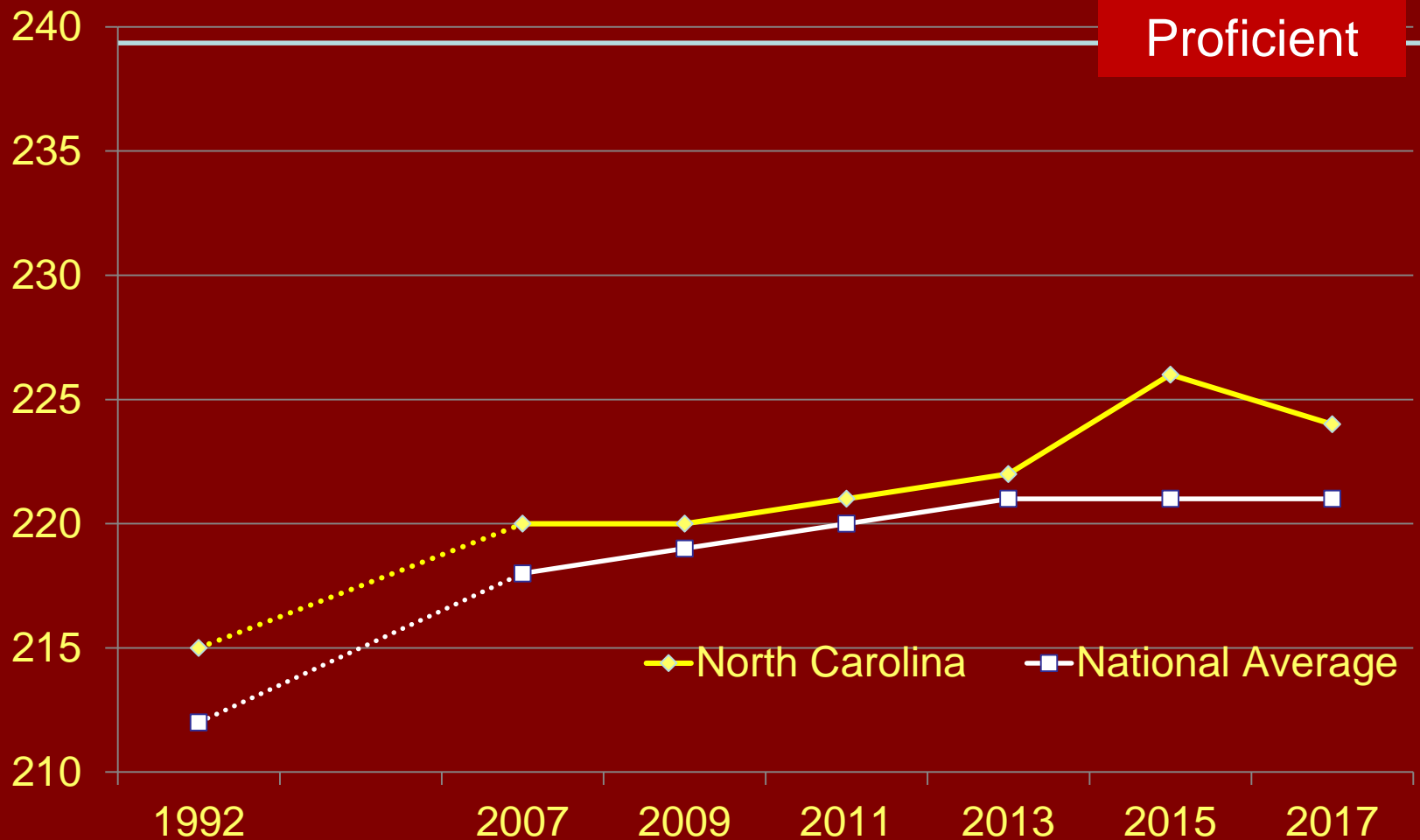
**=> North Carolina's
children need strong
literacy and math skills
right from the start**

How is North Carolina
doing on early-grade
math and literacy?

4th grade NAEP math scores



4th grade NAEP reading scores



How is North Carolina doing
on early math and literacy?

Slightly better than U.S.
average but far from optimal

Can preschools boost
early math and literacy
skills?

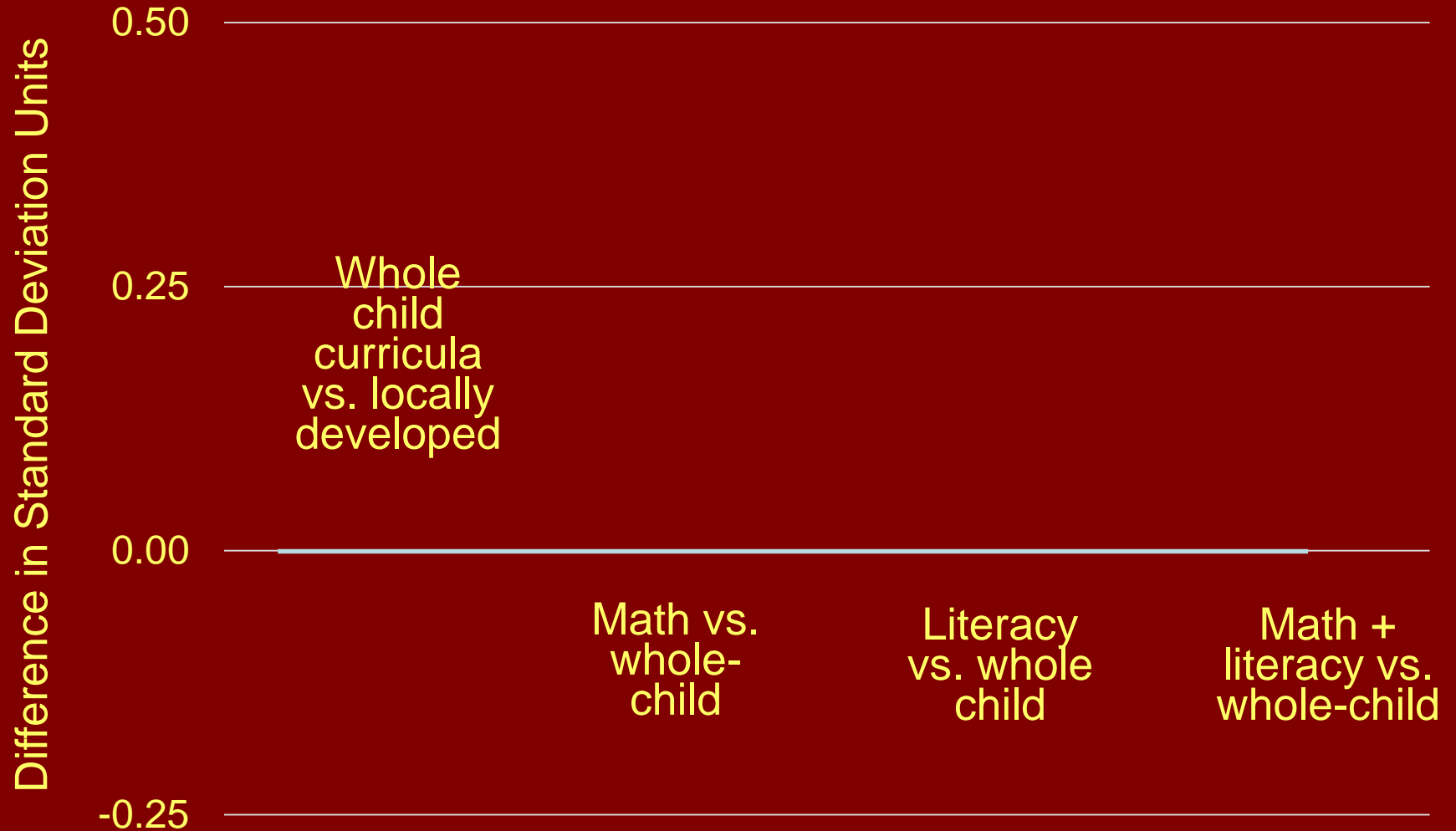
– a cautionary tale

What kind of preschool
curricula best promote
early math and
literacy?

Types of curricula

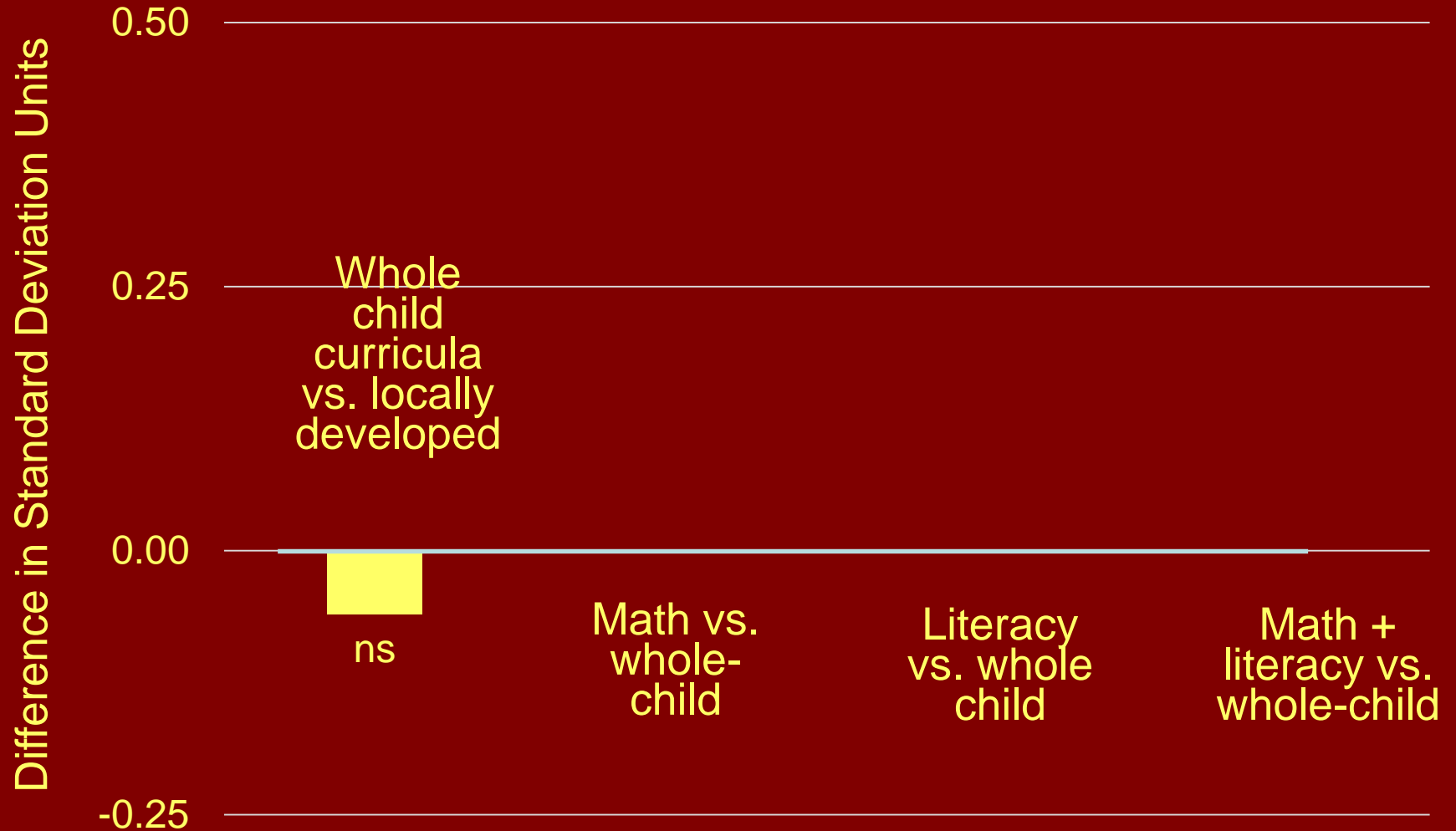
- **Whole-child** (used in 75% of Head Start and 40% of pre-K classrooms; called “Constructivist” by some)
- **Content-specific (e.g., math or literacy)** (used in ~20% of Head Start and pre-K classrooms; not “Direct Instruction”)

Impacts of Various Curricula on Academic Outcomes



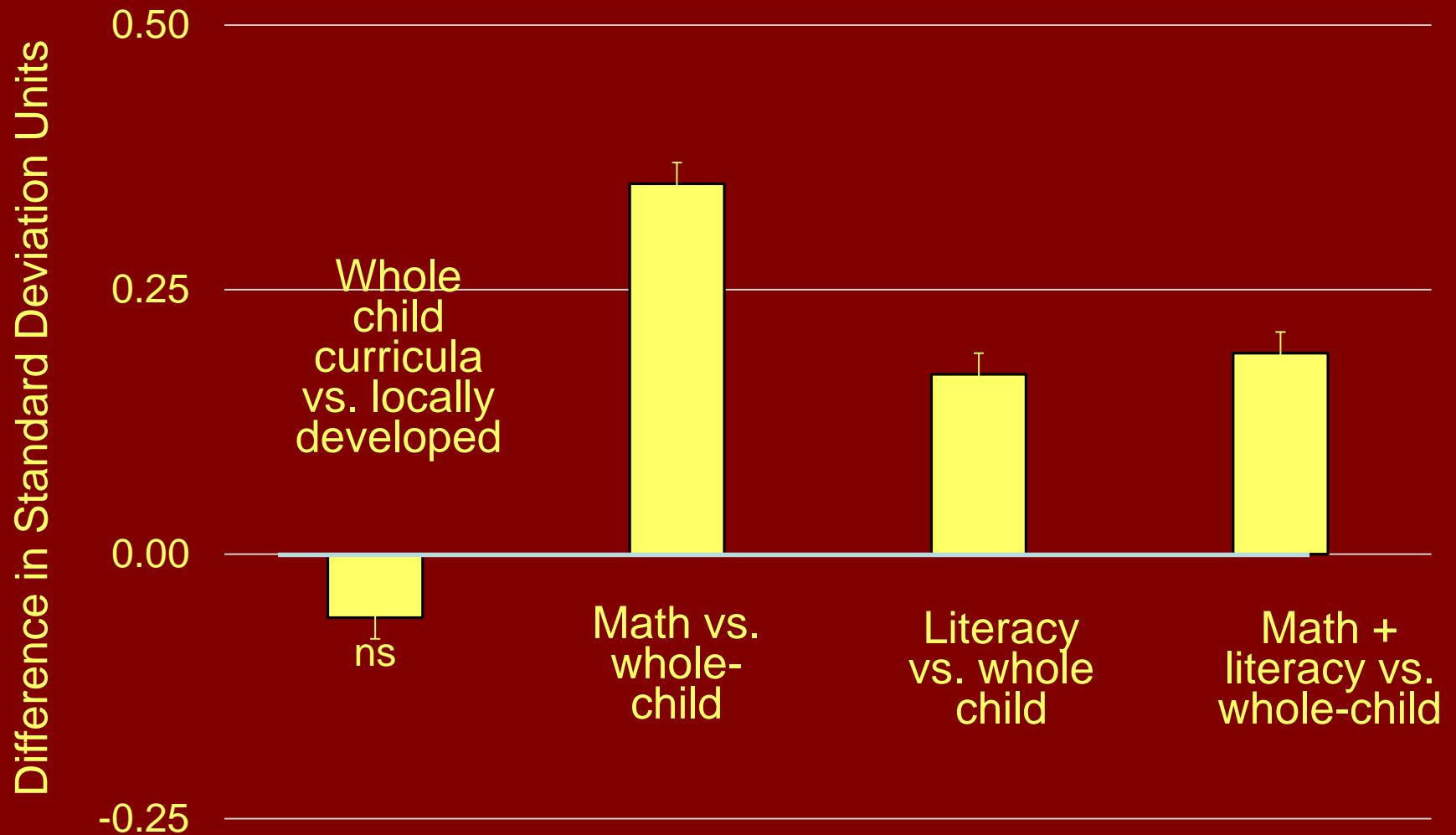
Source: Nguyen's (2016)

Impacts of Various Curricula on Academic Outcomes



Source: Nguyen's (2016)

Impacts of Various Curricula on Academic Outcomes



Source: Nguyen's (2016)

Curriculum Policy Lever

- Mandated (whole-child) curricula do not appear to work
- Stronger evidence that academically-focused curricula do promote school readiness

We know how to boost
math (and literacy) in
Pre-K

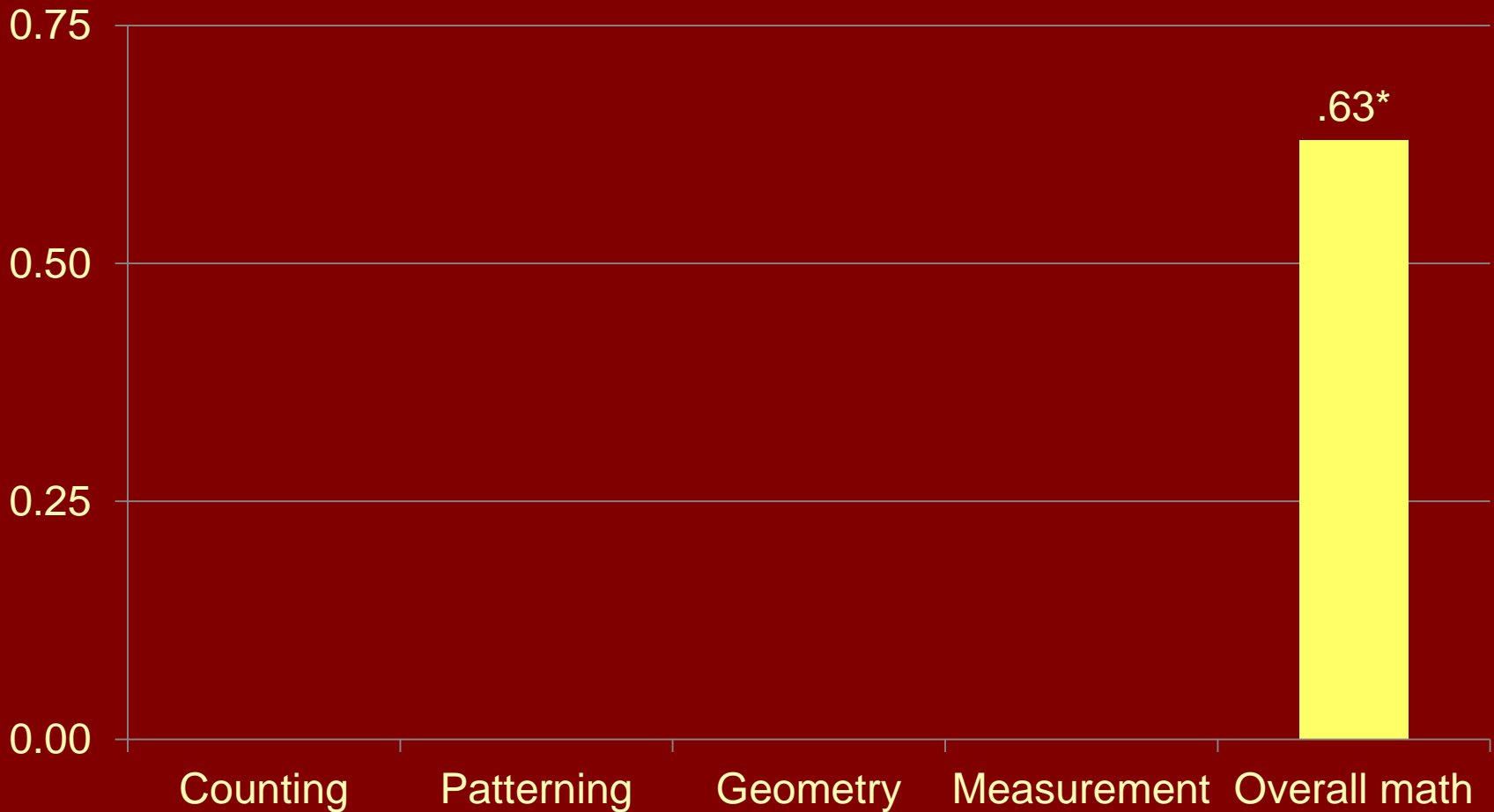
What happens after that?

Building Blocks is a proven pre-K math curriculum

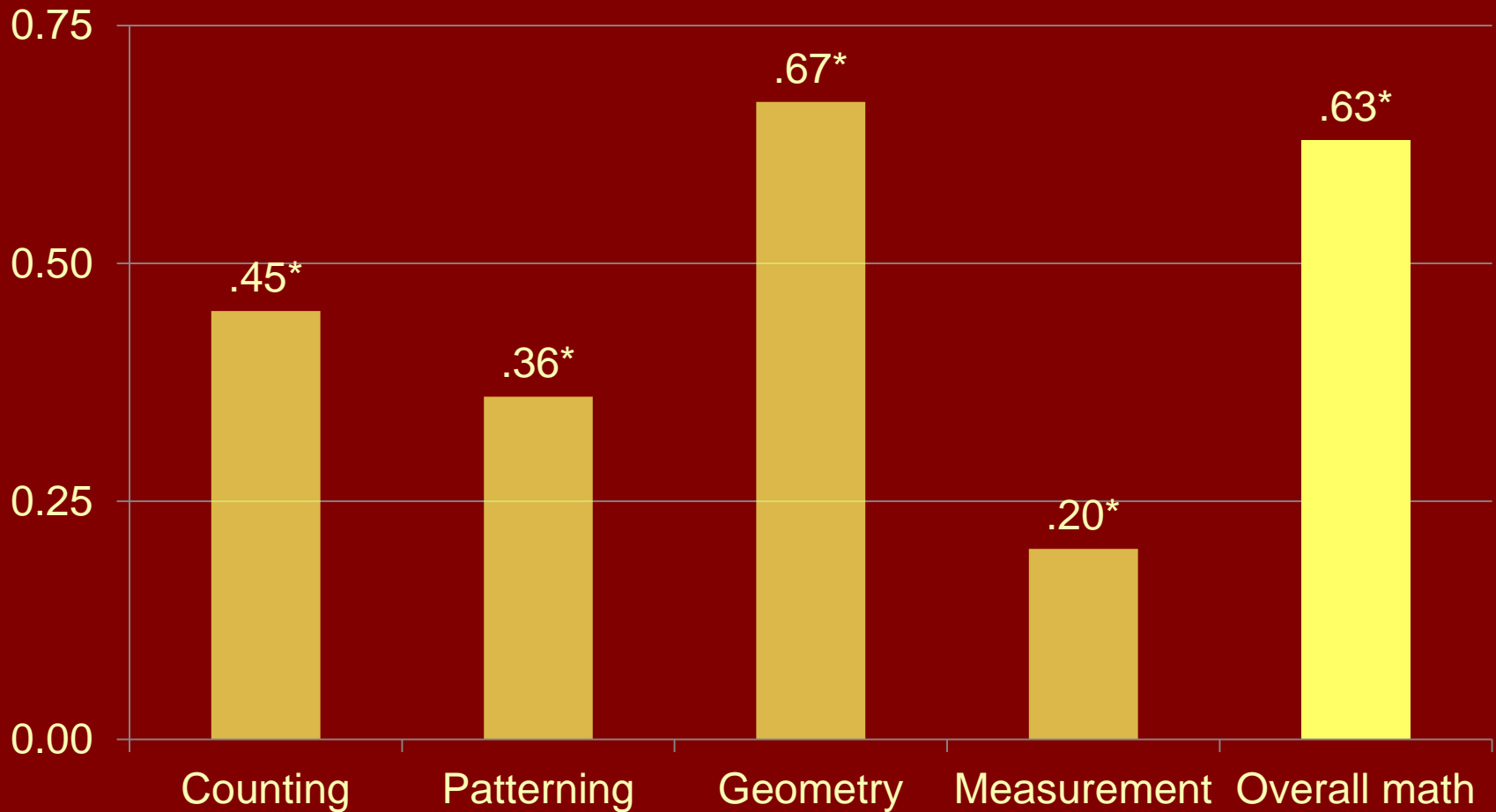
- Developed by Doug Clements and Julie Sarama
- Play-based curriculum that supplements existing curricula
- Uses print, manipulative and computers



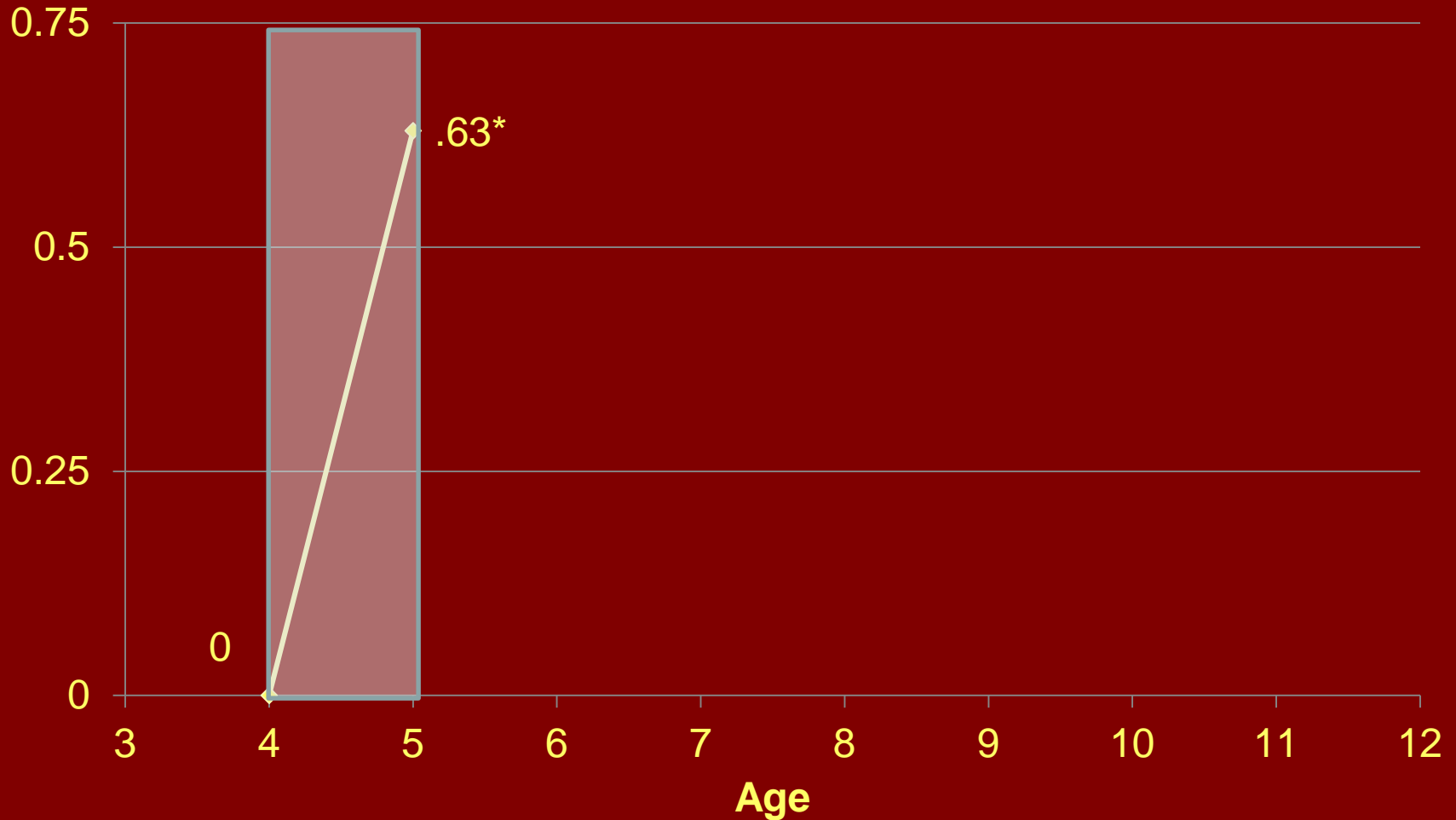
Impacts of Building Blocks at the End of Pre-K (Buffalo and Boston)



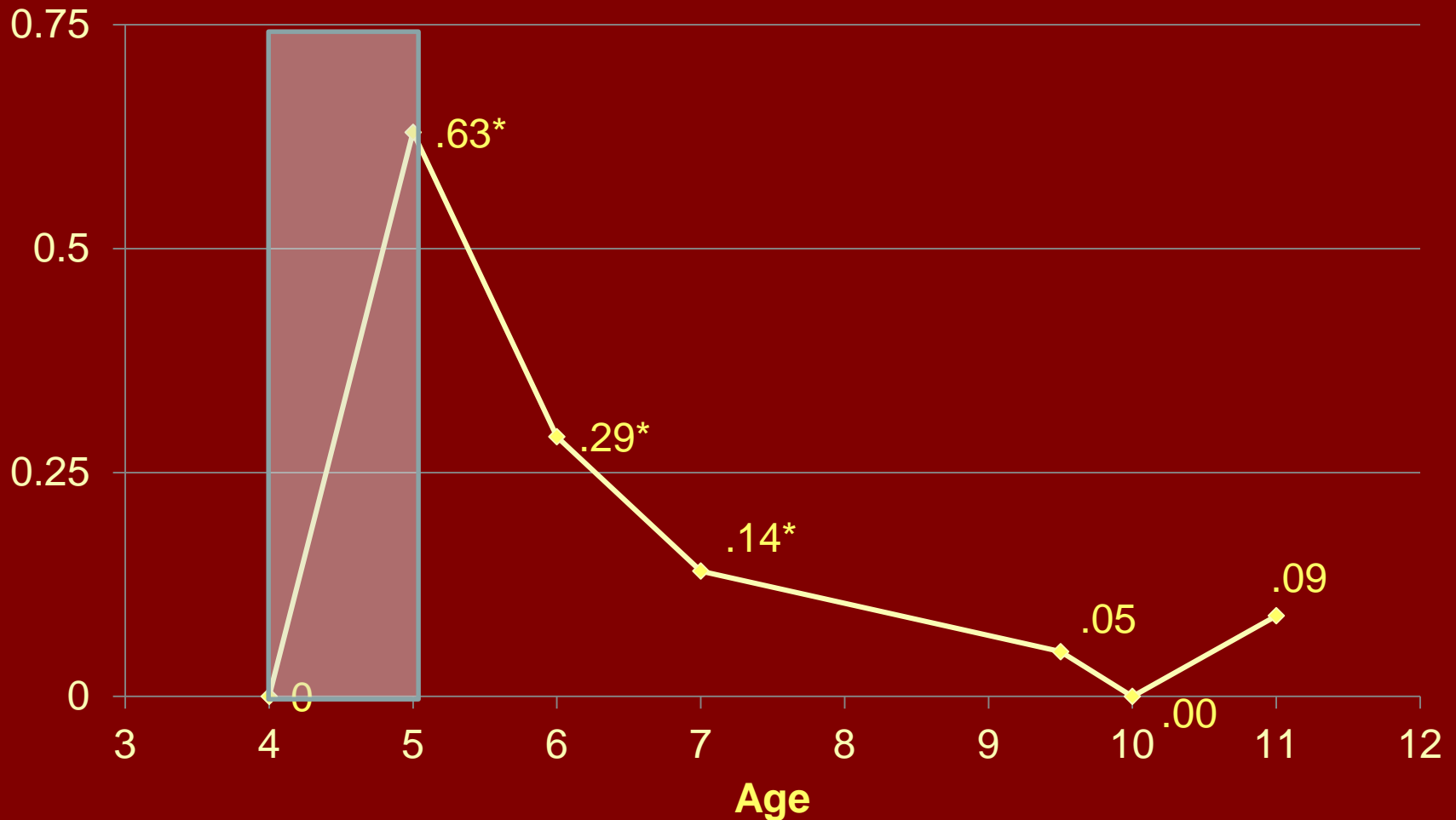
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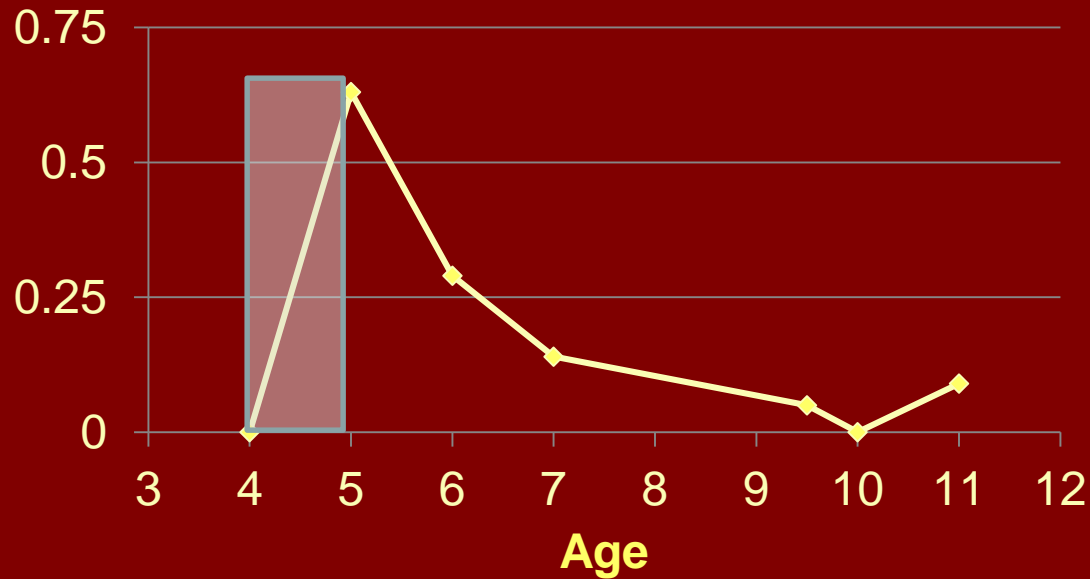
Impacts of Building Blocks Through Fifth Grade



Impacts of Building Blocks Through Fifth Grade

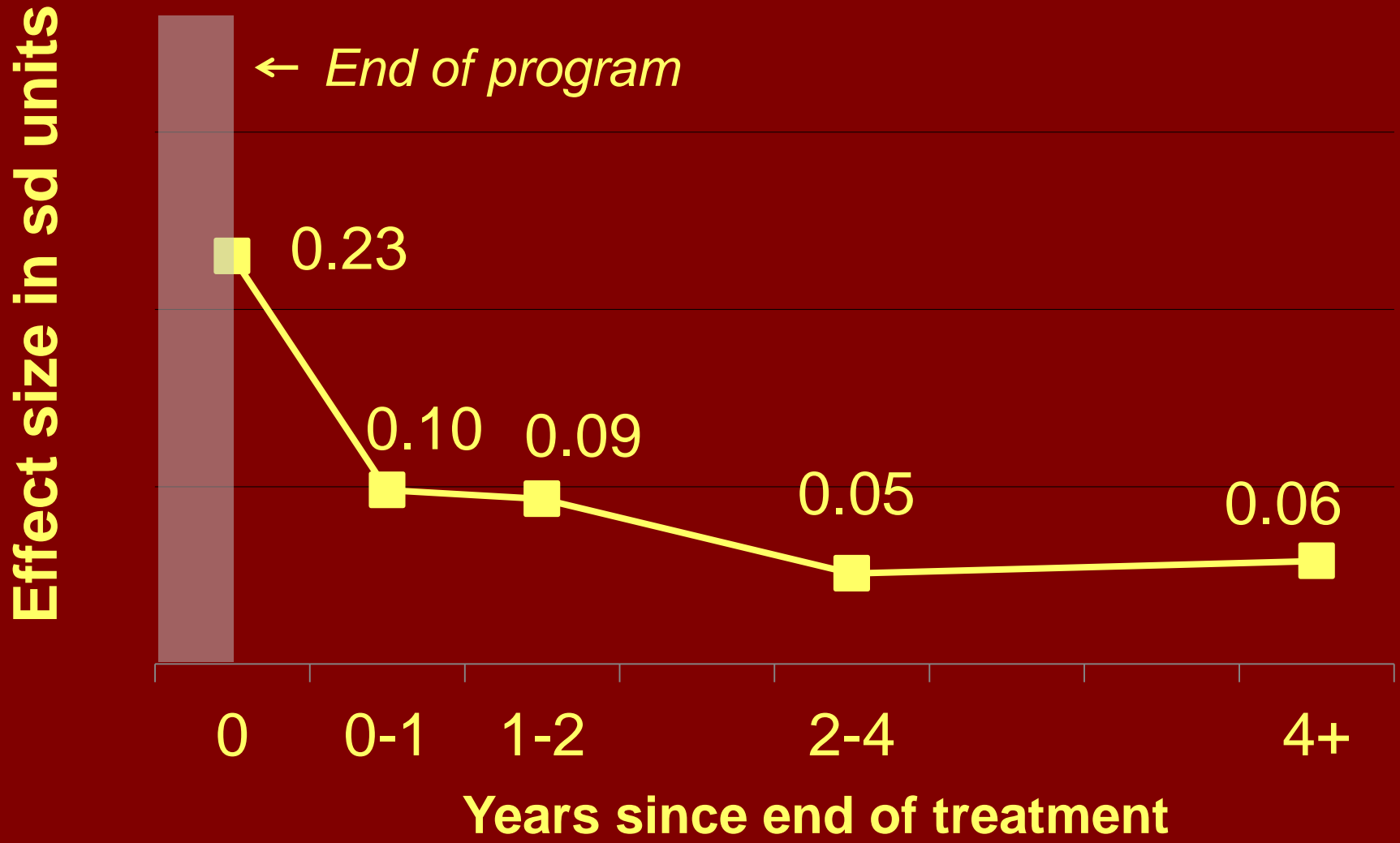


The Challenge:



**Boost *and sustain* early math
(and literacy) skills**

Fade out in cognitive impacts in 67 ECE studies



Huge disappointment

Why the fadeout/catch-up?

- Academic skills taught in pre-K are quickly learned in K
- Need to teach basic skills AND provide early-grade “charging stations” for pre-K skills
- Need curriculum alignment and coaching how to teach children with different math skills

Non-solutions:

- Turn preschool into a stressful, worksheet-laden, regimented mini-elementary school

Possible ways of sustaining ECE impacts:

- Train preschool and early-grade teachers to teach numeracy and literacy
- Use proven play-based pre-K curricula
- Integrate and (co-locate?) preschool and K-3 instruction
- Focus on Common Core-type learning goals and use preschool to prepare children for them

Possible ways of sustaining ECE impacts:

- Alignment
- Alignment
- Alignment



Social Policy Report Brief

What Does PK - 3 Instructional Alignment Mean for Policy and Practice?

The Society for Research in Child Development (SRCD) is an international, interdisciplinary organization of scientists, established in 1933 by the National Academy of Sciences.

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This brief summarizes a longer report available online at www.srkd.org under *Social Policy Report* on the Publications tab.



Why Does This Matter?

With most 4 year olds in the United States now in center-based early care, the need for aligning instruction from preschool through the early grades (PK-3) has become more pressing. Yet so far there has been little guidance on how to create alignment. Research on PK-3 alignment seeks to provide general principles for creating instructional continuity that sustains and enhances student learning.

Background

- PK-3 alignment is intended to provide a continuous education to sustain gains made in preschool and increase learning through the early elementary grades.
- Some PK-3 initiatives have endeavored to improve children's early educational opportunities and sustain the benefits of high-quality early care and education by continuing services (e.g., health, nutrition) and providing other resources (e.g., reduced class sizes) that are typically connected to preschool programs.
- Little is known about the effects on instruction of many policy changes designed to promote PK-3 coherence (e.g., putting preschools and elementary schools in the same place, putting preschools under the auspices of elementary school principals).
- Continuity in instructional practices is less likely if: a) state and district standards and assessments for preschool are not well aligned; b) preschool standards and assessments are not aligned to those for early elementary grades; and c) schools do not provide opportunities for teachers to collaborate across grades.

Research can guide efforts to create a coherent educational experience for children in which each grade from pre-K through the early elementary years builds and elaborates on what was learned the previous year (PK-3 alignment).

- Deborah Stipek, SRCD *Social Policy Brief, 2017*

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