The Null is Always False

(except when it is true)

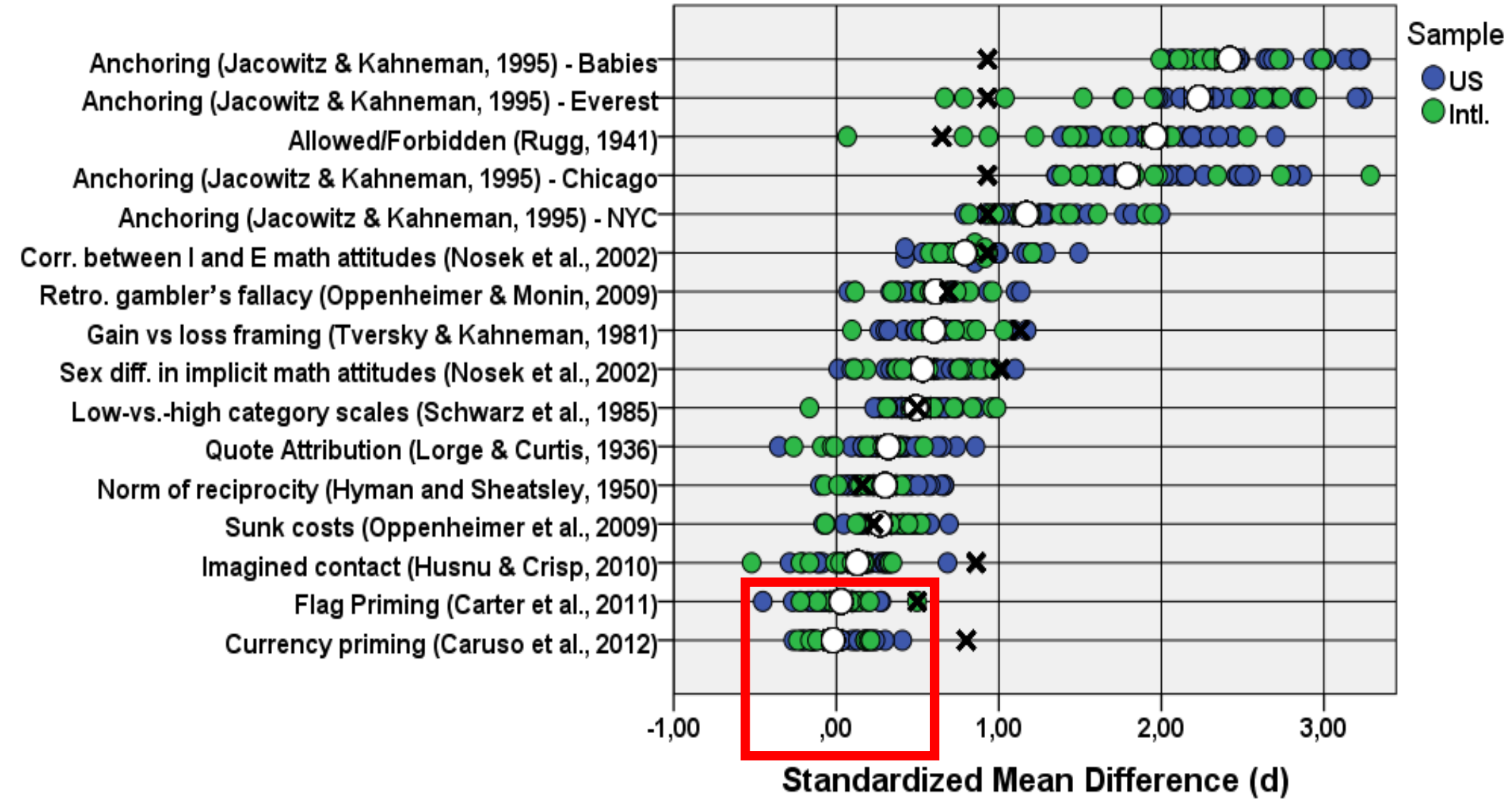
Null-hypothesis significance testing is widely used, but often **criticized**.

“The null hypothesis, taken literally, is always false in the real world.”

“So if the null is always false, what’s the big deal about rejecting it?”

(Cohen, 1990)

With large sample sizes (>5000), some effects are pretty darn close to zero.


Anchoring (Jacowitz & Kahneman, 1995) - Babies
Anchoring (Jacowitz & Kahneman, 1995) - Everest
Allowed/Forbidden (Rugg, 1941)
Anchoring (Jacowitz & Kahneman, 1995) - Chicago
Anchoring (Jacowitz & Kahneman, 1995) - NYC
Corr. between I and E math attitudes (Nosek et al., 2002)
Retro. gambler's fallacy (Oppenheimer & Monin, 2009)
Gain vs loss framing (Tversky & Kahneman, 1981)
Sex diff. in implicit math attitudes (Nosek et al., 2002)
Low-vs.-high category scales (Schwarz et al., 1985)
Quote Attribution (Lorge & Curtis, 1936)
Norm of reciprocity (Hyman and Sheatsley, 1950)
Sunk costs (Oppenheimer et al., 2009)
Imagined contact (Husnu & Crisp, 2010)
Flag Priming (Carter et al., 2011)
Currency priming (Caruso et al., 2012)
Sample
US
Intl.
-1,00
,00
1,00
2,00
3,00
Standardized Mean Difference (d)

Random Assignment

Vs.

Measured Variables

Anchoring Condition

Vs.

Gender

Anchoring: 1/10

Vs.

Gender: 7/10

“Crud Factor” (Systematic Noise)

Lykken, 1968, Meehl, 1990

All models are wrong; some models are useful

George Box

After randomization, the null can be a useful and true hypothesis.

Without randomization, the alternative is not a ‘**bold**’ prediction.

If the null is rarely true, refuting the null says very little about the truth of a theory.

Weak hypothesis: It will rain in April. **Strong hypothesis**: It will rain 7 mm on April 2nd

Meehl, 1978

NHST rejects the null compared to *any* alternative. Point predictions are rare.

Confirming strong hypotheses gives a theory greater **verisimilitude**.

What's the rule?

2, 4, 6, ...

Wason, 1960

Confirmation bias is a systematic error in inductive reasoning

Studies often reject the null; It's stronger to test two **competing point predictions**.

Strong Inference:
Crucial experiments that exclude one alternative hypothesis

Platt, 1964

The Question: "But what experiment could **disprove** your hypothesis?"

Platt, 1964

Test hypotheses by making falsifiable strong predictions (if possible)