

Evidence-Based Investments in Education

What research tells us about
strategies to elevate student
academic performance

Adam Gamoran, University of Wisconsin–Madison, USA

Part 2



1. Investments in Tools

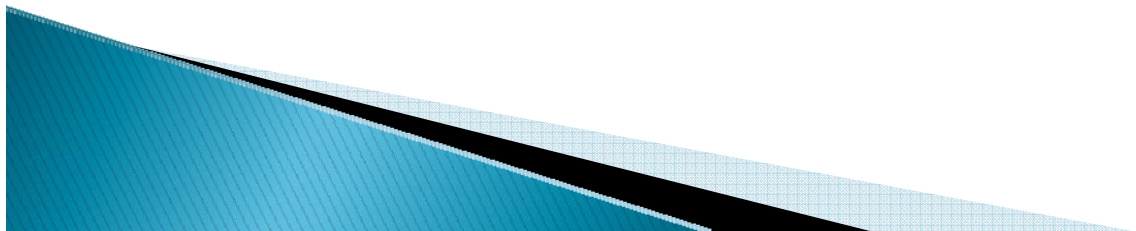
▶ Time



▶ Class size

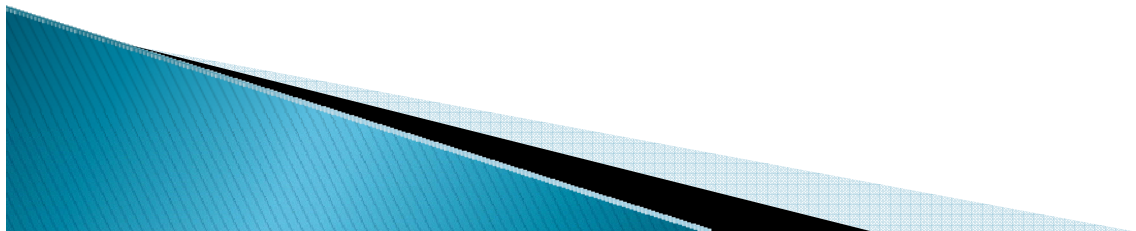


▶ Curriculum



2. Investments in Tools: Time

- ▶ Aside from personnel, time is a school's most precious resource
 - Time for teacher learning
 - Time for student learning



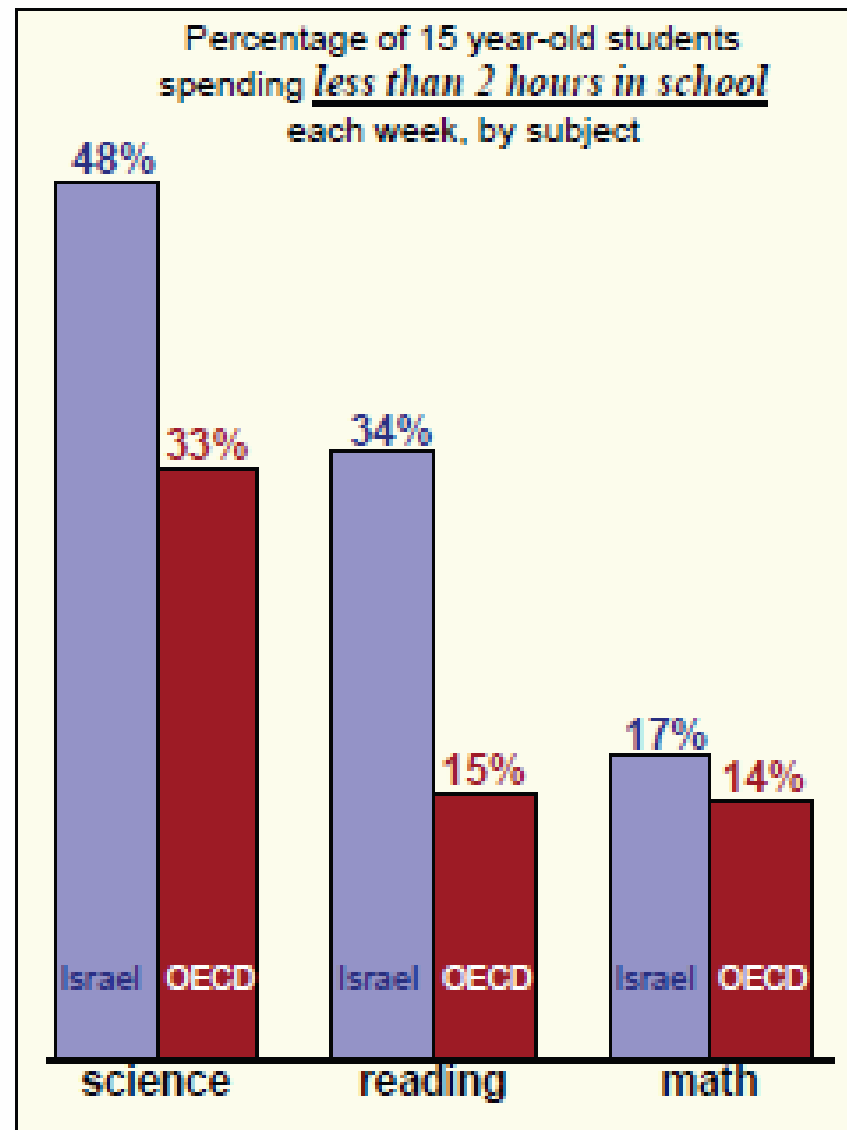
2. Investments in Tools: Time for Student Learning

- ▶ Correlational studies indicate increased time for learning leads to higher achievement
- ▶ Largely sustained in experimental studies
 - Comprehensive reforms
 - Success for All
 - Direct Instruction
 - One-on-one tutoring
 - Double time for struggling students
- ▶ *Lack* of time is often the downfall of failed experiments
 - Instructional technology study: 15 minutes/week



2. Investments in Tools: Time for Student Learning

Israeli schools spend more time on instruction than typical schools in other nations.

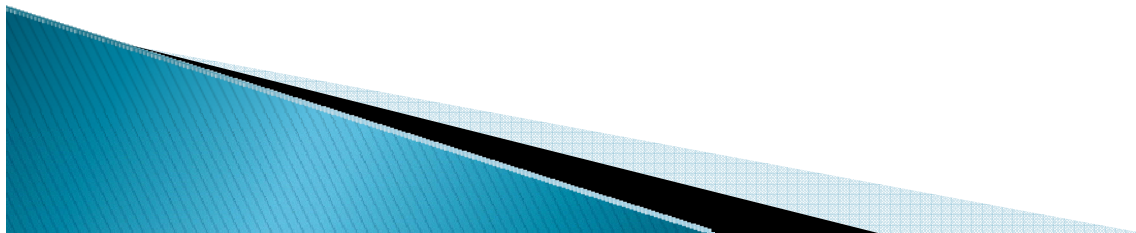


However, the extra time is not spent in core academic subjects.

Source: Ben-David, 2010.

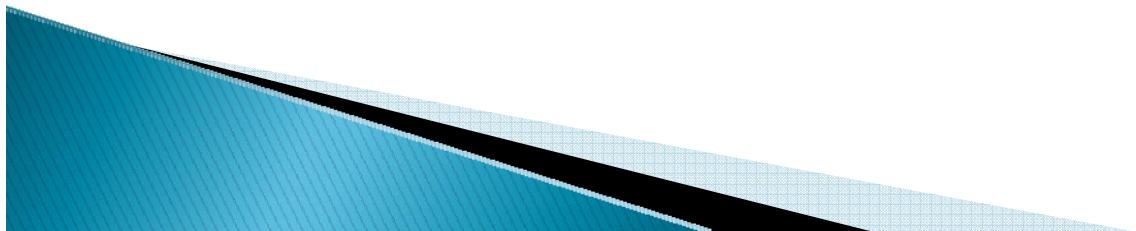
2. Investments in Tools: Class Size

- ▶ U.S. research indicates that smaller classes in the early elementary grades promote higher achievement
 - Mechanism: Better classroom management
 - Requires enabling conditions: High-quality teachers and classroom space
- ▶ U.S. class size evidence reflects comparisons of 23 versus 17 students
- ▶ Class sizes in Israel are much larger, so effects of reductions could be greater



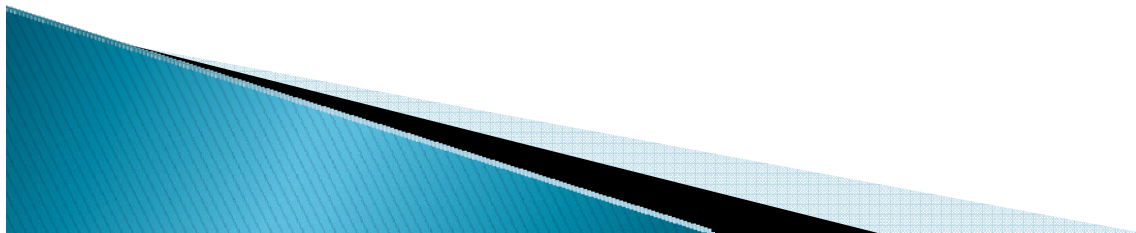
2. Investments in Tools: Curriculum

- ▶ International comparisons demonstrate that achievement is higher in countries with curricula that are more:
 - **Focused** -- Fewer content topics per grade level
 - **Coherent** -- Connected across grade levels, topics build upon one another
 - **Rigorous** -- High level of complexity
- ▶ Findings hold in math, science, and reading

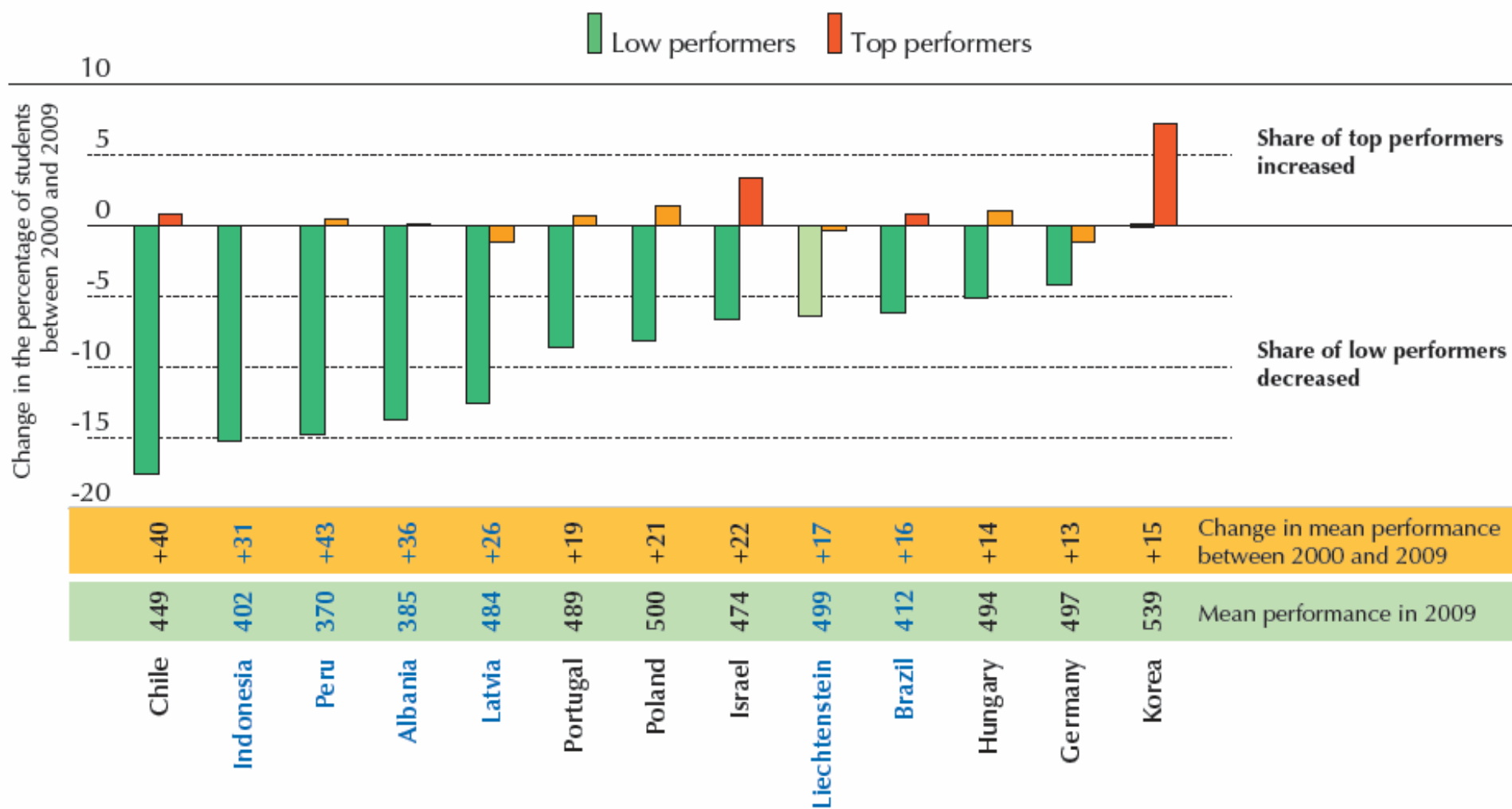


2. Investments in Tools: Curriculum

- ▶ Latest example: PISA 2009 reading
- ▶ Many countries improved performance compared to 2000, including Israel
 - Performance improved most for lowest-achieving students
- ▶ OECD: A common curriculum for all students contributes to high performance

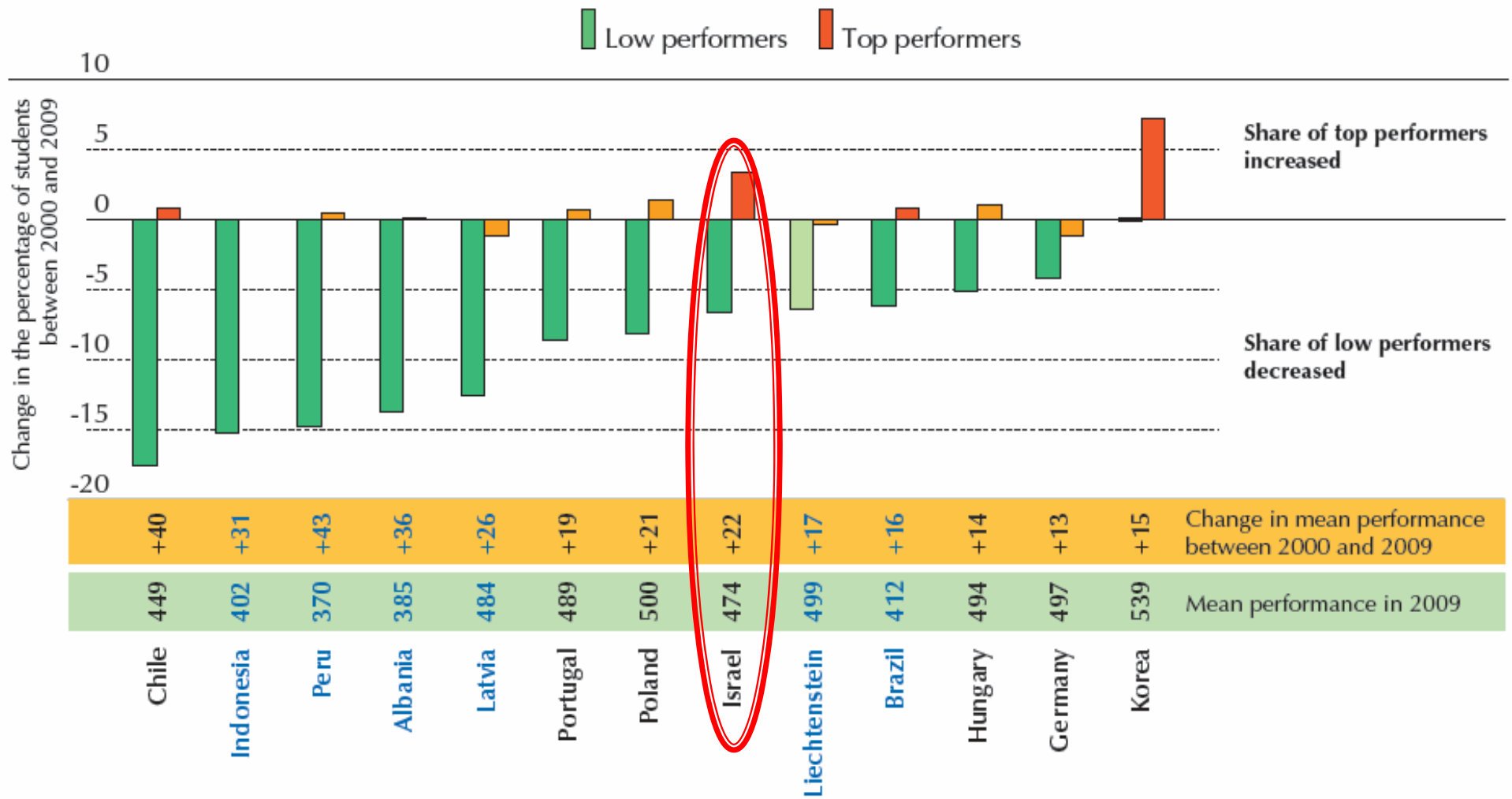


Change in the percentage of low and top performers in reading since 2000



Source: OECD, 2011

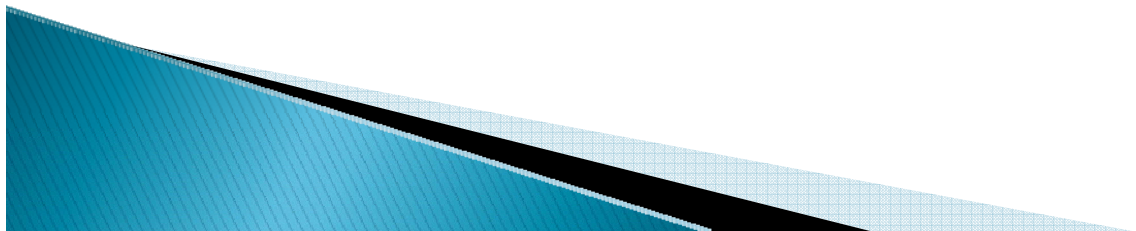
Change in the percentage of low and top performers in reading since 2000



Source: OECD, 2011

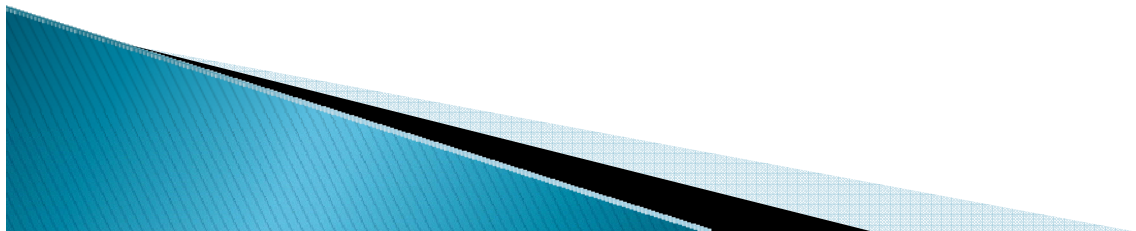
2. Investments in Tools: Curriculum

- ▶ Not clear that international differences reflect causal factors
- ▶ Within-country comparisons can help assess the causal role of curricular coherence, rigor, and focus
 - Over time
 - Across administrative regions e.g. states



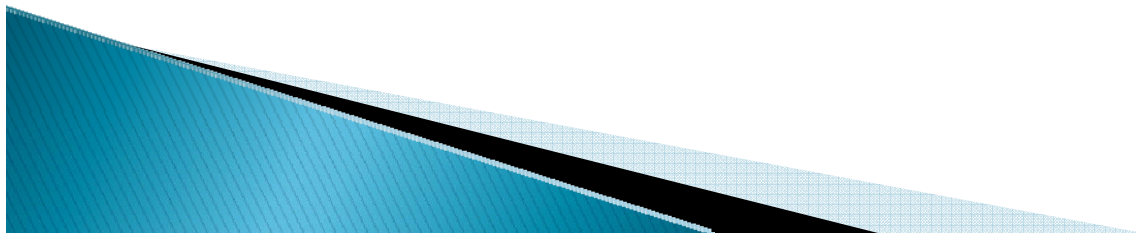
2. Investments in Tools: Curriculum

- ▶ Minnesota case study (Bill Schmidt)
 - Increases in curricular focus and coherence between 1995 and 2007 coincided with dramatic rise in TIMSS performance
 - Other states that did not exhibit changes in curricular standards did not experience changes in student performance

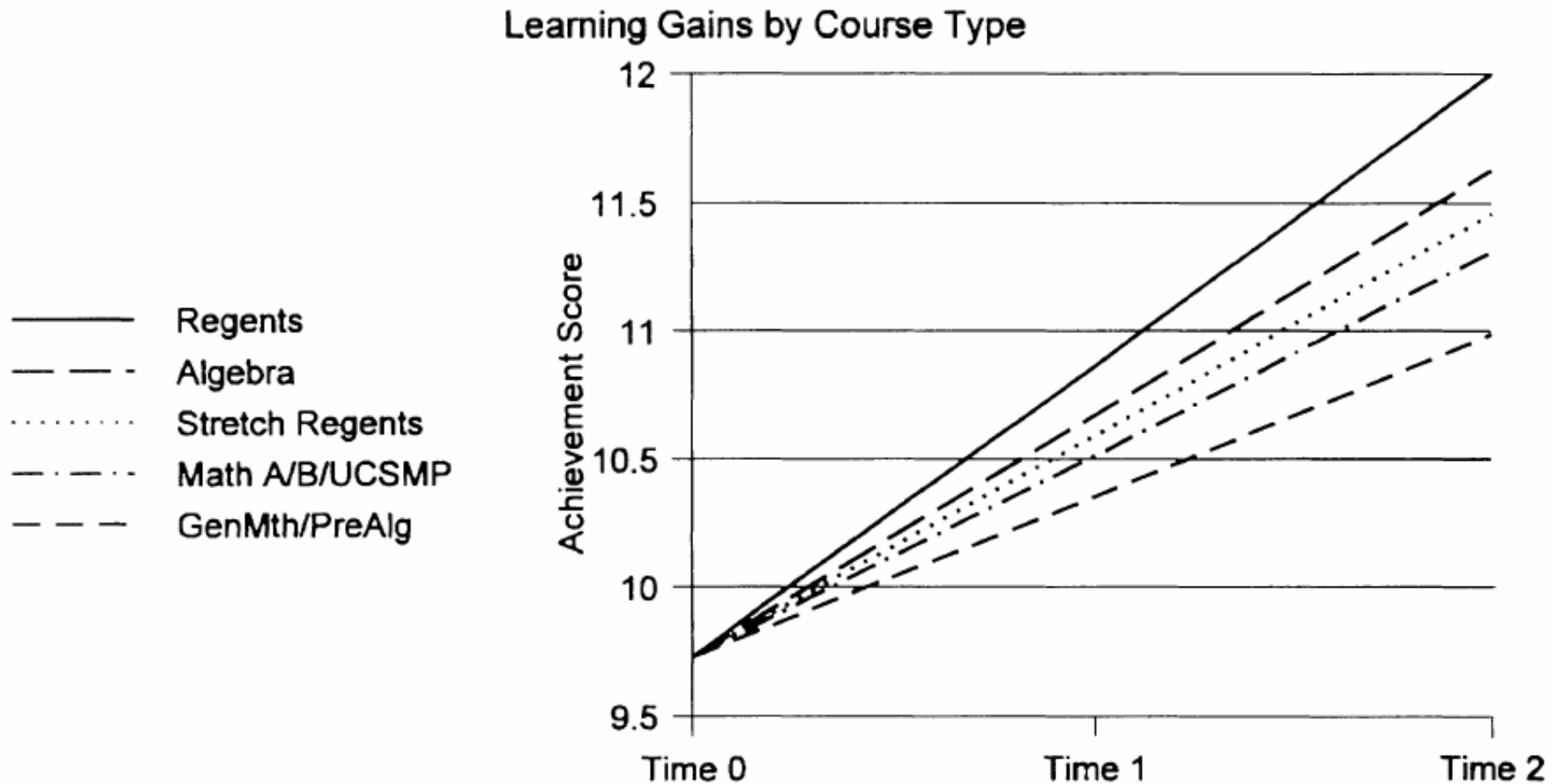


2. Investments in Tools: Curriculum

- ▶ Another example: Upgrading the high school mathematics curriculum
- ▶ New York and California
- ▶ Elimination of low-level, dead-end courses
- ▶ Replaced by “transition” courses designed to bridge the gap between elementary and advanced mathematics
- ▶ Found: enhanced performance, attributable to greater curricular coverage

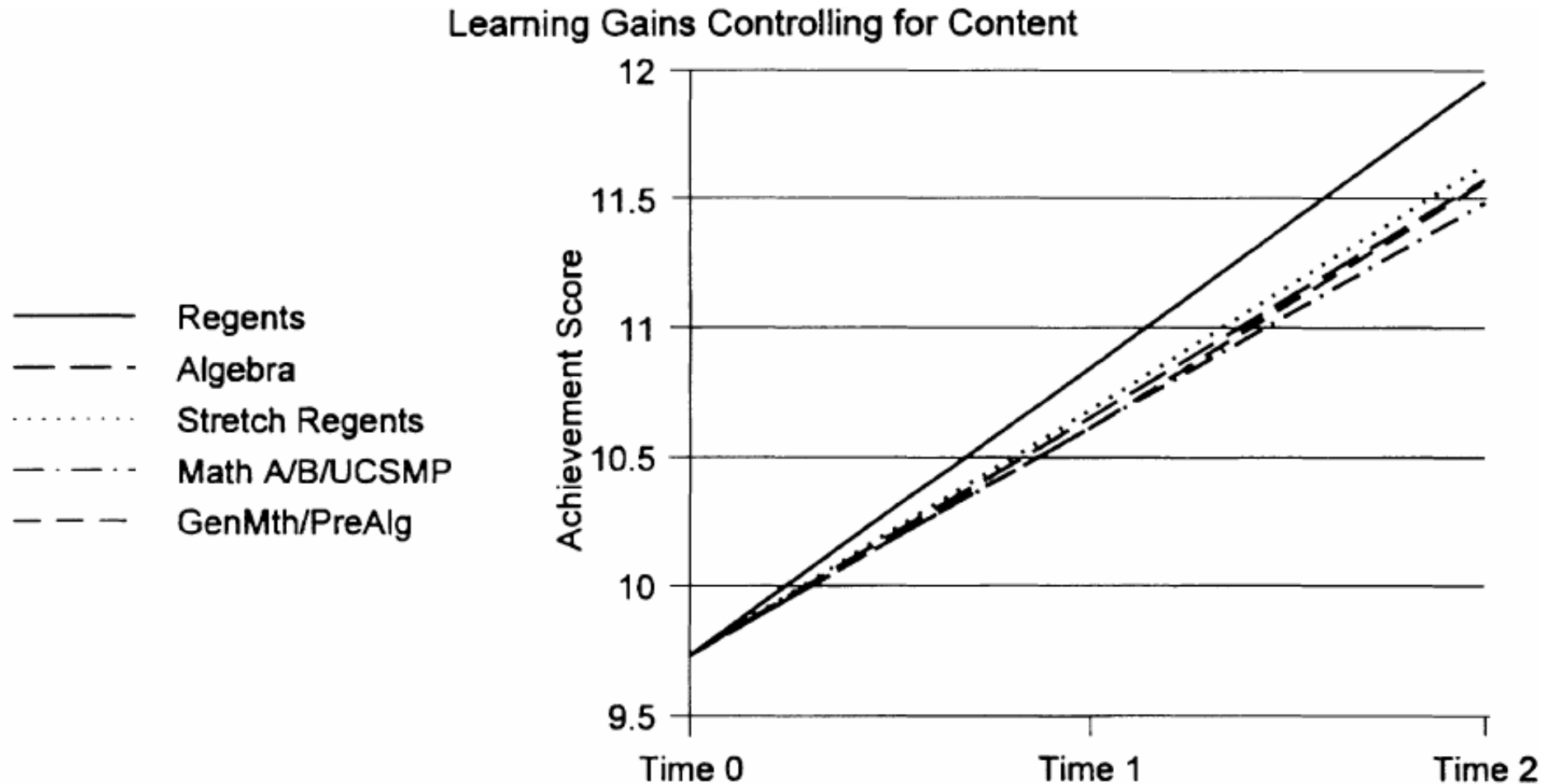


Increasing Curricular Rigor in U.S. Secondary Math



Source: Gamoran, Porter, Smithson, & White, 1997

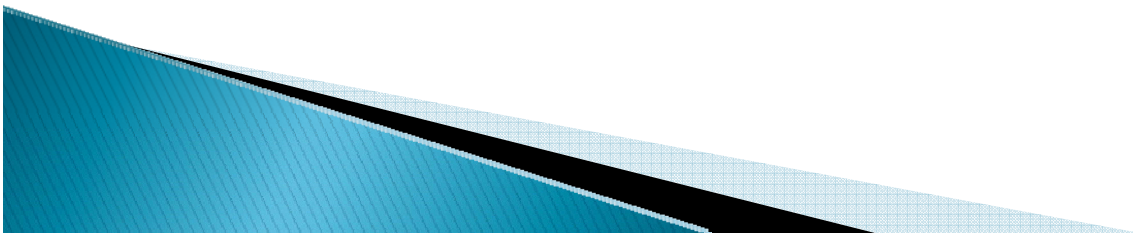
Increasing Curricular Rigor in U.S. Secondary Math



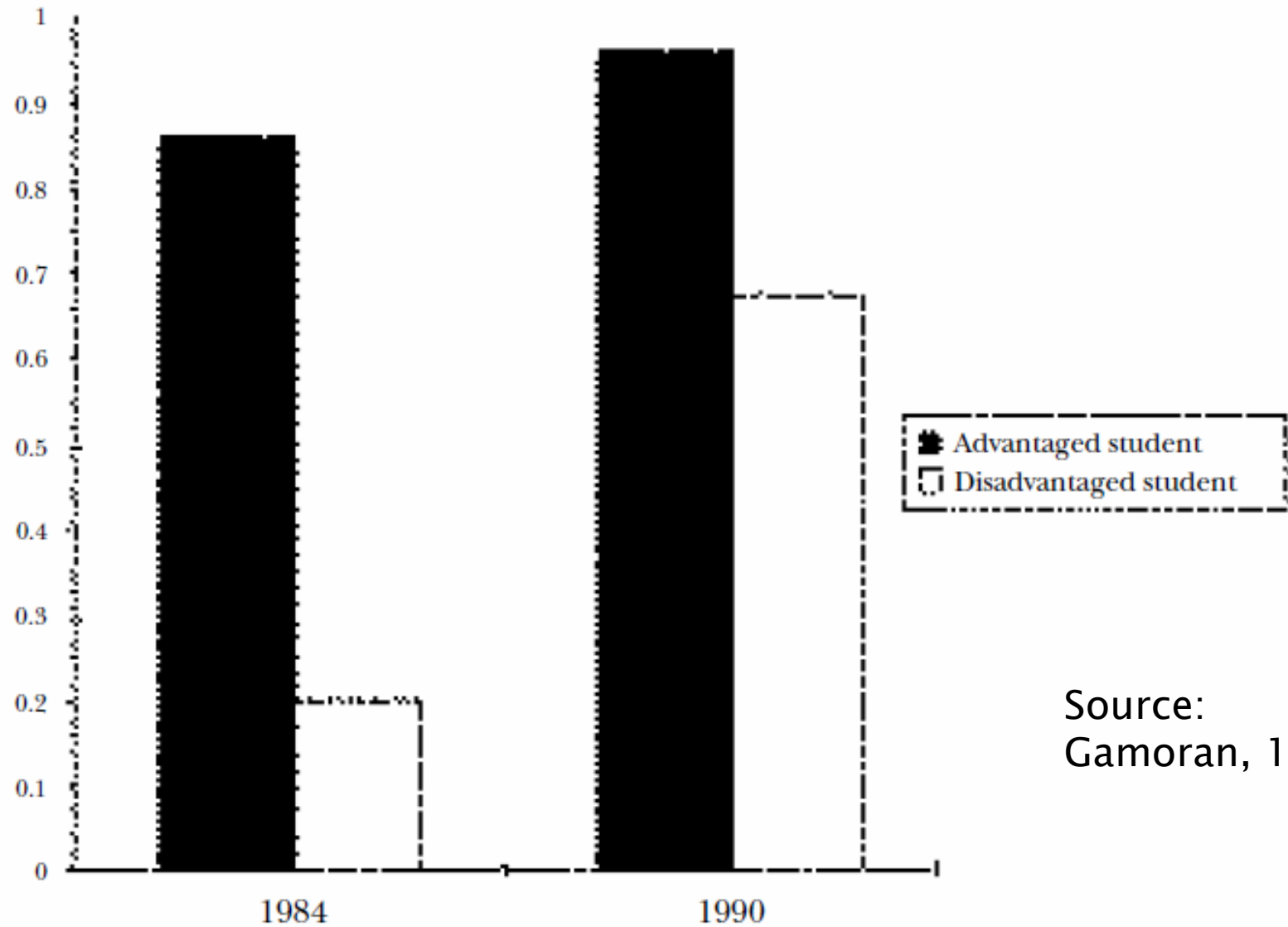
Source: Gamoran, Porter, Smithson, & White, 1997

2. Investments in Tools: Curriculum

- ▶ Another case: Reform of the Scottish secondary curriculum in the 1980s
- ▶ Increased access to the academic secondary curriculum
- ▶ Boosted academic performance
- ▶ Largest effects for more disadvantaged students



Increasing Curricular Rigor in Scotland, 1984–1990

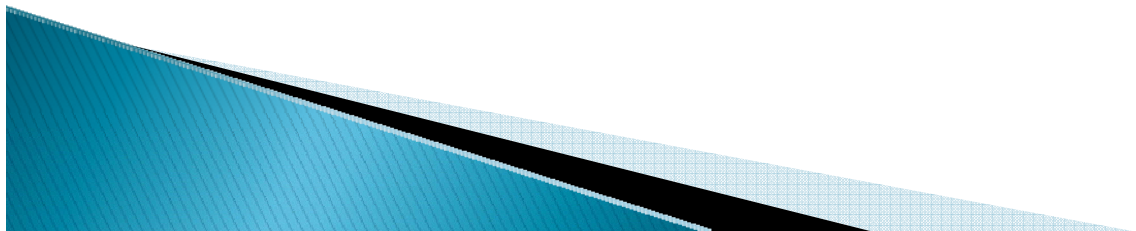


Source:
Gamoran, 1997

Figure 3. Changes in Probabilities of Obtaining a Mathematics Award at Age 16

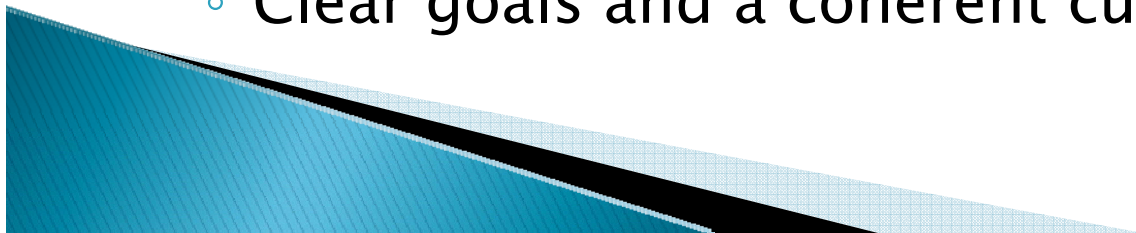
3. Investments in Systems

- ▶ Systemic improvements may be necessary to allow teachers to become more productive
 - Organizational conditions that support teaching
 - Climate that supports learning



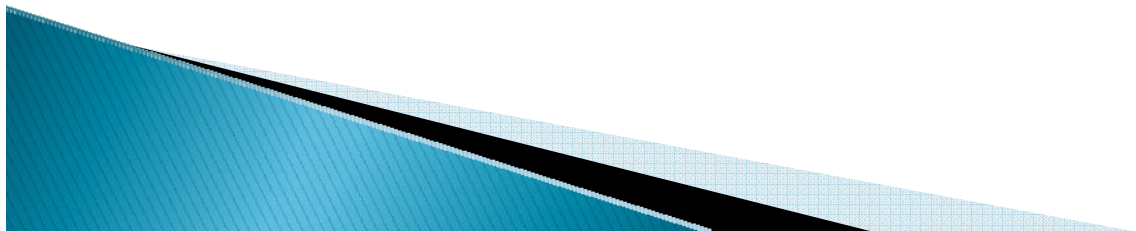
3. Investments in Systems: Organizational Conditions

- ▶ Chicago study of organizational supports for learning
- ▶ Findings based on relation between school conditions and value-added achievement growth
- ▶ Five essential supports for learning
 - Leadership that is strategic and focused on instruction
 - Positive parent–community ties
 - High capacity teaching faculty
 - Safe and orderly learning environment
 - Clear goals and a coherent curriculum



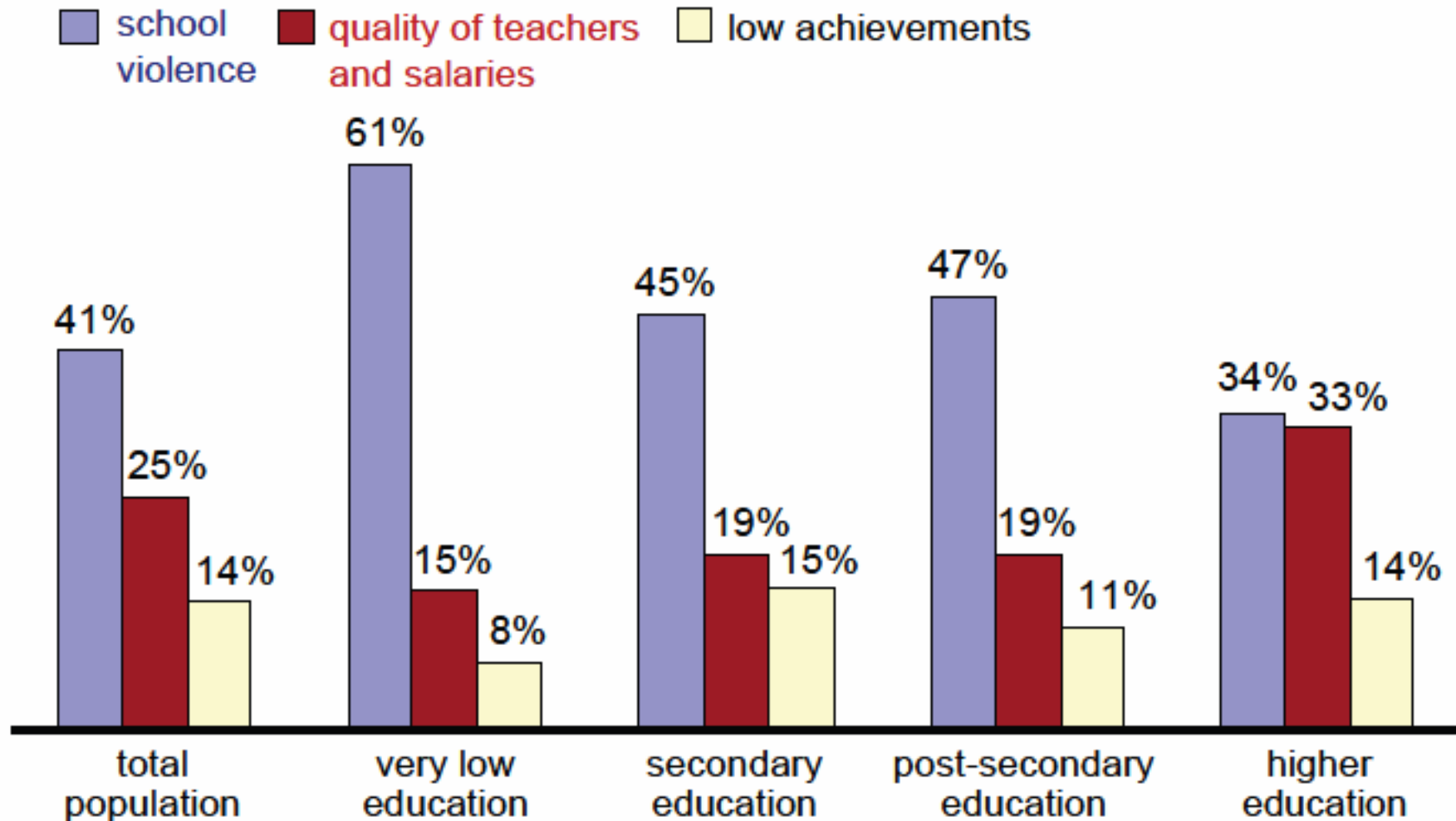
3. Investments in Systems: Student Climate

- ▶ When Israeli parents are asked about the biggest problem facing schools, they do not focus on low achievement
- ▶ Particularly among parents from disadvantaged backgrounds, school violence is seen as the greatest problem



The Education System's Primary Problem*

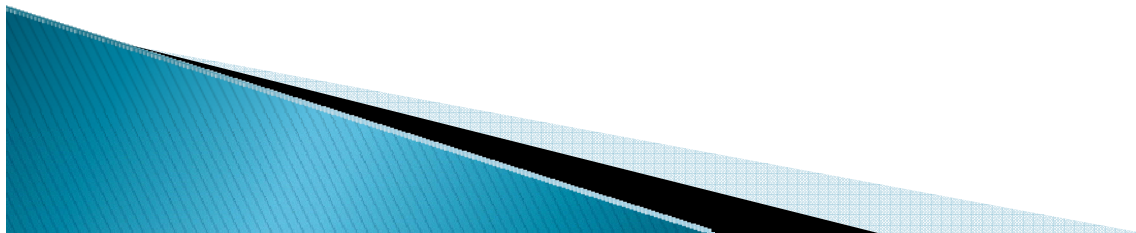
by education level, 2009



Source: Blass & Nachshon-Sharon in Ben-David, 2010.

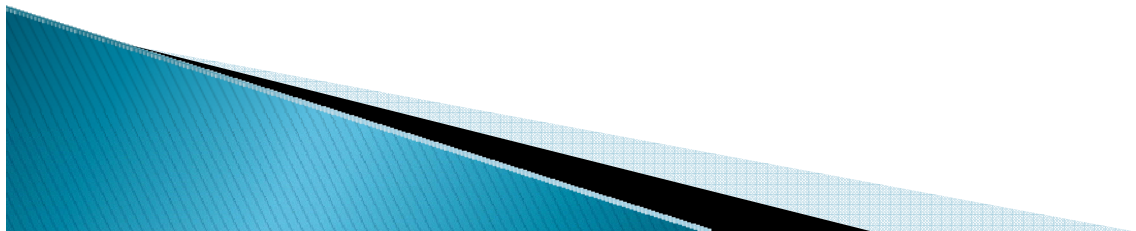
3. Investments in Systems: Student Climate

- ▶ Are there effective programs to reduce school violence?
- ▶ What Works Clearinghouse includes a focus on “What works in character education”
- ▶ Several programs improve behavior, including violence reduction
- ▶ Also tend to boost achievement



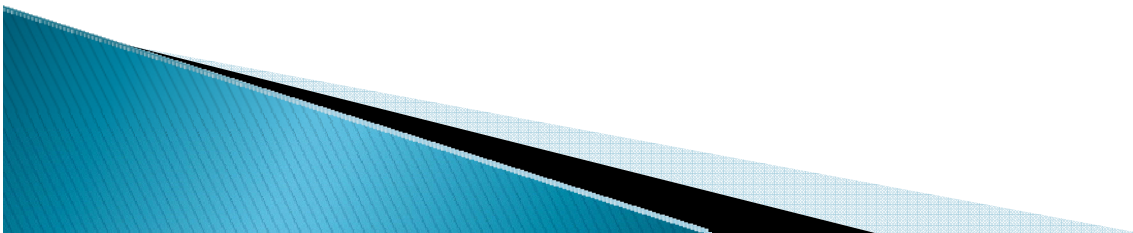
3. Investments in Systems: Student Climate

- ▶ Example: *Positive Action*
 - 6 curricular units include classroom discussion and role-play
 - Aim: use positive actions to help students feel good about themselves
 - Experimental studies included 36 schools in Florida and 20 schools in Hawaii
 - Lower rates of violent behavior, fewer suspensions
 - Lower rates of retention in grade
 - Higher academic achievement



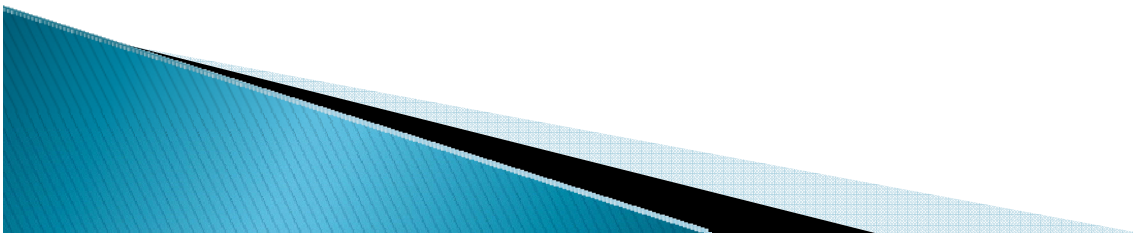
Conclusions

- ▶ Despite advances, research-based knowledge is still limited
- ▶ Investments in teachers and leaders are key
 - Compensation incentives can be *part* of the plan
 - On its own, performance pay is not enough to improve teaching and learning
 - Teacher development holds promise but is difficult to scale up and sustain



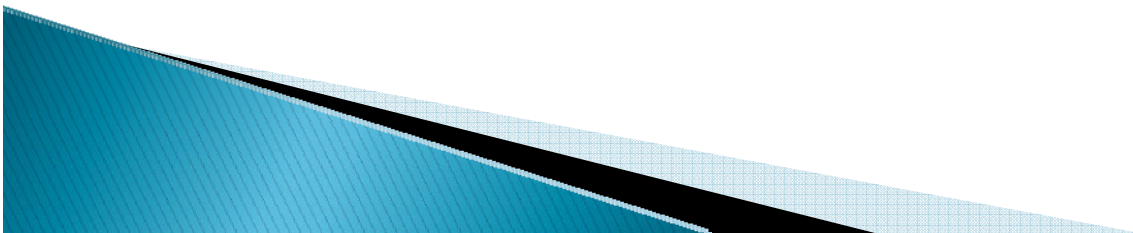
Conclusions

- ▶ Teaching is more effective when better tools are available
 - More time for instruction
 - Smaller classes in early elementary grades (if space and personnel are available)
 - Curricula that are more focused, coherent, and rigorous



Conclusions

- ▶ Investments in systems may also pay off
 - Greater learning is more likely in schools with more supportive professional climates
 - Programs are available to address the challenge of school violence
- ▶ Research in all of these areas is needed to identify which programs and policies work for Israel



References

- ▶ Ben-David, D., Editor. (2010). *State of the nation report: Society, economy, and policy in Israel, 2009*. Jerusalem: Taub Center
 - ▶ Borman, G. D., Gamoran, A., & Bowdon, J. 2008. A randomized trial of teacher development in elementary science: First-year effects. *Journal of Research on Educational Effectiveness, 1*, 237–264.
 - ▶ Bryk, A. S., Sebring, P. B., Allensworth, E., Luppescu, S., & Easton, J. Q. (2010). *Organizing schools for improvement: Lessons from Chicago*. Chicago: University of Chicago Press.
 - ▶ Gamoran, A. (1997). Curriculum change as a reform strategy: Lessons from the United States and Scotland. *Teachers College Record, 98*, 608–628.
 - ▶ Gamoran, A., Borman, G. D., & Bowdon, J. (2011). *Challenges of scaling up and sustaining reform: Lessons from a mixed-methods study of professional development for elementary science*. Paper presented at the fall meeting of the Society for Research on Educational Effectiveness, Washington, DC.
 - ▶ Gamoran, A., Porter, A. C., Smithson, J., & White, P. A. (1997). Upgrading high school mathematics instruction: Improving learning opportunities for low-income, low-achieving youth. *Educational Evaluation and Policy Analysis, 19*, 325–338.
 - ▶ Marsh, J. A., Springer, M. G., McCaffrey, D. F., Yuan, K., Epstein, S., Koppich, J., Kalra, N., DiMartino, C., & Peng, A. (2011). A big apple for educators: New York City's experiment with schoolwide performance bonuses: Final evaluation report. Santa Monica, CA: RAND.
 - ▶ OECD. (2011). *Improving performance: Leading from the bottom. PISA in Focus, 2*. Paris: OECD.
 - ▶ Porter, A. C., Polikoff, M. S., Goldring, E. G., Murphy, J., Elliott, S. N., & May, H. (2010). Investigating the validity and reliability of the Vanderbilt Assessment of Leadership in Education. *Elementary School Journal, 111*, 282–313,
 - ▶ Schmidt, W. H. (2011). *STEM reform: Which way to go?* Background paper prepared for the Workshop on Highly Effective Schools and Programs in K–12 Education, Washington, DC.
 - ▶ Springer, M.G., Ballou, D., Hamilton, L., Le, V., Lockwood, J.R., McCaffrey, D., Pepper, M., & Stecher, B. (2010). *Teacher pay for performance: Experimental evidence from the Project on Incentives in Teaching*. Nashville, TN: National Center on Performance Incentives at Vanderbilt University.
- 