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Adam Gamoran is the John D. MacArthur Professor of Sociology and Educational Policy Studies and Director of the Wisconsin Center for Education Research at the University of Wisconsin-Madison. His research focuses on inequality in education and school reform. His publications include edited books such as *Standards-Based Reform and the Poverty Gap: Lessons for No Child Left Behind* (Brookings Institution Press, 2007) and, with Yossi Shavit and Richard Arum, *Stratification in Higher Education: A Comparative Study* (Stanford University Press, 2007).

Gamoran's current research includes large-scale randomized trials to test the impact of education reforms. One study examines the impact of professional development on science teaching and learning in elementary schools in Los Angeles. Another of his studies assesses a program to promote parent involvement in schools with high concentrations of Latino families in Phoenix and San Antonio. He is a member of the National Academy of Education, and he serves on a variety of national committees, including the National Research Council's Board on Science Education. He chairs the congressionally-mandated Independent Advisory Panel of the National Assessment of Career and Technical Education for the U.S. Department of Education, and in 2010, he was appointed by President Obama to serve on the National Board for Education Sciences.

Evidence-Based Investments in Education: What Research Tells Us about Strategies to Elevate Student Academic Performance

Educators and policy makers have long bemoaned the quality of research on education. “Oh my God,” declared educational historian Diane Ravitch as she told the story of her experience in a New York hospital, “What if, instead of medical researchers, I were being treated by education researchers?” In contrast to this bleak depiction, little by little, education research is becoming an evidence-based endeavor. Increasingly, researchers recognize the central challenge of distinguishing education effects from selection effects (that is, effects that reflect the selection of participants into programs, as opposed to the effects of the programs themselves). More and more studies use methods that address the potential for such biases. Compilations and syntheses of rigorous studies are increasingly available, notably at the U.S. Department of Education’s What Works Clearinghouse. These syntheses are the building blocks of a reliable knowledge base for investments in education.

The purpose of this presentation is to discuss possible investments in Israeli education that are likely to pay off with increased productivity – that is, greater learning as reflected by higher scores on achievement tests. Three areas of investment seem most fruitful: personnel, tools, and systems.

While my remarks draw on the best available evidence to date, it is important to recognize that even the best evidence is likely to be context-specific. Even where evidence of effectiveness is available, education researchers have made little progress in identifying which investments pay off for whom and under what circumstances. Thus, decisions about new investments in Israeli education, to the extent they are based on international evidence, should be preceded by careful local research before being implemented on a large scale.

Personnel

Teachers have powerful effects on student learning; from the standpoint of students, it matters a great deal as to whether a student encounters high-performing or low-performing teachers. However, the research is equivocal as to what effective teachers do that makes them more successful than others. Lacking such knowledge, recent policy proposals advocate assessing teacher performance by monitoring student test scores, and firing teachers who do not measure up. Though such a stark policy would be difficult to implement, the evidence does support using student achievement growth as one component of a teacher evaluation system. Unfortunately this policy would be difficult to implement in Israel because students are rarely tested in a uniform way.



Other strategies for improving teacher quality have focused on *incentives* and *development*. Recent studies from the U.S. provide clear evidence that compensation incentives for teachers do not suffice to elevate teacher performance in raising student test scores. The ineffectiveness of compensation strategies suggests that even if teachers are motivated to perform better, they lack the tools or working conditions to do so. Other policy advocates recommend working with teachers to improve their skills as a way to elevate teacher quality. While there is an emerging consensus on the elements of effective professional development programs – including an emphasis on teacher knowledge and capacity to teach particular content – reliable evidence is in short supply. Evidence about high-quality teacher preparation programs is even more scarce, although teacher content knowledge for teaching is likely to be equally important in that realm.

As with teachers, recent evidence suggests that student performance may be a reliable component of principal evaluations, in addition to other sources of evidence.

Tools

The most important tools that educators have at their disposal are time and materials. The Taub Center's 2009 *State of the Nation* report indicated that compared to other countries, Israeli schools devote a substantial amount of time to instruction, but not necessarily in core academic subjects. This is problematic because time devoted to instruction in a subject area is one of the strongest correlates of student achievement.

Current evidence suggests that curricular variations across nations and, within the U.S., across states are linked to variations in student performance. Curricula that are more focused, coherent, and rigorous constitute an essential instructional tool that, if implemented effectively, can elevate student achievement. This proposition has been tested in a variety of arenas, but the best evidence comes from comparisons of student learning opportunities within and across schools. Not surprisingly, students tend to learn more when they have richer opportunities for learning. This line of work speaks to the current debate over a core curriculum in Israel, suggesting that a move to a core curriculum would elevate student achievement in the curricular areas that would become more focused, coherent, and rigorous.

Systems

Systemic changes in education may be examined at the level of the nation, state, local authority, or school. I will focus on elements at the school and local authority level that have been subjected to rigorous research. First among these is class size. My reading of the evidence indicates that lowering class size in kindergarten and first grade contributes positively to student achievement. This effect persists over time but it does not increase regardless of the size of classes in later grades. It is important to note that this evidence comes from changes in the sizes of classes that are already relatively small, e.g. from 23 students to 17 students. Because classes are much larger in Israel, particularly at the lower secondary level, the effect of class size reduction could be much larger in Israel.



A second systemic element is curricular differentiation. In general the practice of tracking – dividing students into different streams of classes that channel them toward different future directions – exacerbates inequality without raising productivity because gains in high tracks are offset by losses in low tracks. However a comparative study of Israel and the U.S. showed that differentiation within Israeli academic secondary programs – i.e. offering courses at different levels of preparation for the matriculation examination – helped reduce inequality, presumably because in contrast to the U.S., where students in low-level classes lack incentives for performing well, Israeli students have positive incentives to perform well even on lower-level matriculation examinations.

Evidence is also available on various aspects of school climate that may elevate student academic performance by supporting conditions for effective classroom instruction. Such conditions may include strong ties with parents, a student-centered learning climate, and instructional guidance for teachers.



Evidence-Based Investments in Education

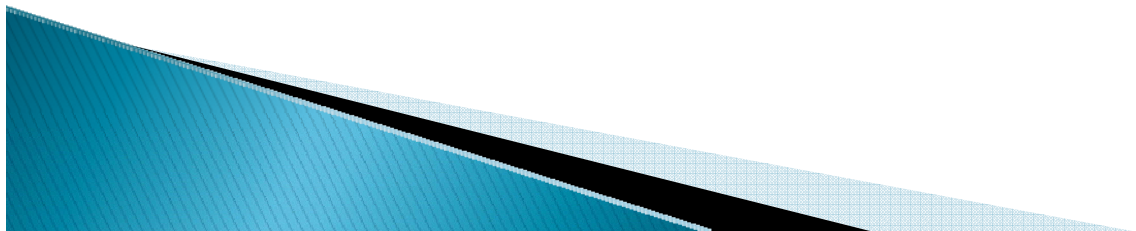
What research tells us about
strategies to elevate student
academic performance

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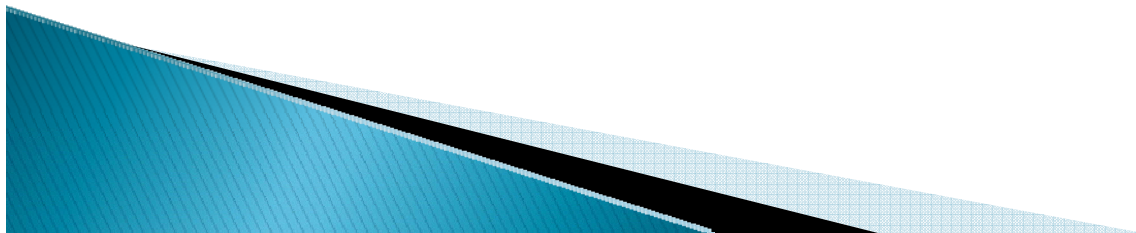
Evidence and Education Research

- ▶ What evidence speaks to investment decisions in education programs and policies?
- ▶ Historically – not much
 - Education research has been long on description, short on prediction
 - Research plagued by inability to distinguish effects of **programs** from effects of **who is in the program**, and who isn't
 - Selection bias



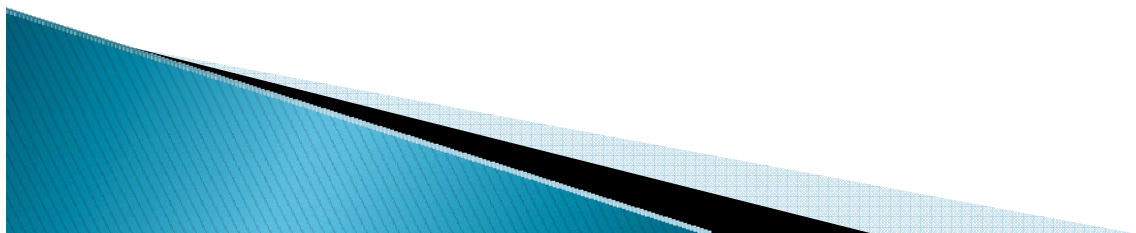
Evidence and Education Research

- ▶ Today, education research is becoming more evidence-based
 - Use of research designs and statistical techniques that address selection bias
 - Funding from the Institute of Education Sciences
 - Compilations and syntheses of evidence
 - What Works Clearinghouse
- ▶ Building blocks of a reliable knowledge base



Evidence and Education Research

- ▶ My comments are based on evidence that can be reasonably interpreted as causal
- ▶ HOWEVER – even the best causal evidence may be context-specific
 - We know too little about what works FOR WHOM and under WHAT CIRCUMSTANCES
 - Generalizing U.S. research to Israel is problematic
- ▶ Decisions about new investments in Israel, if based on international evidence, should be accompanied by rigorous local research



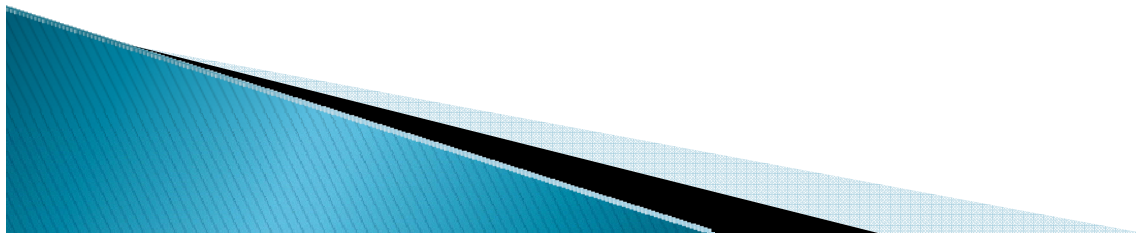
Research-Based Investments in Education Policies and Programs

- ▶ Investments that are most likely to pay off
 1. Personnel
 2. Tools
 3. Systems



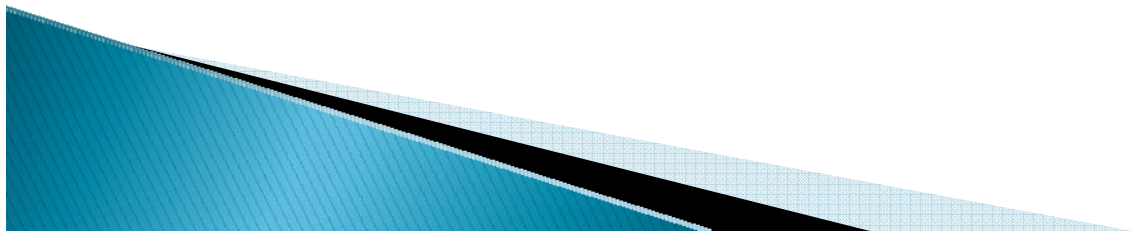
1. Investments in Personnel

- ▶ Teachers have powerful effects on student learning
 - It matters to students whether they learn with a more or less productive teacher
 - Evidence is thin on WHY some teachers are more productive than others
- ▶ Policy makers now consider assessing teacher performance based on test scores, and dismissing teachers who do not measure up



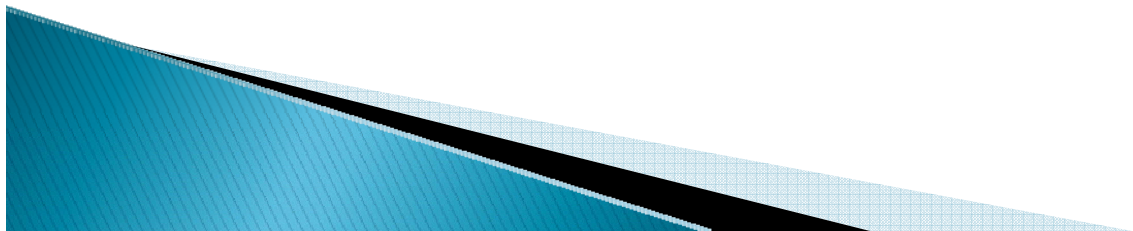
1. Investments in Personnel

- ▶ Evidence supports using student achievement growth as a component of teacher evaluation
- ▶ Cannot serve as the sole measure
 - Imprecise
 - Incomplete
- ▶ Combine with other sources of information
 - Performance evaluations
 - Include student outcomes and other evidence



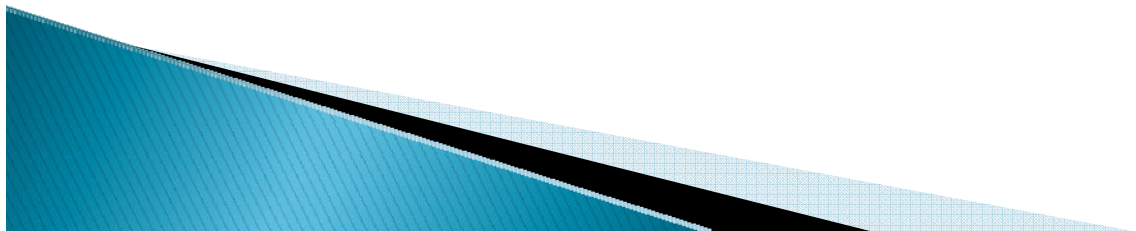
1. Investments in Personnel

- ▶ Elements of performance evaluations
 - Portfolio of practice
 - Observations of practice
 - Outcomes of practice (student learning)
- ▶ Focus of performance evaluations
 - Attention to standards
 - Use of formative assessment
 - Engagement of students
 - Teacher content knowledge
 - Relationship with students



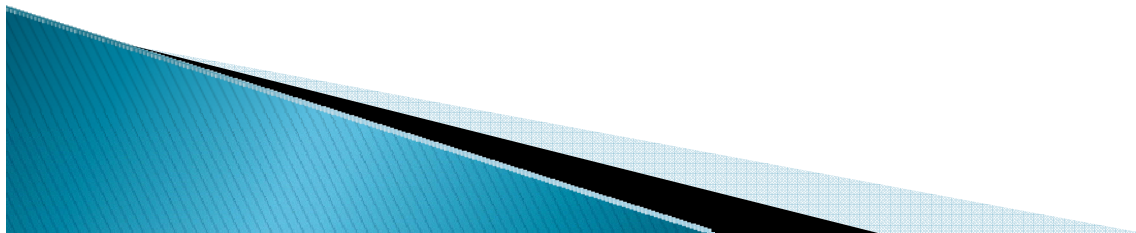
1. Investments in Personnel

- ▶ Two alternatives to evaluation and dismissal strategies
 - Incentives
 - Development



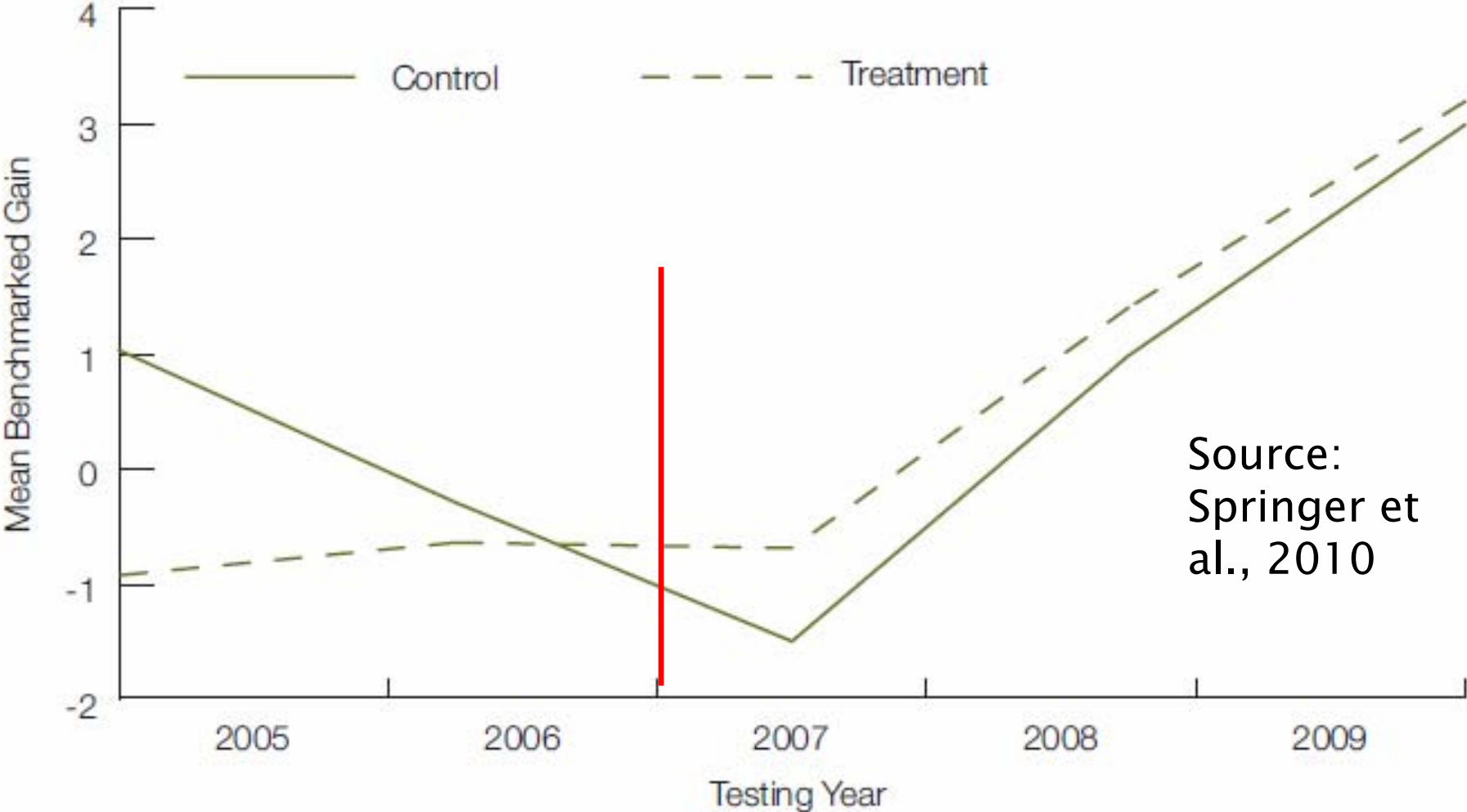
1. Investments in Personnel: Incentives

- ▶ Recent research on pay for performance yields disappointing results
 - Examples: Nashville and New York City
 - No effects on achievement after three years, despite meaningful incentives
 - Irrespective of whether awards provided to teachers (Nashville) or schools (New York City)
 - New York: no evidence of changes in practice
- ▶ Incentives may still help recruit better teachers into the profession



Effects of Teacher Performance Pay in Nashville

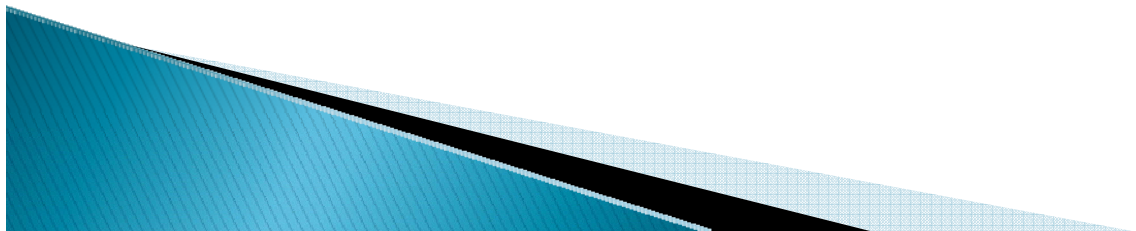
Math Achievement Trends Overall



Source:
Springer et
al., 2010

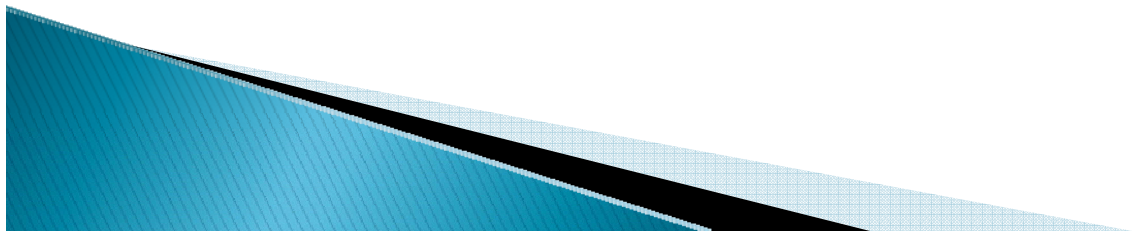
1. Investments in Personnel

- ▶ Ineffectiveness of compensation incentives for teachers suggests that motivation is not enough to improve performance
- ▶ Perhaps money is not a big motivator for teachers
 - Teachers often choose better working conditions even if it means less money
 - But there was no such tradeoff in recent studies
- ▶ More likely: teachers *are* motivated by higher pay, but lack the tools and/or working conditions to perform better



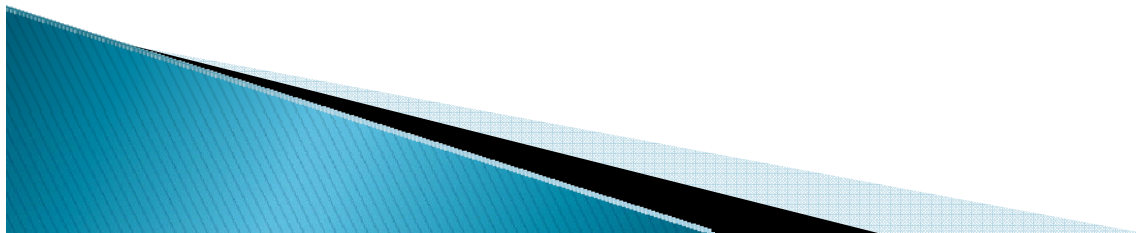
1. Investments in Personnel: Development

- ▶ Evidence on teacher development is limited
- ▶ Emerging consensus on qualities of effective teacher development
 - Focus on teachers' knowledge of subject matter, and how to teach subject matter
 - Address teachers' classroom work and the problems teachers encounter in classrooms
 - Provide multiple, coherent opportunities for teacher learning over a sustained time interval
- ▶ Not yet verified by rigorous research



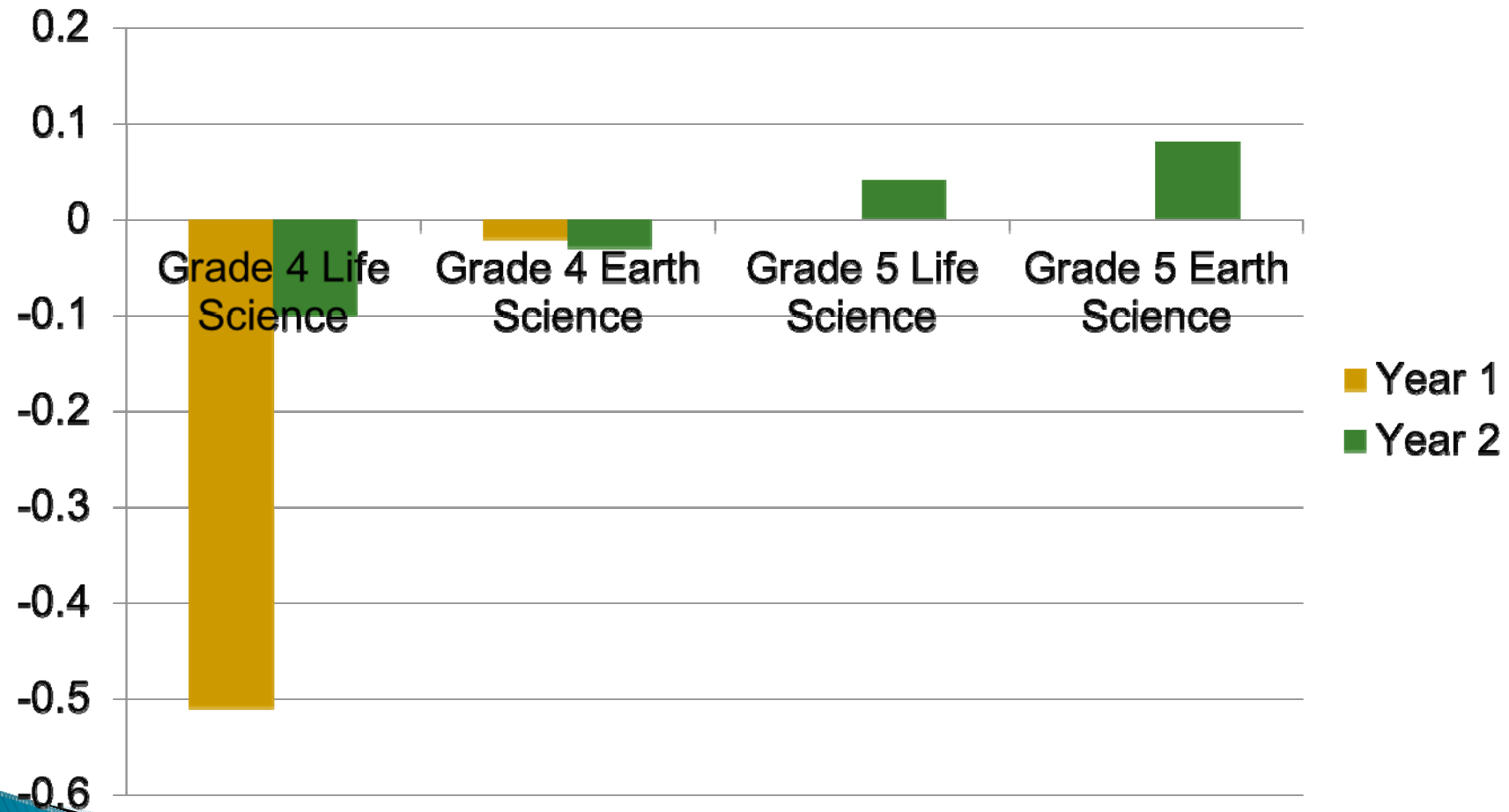
1. Investments in Personnel: Development

- ▶ Even long-term, content-focused teacher development does not guarantee enhanced performance
- ▶ Difficult to scale up and sustain
- ▶ Challenged by instabilities
 - Turnover of teachers and leaders
 - Financial constraints
- ▶ Example: Recent study in Los Angeles
 - Professional development failed to boost achievement in elementary science



Achievement Effects of Teacher Development in LA

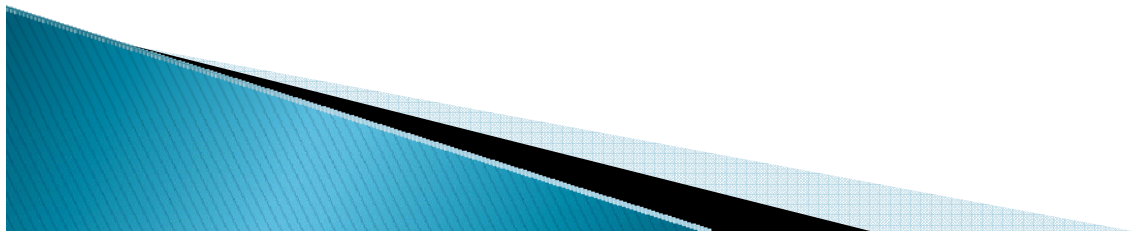
Effect Size



Source: Gamoran, Borman, & Bowdon, 2011.

1. Investments in Personnel: Leaders

- ▶ Similar issues and concerns arise for leaders
- ▶ Principals are judged on student test performance
- ▶ Problematic because not entirely under the principal's control
- ▶ New approaches to evaluating principals include test scores as one component



1. Investments in Personnel: Leaders

- ▶ Example: VAL-ED (Vanderbilt Assessment of Leadership in Education)
- ▶ Focus on **principals' learning-related leadership behavior**
 - Planning, implementing, supporting, advocating, communicating, mentoring
 - In 6 domains inside and outside the school
- ▶ National field trial suggests valid and reliable
- ▶ Not yet linked to achievement gains or school improvement

