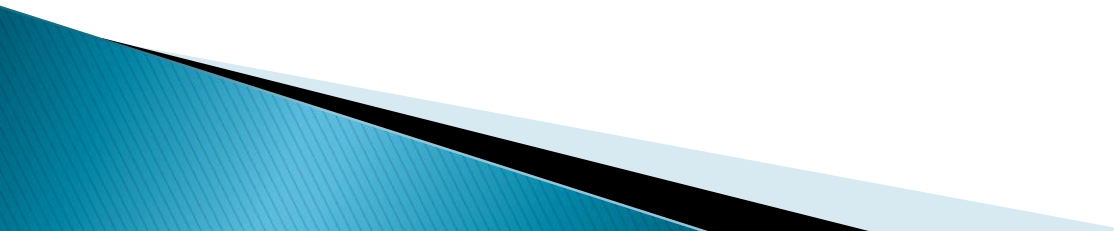


Effective Programs for Elementary Science: A Best- Evidence Synthesis

Robert E. Slavin
Cynthia Lake
Pam Hanley
Allen Thurston

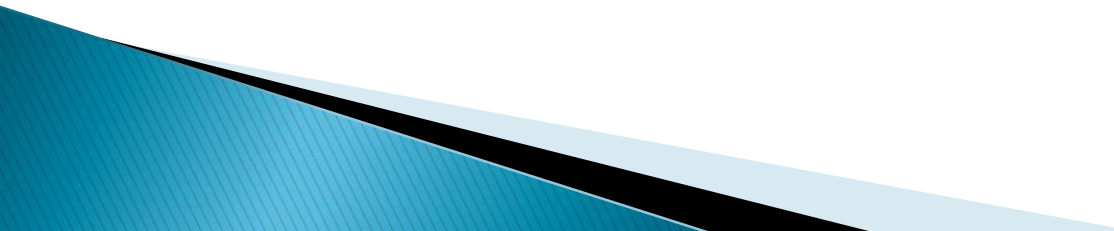
The Importance of Evidence on Elementary Science Programs

- ▶ Science is becoming increasingly important
 - ▶ International comparisons show American students are behind many peer nations
 - ▶ Attitudes and orientations to science begin in elementary school
- 

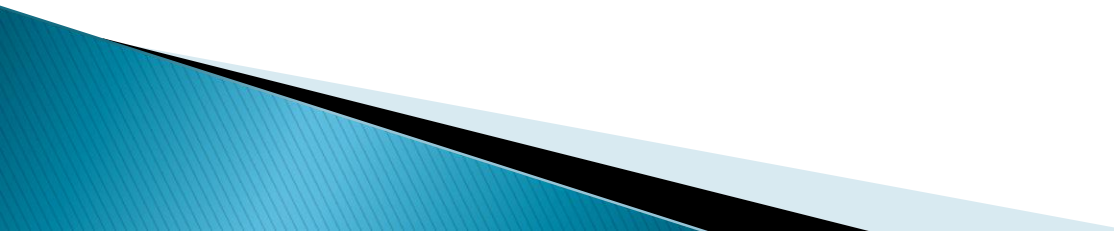
State of the Art

- ▶ Reviews of inquiry teaching, cooperative learning, and other topics focus mostly on secondary schools

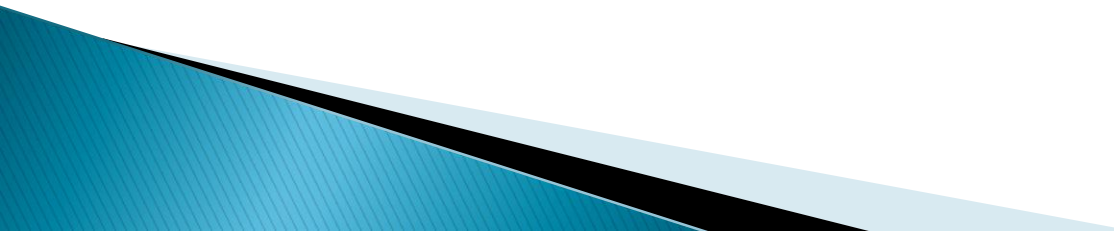
Review Methods

- ▶ Exhaustive literature search
 - ▶ Outcomes in effect sizes
 - ▶ Criteria for study inclusion
 - Compared experimental to control group
 - Experimental–control pretest differences <0.5 ES
 - Dependent measures not inherent to treatment
 - Duration at least 4 weeks
- 

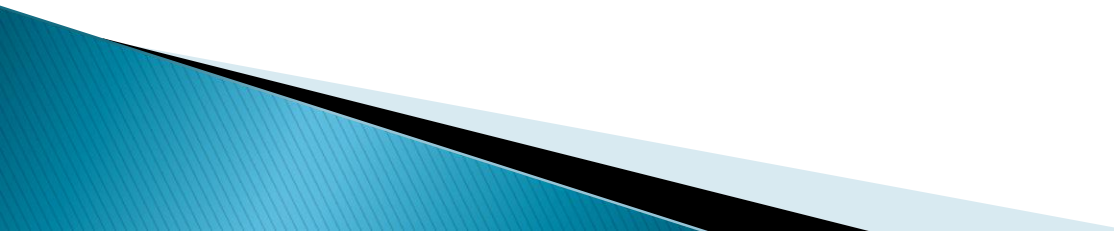
Methodological Issues

- ▶ Artificial, non-replicable treatments
 - ▶ Dependent variables inherent to treatments
 - ▶ Brief treatments
- 

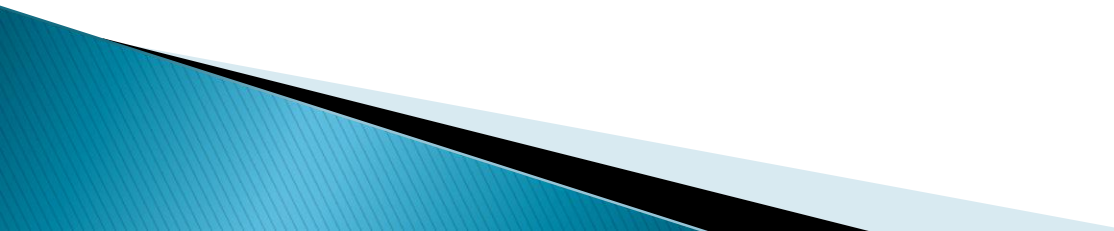
Categories of Treatments

- ▶ Inquiry-oriented instructional process programs without science kits
 - ▶ Inquiry-oriented instructional process programs with science kits
 - ▶ Technology applications
- 

Overall Findings

- ▶ 17 qualifying studies
 - ▶ Grades 3–6
 - ▶ Diverse treatments, outcomes
- 

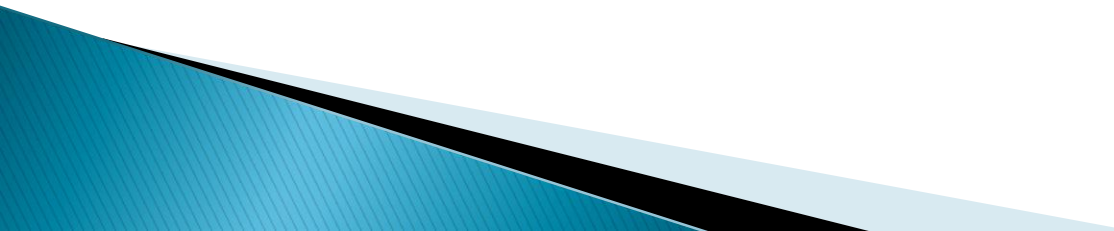
Inquiry-Oriented Instructional Process Programs Without Science Kits

- ▶ 8 qualifying studies
 - ▶ Weighted mean ES = +0.30
 - ▶ Professional development for inquiry teaching
 - ▶ Cooperative learning
 - ▶ Science IDEAS (combining science and reading)
- 

Inquiry-Oriented Instructional Process Programs With Science Kits

- ▶ 4 qualifying studies
- ▶ Weighted mean ES = +0.02 (near zero)
- ▶ Pine et al. (2005) study of insights, FOSS, STC
- ▶ Leach (1992) study of FOSS
- ▶ G. Borman et al. (2008) study of SCALE
- ▶ K. Borman et al. (2009) study of Teaching SMART

Technology Applications

- ▶ 5 qualifying studies
 - ▶ Weighted mean ES = 0.37
 - ▶ BrainPOP
 - ▶ The Voyage of the Mimi
 - ▶ Web-based labs
- 

Discussion

- ▶ Surprising findings on science kits
 - ▶ Successful programs focused on improving teaching all year
 - ▶ Extensive professional development is essential
 - ▶ More development and evaluation are needed
- 