Avoiding Self-Delusion: New Technologies and Expectation Effects

Ruben R. Puentedura, Ph.D.

Four Types of Expectation Effects

1. The Placebo and Halo Effects

- Placebo Effect: a technology has an effect, because the person interacting with that technology believes it will.
- Halo Effect: one aspect of a technology colors how other aspects of that technology are perceived, and consequently its effect.

2. The Hawthorne Effect

- The fact that someone is exposed to a technological shift by itself can affect how they perform, regardless of the specifics of that technological shift.

3. The John Henry Effect

- A group that is not exposed to a technological shift, and knows that another one is, may view itself as in competition with the latter group and change its performance accordingly.

4. The Pygmalion Effect

- Teachers' expectations of the performance of their students will tend to determine their actual performance.

Controlling for Expectation Effects

Tools for Research

- Try to have multiple instructors use the technology
- Try to have multiple classes use the technology
- Have a third party observe instructors and classes
- Look for trends in class performance throughout the term
- Use end-of-term attitudinal surveys

Experimental Design

Groups	Teacher Expectation	
	For Benefit	For No Benefit
1. No-treatment control	A	B
2. Hawthorne control	C	D
3. Experimental procedure	E	F

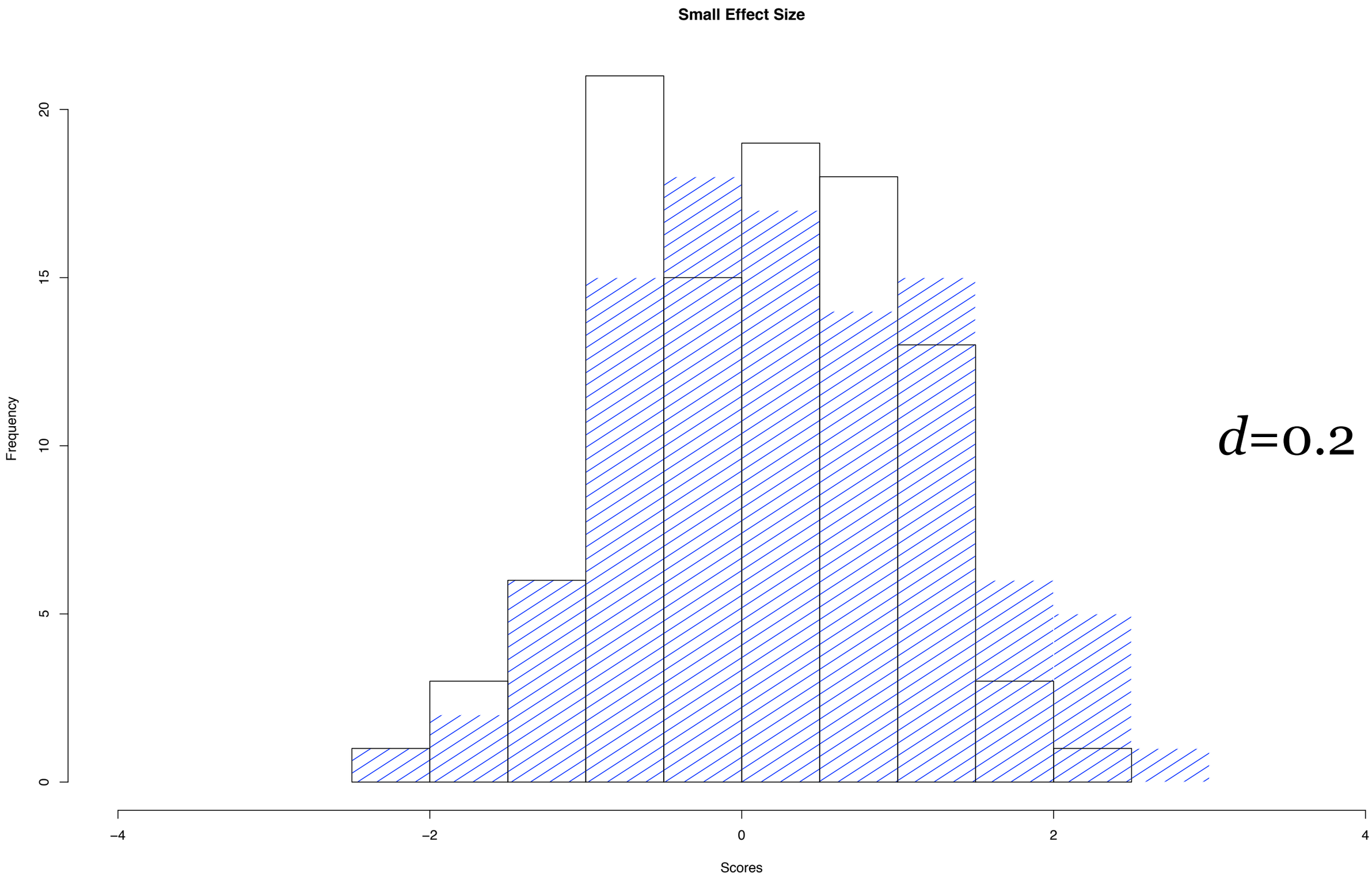
	Essential
	Important
	Desirable

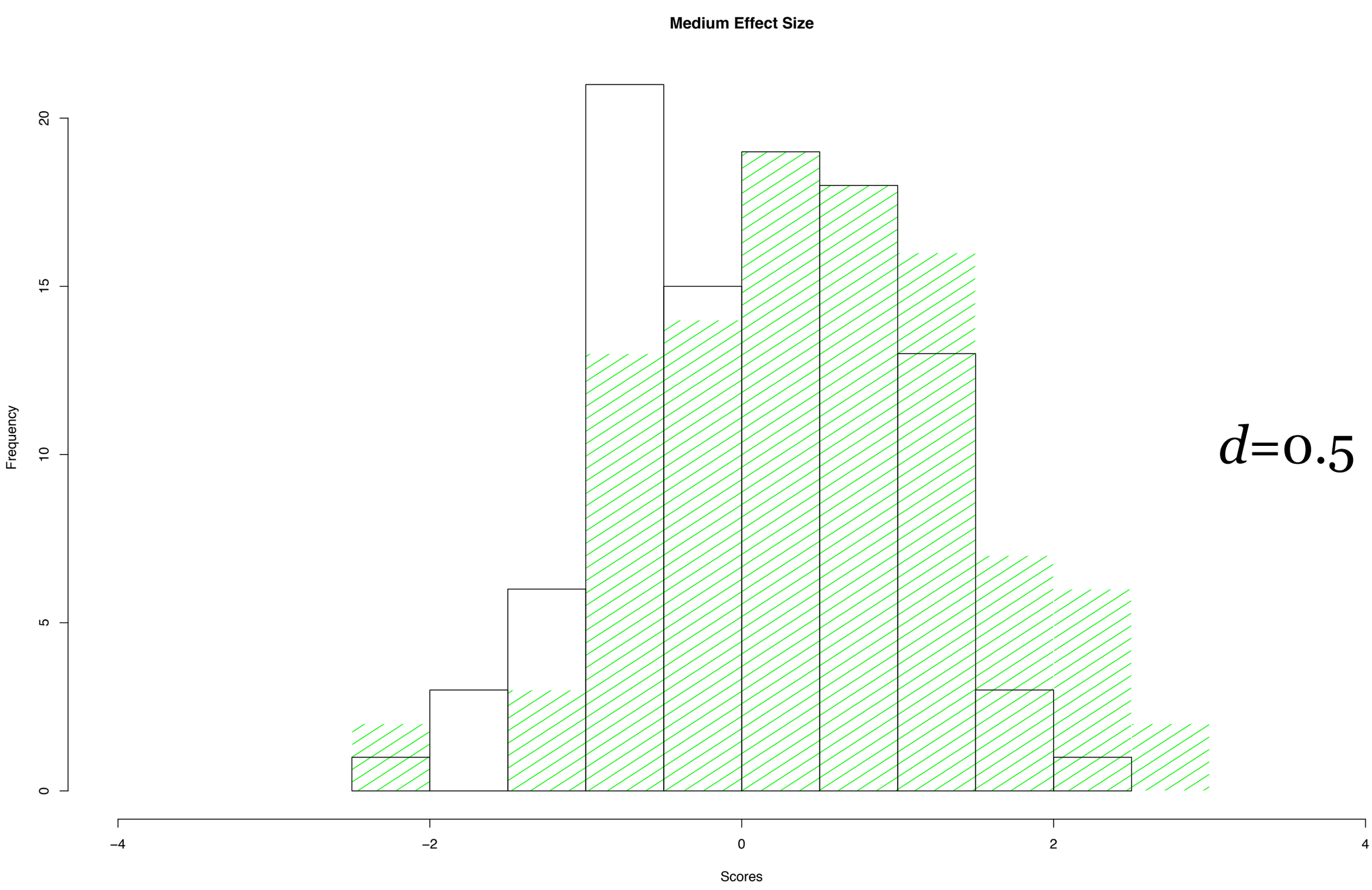
Cohen's Effect Size Index *d*

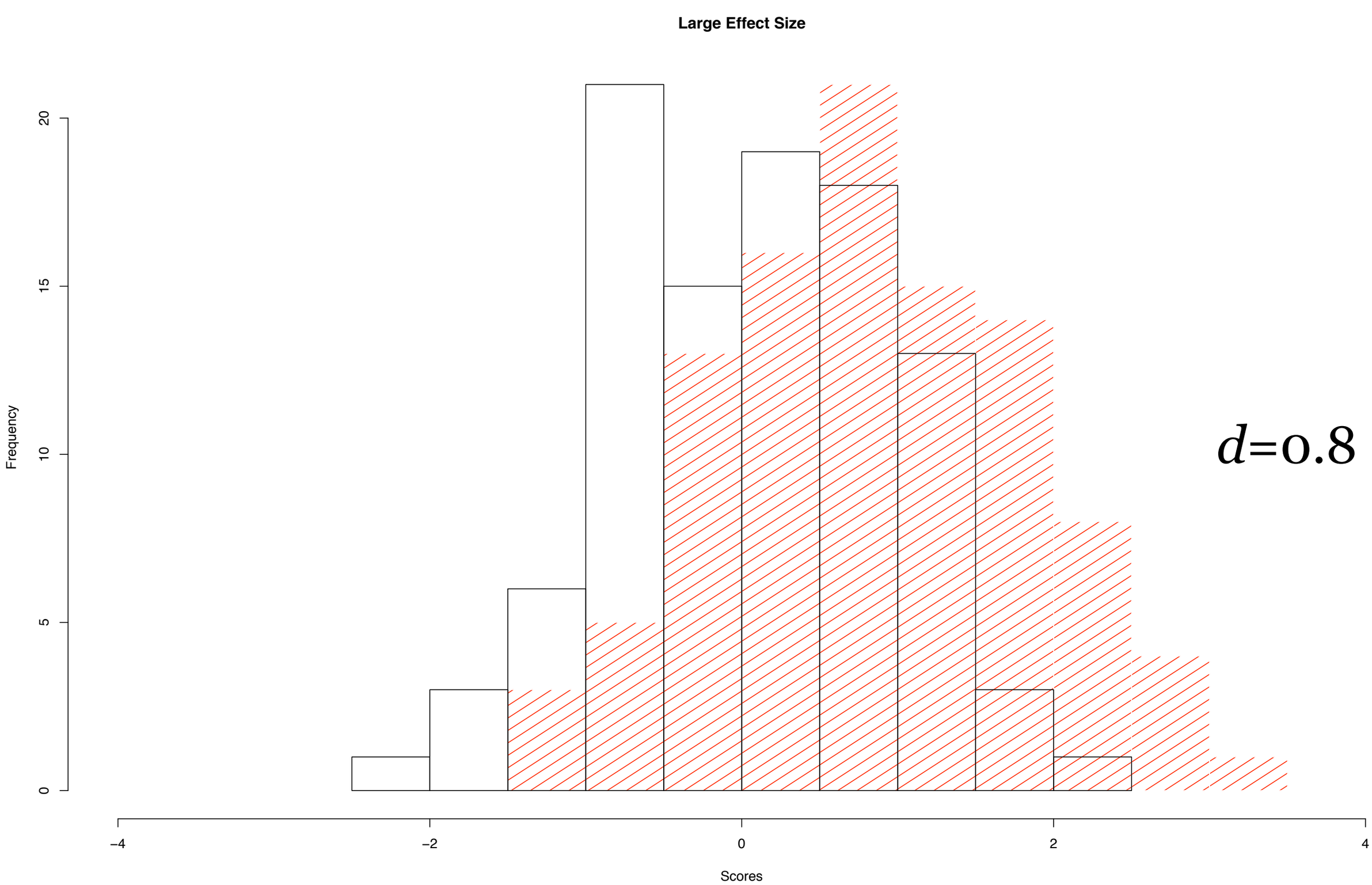
$$d = \frac{|m_A - m_B|}{\sqrt{\frac{\sigma_A^2 + \sigma_B^2}{2}}}$$

m_A, m_B: mean scores for the two groups being compared

σ_A, σ_B: standard deviation of the scores for the two groups being compared


Small Effect Size
Frequency
0
5
10
15
20
−4
−2
0
2
4
Scores
d=0.2


Medium Effect Size
Frequency
0
5
10
15
20
−4
−2
0
2
4
Scores
d=0.5


Large Effect Size
Frequency
0
5
10
15
20
−4
−2
0
2
4
Scores
d=0.8

Three Pitfalls to Avoid

I. Equivalent Exchange

- "Maybe it didn't help, but it didn't hurt anything either."

2. Novelty

- "All new tools get this sort of reception at first."

3. Problems Obscured

- "We now know to what degree the results of introducing this tool were influenced by expectation effects, so that's all there is to say about that."

Expectation Effects and the Horizon Report

Classifying Expectation Effects by Likelihood

Extended Learning

Intelligent Searching

Social Networks & Knowledge Webs

Time-to-Adoption: One Year or Less

Time-to-Adoption: Two to Three Years

Time-to-Adoption: Four to Five Years

Ubiquitous Wireless

Educational Gaming

Context-Aware Computing & Augmented Reality

Bibliography

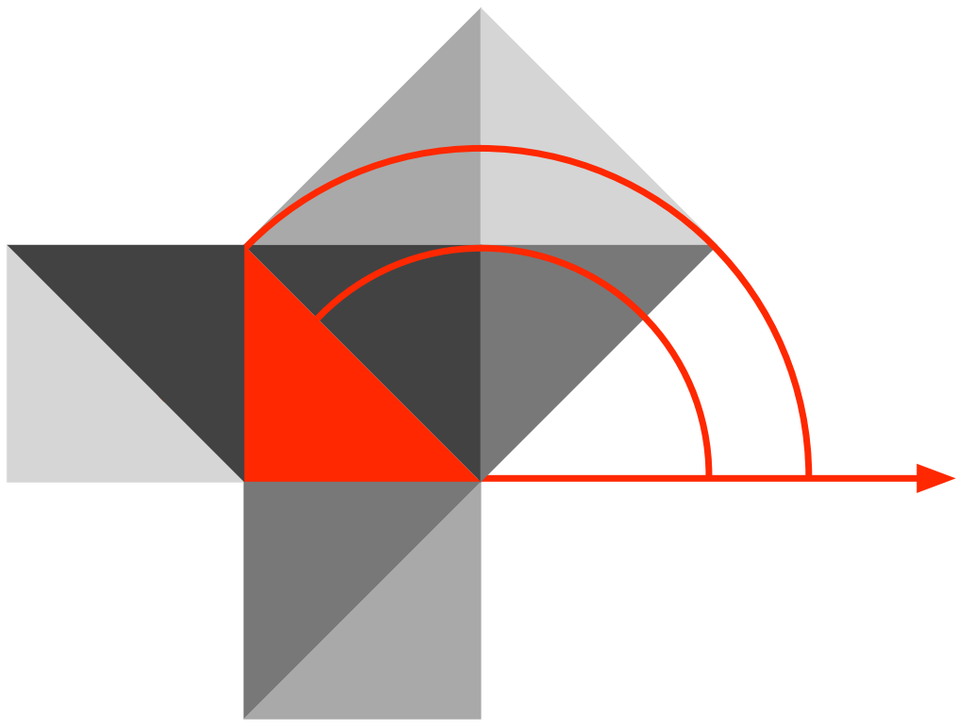
- **General Overview:**
  - Draper, S.W. *The Hawthorne Effect*. URL: http://www.psy.gla.ac.uk/~steve/hawth.html (March 28, 2005)

- **Tools for Research:**
  - Rosenthal, R. and R.L. Rosnow. *Essentials of Behavioral Research: Methods and Data Analysis - Second Edition*. New York: McGraw-Hill, Inc., 1991. (See esp. Chapter 6)
  - Rosenthal, R. *Experimenter Effects in Behavioral Research - Enlarged Edition*. New York: Irvington Publishers, Inc., 1976. (See esp. Chapters 19-24)

- **Experimental Design:**
  - Rosenthal, R. and L. Jacobson. *Pygmalion in the Classroom: Teacher Expectation and Pupils' Intellectual Development*. New York: Holt, Rinehart, and Winston, Inc., 1968. (See esp. Chapter 11)

- **Effect Size Index:**
  - Cohen, J. *Statistical Power Analysis for the Behavioral Sciences*. New York: Academic Press, 1969. (See esp. Chapter 2)

Hippasus



- http://www.hippasus.com
- rubenrp@hippasus.com