COST-EFFECTIVENESS ANALYSIS FOR EDUCATION AND SOCIAL POLICY: THEORY AND PRACTICE

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Outline

Cost-effectiveness analysis (CEA):

Evaluation method that compares policy alternatives based on ratio of their costs to a quantifiable (but not monetized) effectiveness measure

① Current research practice in education

② CEA problems

③ Future for CEA

Almost no CEAs in education

- CEA is not a newly developed research method
- Thousands of CEAs in health research
- CEAs in education are becoming more common (with cost disease pressures and move to experimental methods)
- But very slowly and from a low base; much CEA research is ‘rhetorical’

➢ Policy reform debate is misguided and distorted

Misguided reform debate in education

- Reducing class size – effective but expensive
- Vouchers – supposedly ‘free’
- School-wide reforms – hidden reorganization costs
- Early reading programs – very different sizes
- Teacher accountability – wage effects ignored
- Web-learning, MOOCs – claimed ‘low-cost’ via large scale

- **Need economic analysis: CEA, CBA or other**

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- Perform CBA/CEA:
  1. Dropout prevention (2012)
  2. Early literacy (2013)
  3. Socio-emotional learning interventions (2014)
- Train researchers in CBA/CEA
- Provide toolkit (CEA spreadsheets, input price spreadsheets, inflation indices, locality indices, amortization calculator)
- Guidance/recommendations on best practice

CEA Problems: Costs

- Empirical problems with costs data:
  - Cost data reliant on budget documents
  - Marginal costs typically unavailable
  - Control group costs ignored
  - Data collected *ex post*

- Methodological problems with costs analysis:
  - Limited sensitivity testing
  - Limited statistical testing
  - Not harmonized across studies

CEA Problems: Validity

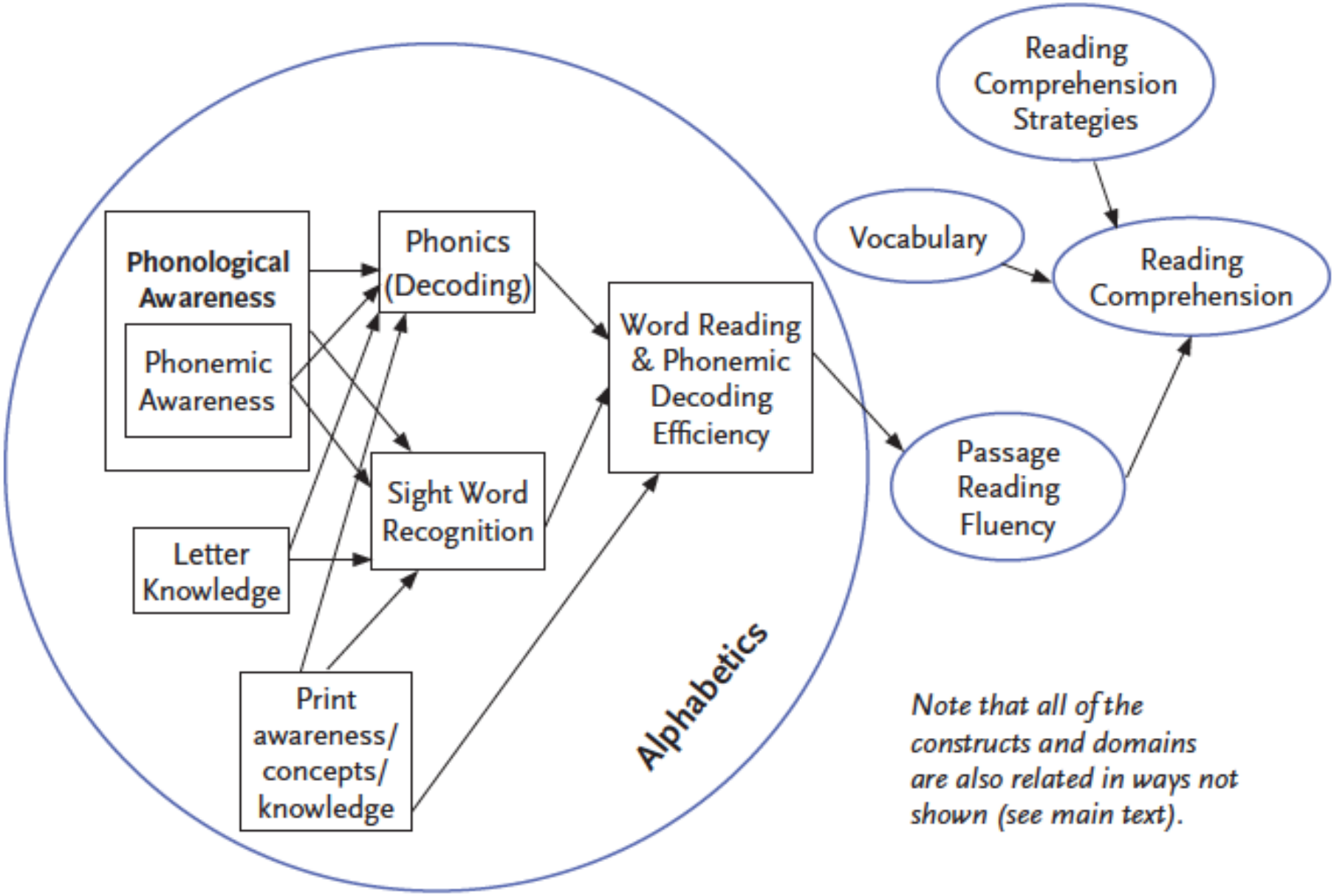
- CEA requires precise description of inputs of intervention
  But many interventions lack fidelity with respect to site, duration, in-kind resources, or scale:
  - Off-shelf ‘standard’ reading programs per student cost $400 to $1,200
  - Talent Search delivery dosage of 1-6 years
- CEA forces precise description of *incremental* inputs of intervention relative to business as usual
  But this – buying ‘gains’ in outcomes, not absolute outcomes – is hard to explain or to value
- Many interventions fail to specify ‘production function’ or ‘technology of skill formation’

Site-level Cost-effectiveness Results for JOBSTART
(Social Costs; High School Graduation)

	Cost per Participant	Gain in HSG (% point)	C-E Ratio ($Cost/HSG)	Yield (Extra HSG per $100,000)
All sites	$10,460	15.1	$69,510	1.44
By site:				
Corpus Christi	$4,340	28.0*	$15,520	6.44
El Centro	$10,790	39.0*	$27,670	3.61
Connelley	$10,660	28.2*	$37,810	2.64
Phoenix	$12,480	20.7*	$60,280	1.66
EGOS Denver	$4,570	7.4	$61,310	1.63
Allentown	$11,920	9.5	$125,150	0.80
Hartford	$11,820	7.8	$152,210	0.66
Atlanta	$11,660	5.9	$197,800	0.51
LA Jobs Corps	$15,720	7.7	$204,470	0.49
CET/San Jose	$6,460	3.1	$206,830	0.48
East LA	$12,060	0.0	n/a	0.00
BSA (NYC)	$20,190	-1.2	n/a	-0.06
Chicago	$14,330	-5.0	n/a	-0.35

CEA Problems: Effectiveness

- Methodological problems:
  - Effects for follow-up subsamples with attrition – matters for costs
  - Effects reported on ITT or TOT – matters for costs
  - Effect size interpretation depends on variation within samples
- Validity problem: How to measure effectiveness? CEA forces a uni-dimensional answer
  - Unclear, multiple outcomes
  - Cumulative nature of learning
  - Cost-utility analysis not used (unlike QALYs)


Reading Comprehension Strategies
Vocabulary
Reading Comprehension
Phonological Awareness
Phonemic Awareness
Phonics (Decoding)
Word Reading & Phonemic Decoding Efficiency
Sight Word Recognition
Letter Knowledge
Print awareness/ concepts/ knowledge
Passage Reading Fluency
Alphabetics
Note that all of the constructs and domains are also related in ways not shown (see main text).

CEA Problems: Application

- CEA evidence implies decisions:
  - Not enough comparative evidence
  - Results depend on which decision-maker specified
  - Policymakers do not like this implication
  - Squeamishness of allocating resources
  - Decisions are too easy: peer tutoring (cheap student labor); targeted interventions (big effects); higher ability students (easier to reach thresholds)
  - Not the purpose of education research (Ludwig, Kling, and Mullainathan, 2011)

Cost-Effectiveness Ratios across Interventions to Raise the High School (HS) Completion Rate			
	Cost per Student	Cost per Extra HS Completer	Yield: Extra HS Completers per $100,000
NGYC	$14,100	$71,370	1.40
Job Corps	$22,290	$131,140	0.76
JOBSTART	$10,460	$69,510	1.44
New Chance	$17,820	$194,640	0.51
Chicago CPC	$14,090	$134,150	0.75
Perry Preschool	$31,840	$165,430	0.60
Talent Search	$3,400	$30,660	3.26

Programs by grade level	Reading ability of target students	Program duration (weeks)	Total cost per student	Literacy domain	Effect size gain	Cost per unit increase in effect size*
Kindergarten average readers:						
K-PALS**	All	20	$27	Alphabetics	0.61	$38
Kindergarten struggling readers:						
Stepping Stones	Struggling; behavioral disorders	5	$479	Alphabetics	0.84	$570
Sound Partners	20–30th percentile	18	$791	Alphabetics	0.34	$2,093
				Fluency	0.48	$165
First grade struggling readers:						
Fast ForWord Reading 1	Slightly below average	6	$282	Alphabetics	0.24	$601
Reading Recovery	Bottom 20th percentile	12–20	$4,144	Alphabetics Fluency	0.70 1.71	$1,480 $606
Third grade struggling readers:						
Corrective Reading	Bottom 25th percentile	28	$10,108	Alphabetics Fluency	0.22 0.27	$38,135 $6,364
Wilson Reading System	Bottom 25th percentile	28	$6,696	Alphabetics	0.33	$13,392

Summary

Main ‘problems’ with CEA are:

A. Validity of intervention (lack of specificity/fidelity)
B. Validity of effects (vagueness)
C. Helps make decisions

Problems A and B have little to do with CEA *per se*; CEA makes them explicit

Solutions:

- Do more CEA – health research offers only some promise
- Conduct research with decision-makers
- Perform CBA instead of CEA – only eliminate validity of effects problem; change relevance for decision-makers; harder to make comparisons