

# Funnel Plots

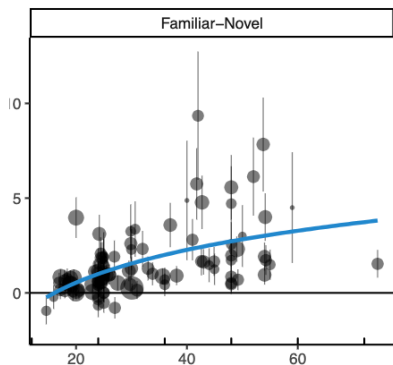
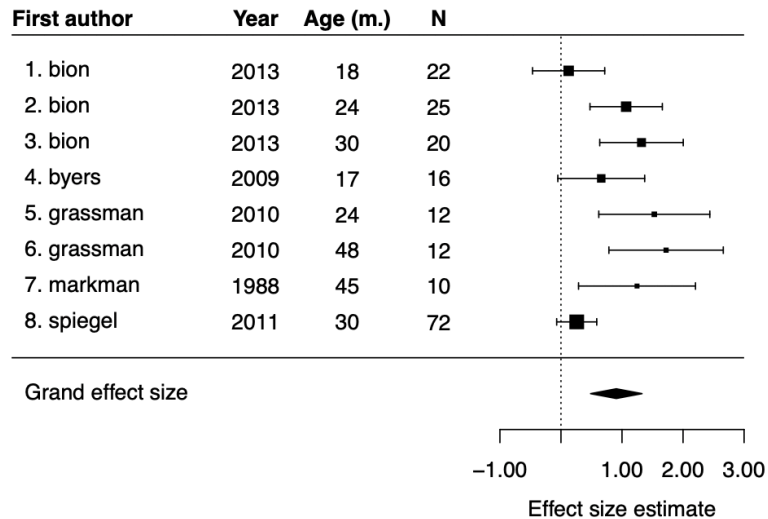
10 November 2021

*Modern Research Methods*

# Business

- Office hours today – email me or let me know if you'd like to meet
- Assignment 7 due Friday at noon
- Each person in group should code 5 pages of Google Scholar results

# Conducting a Meta-analysis



1. Identify Topic

2. Conduct literature search

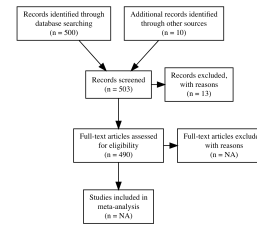
3. Code studies and calculate ES

4. Plot and analyze data

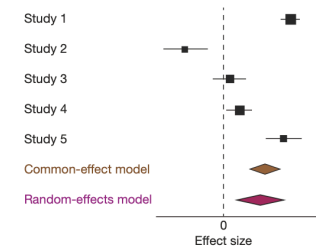
5. Report and discuss results

# Four meta-analytic visualizations

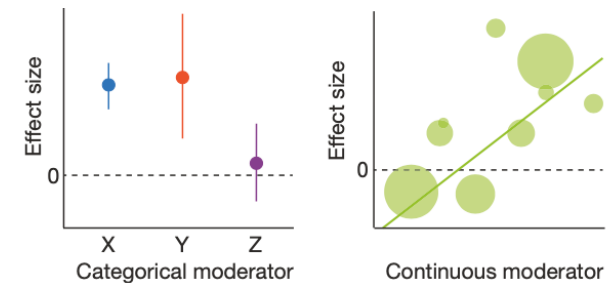
1. PRISMA flow diagram



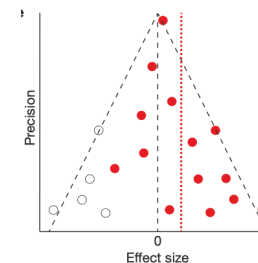
2. Forest plot



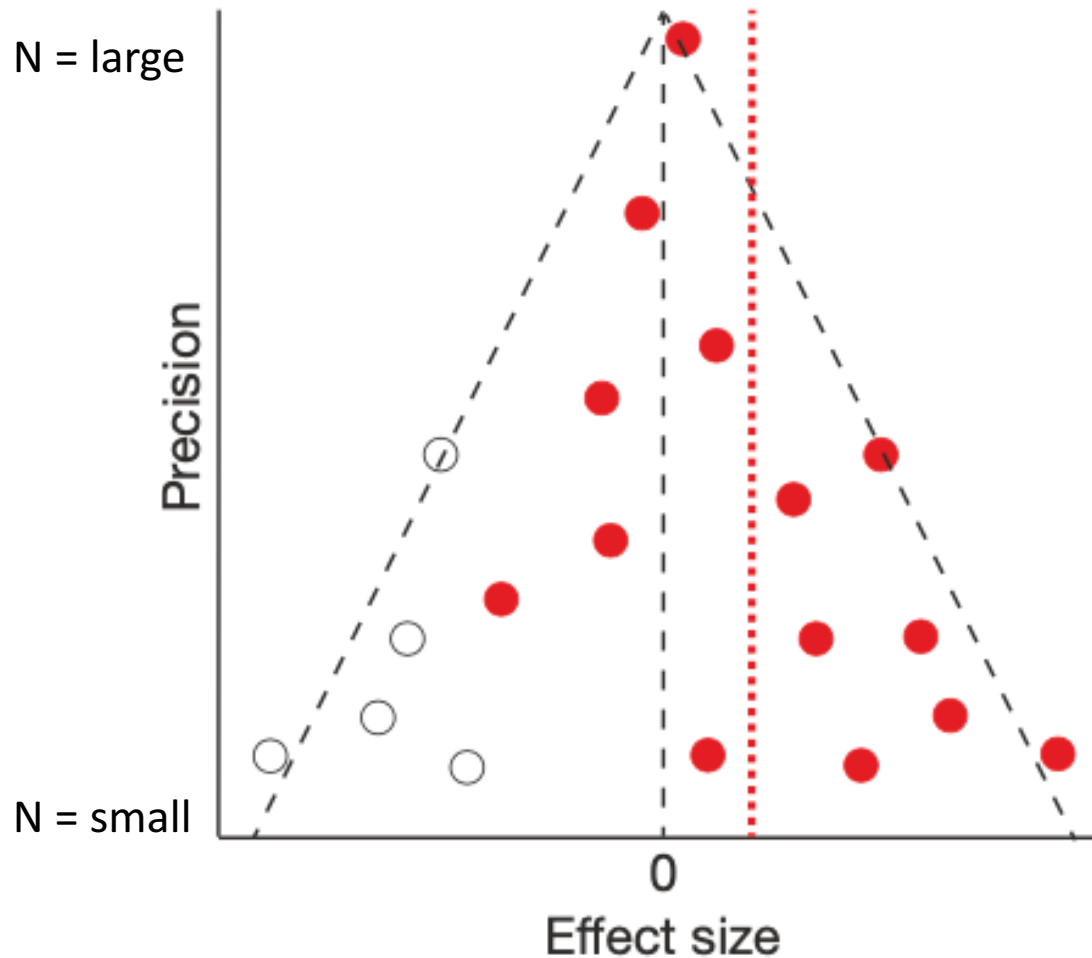
3. Moderator plots



4. Funnel plot



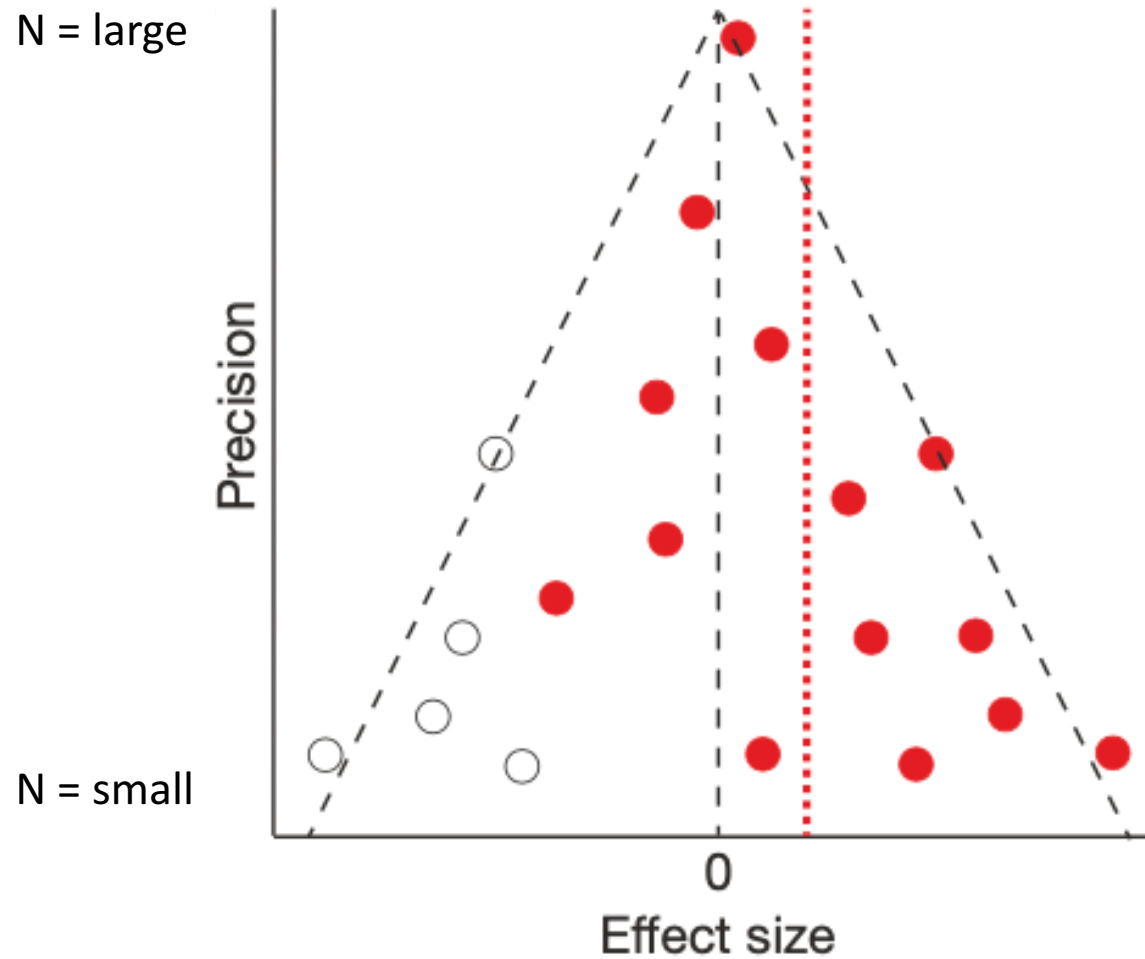
# Funnel Plots



- Scatter plot
- Red points are each an effect size
- X-axis = magnitude of effect size
- Y-axis = measure of how precise the study is (number of participants, SE)
- Black vertical dashed line is an effect size of zero
- Red dashed line is meta-analytic effect size

(ignore black circle points for now)

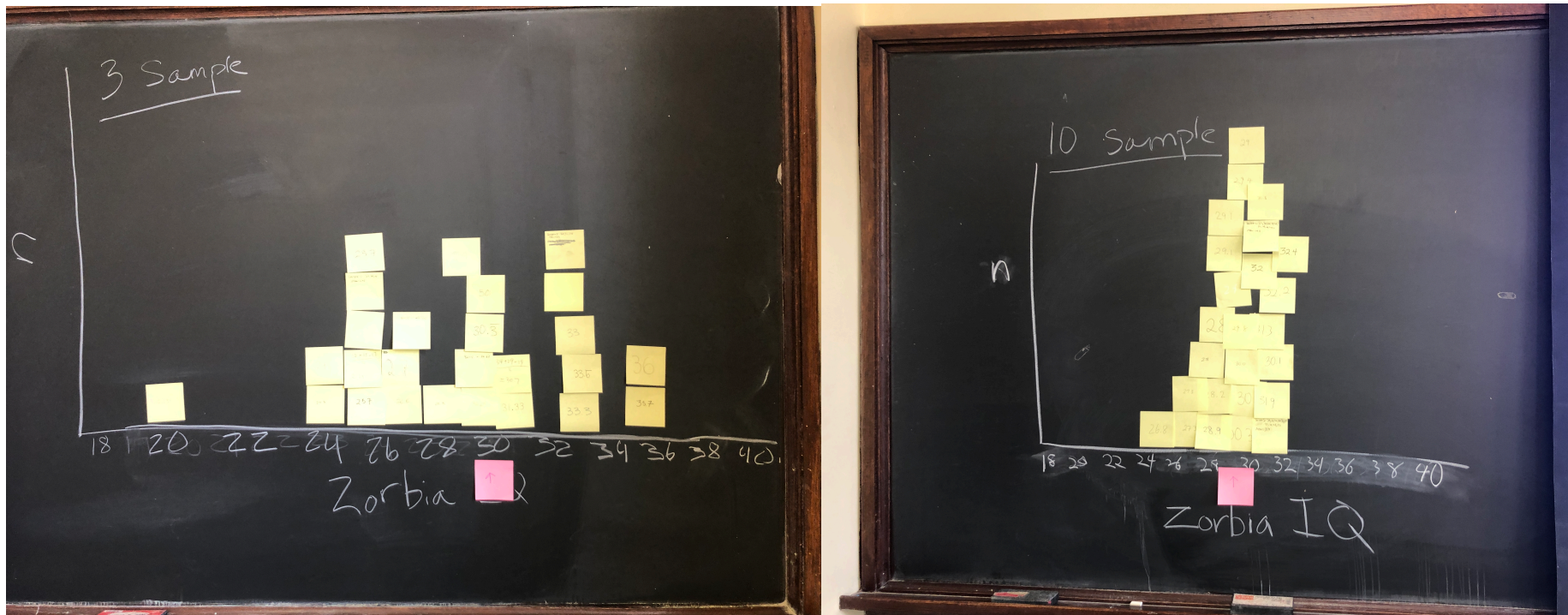
# Funnel Plots



Studies that are more precise (i.e. larger sample sizes) should have less variance around the true population effect size.

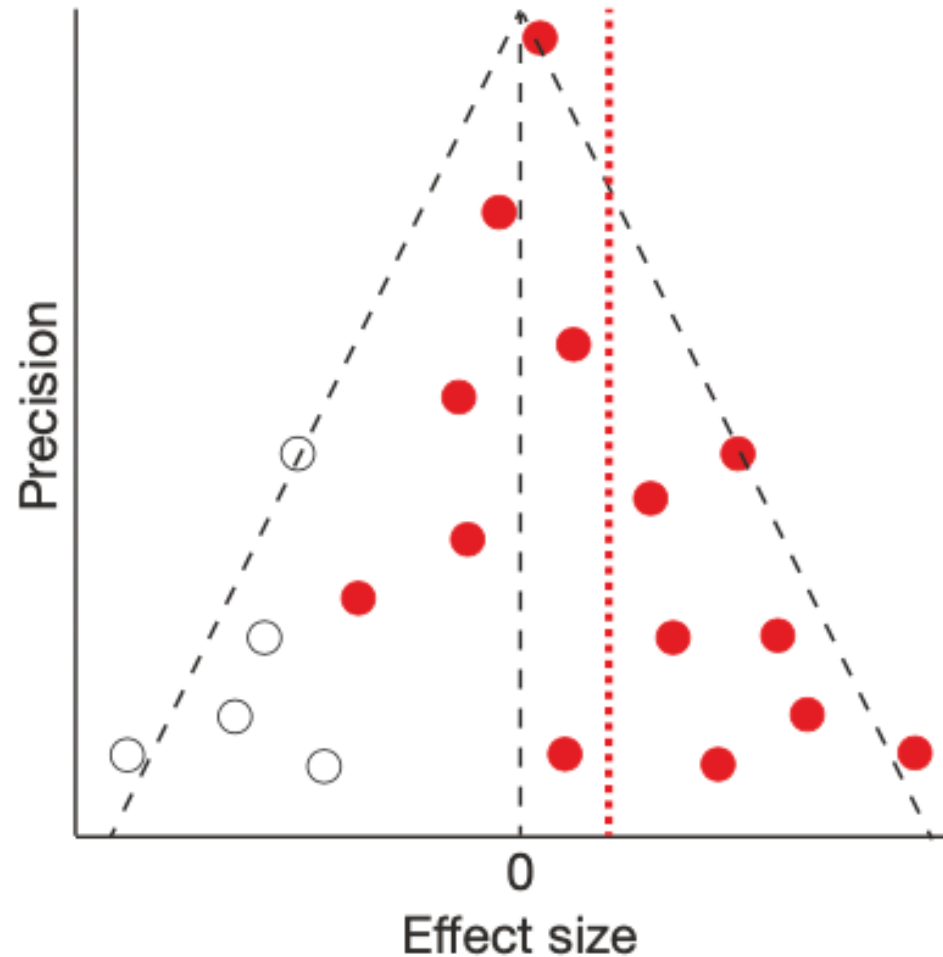
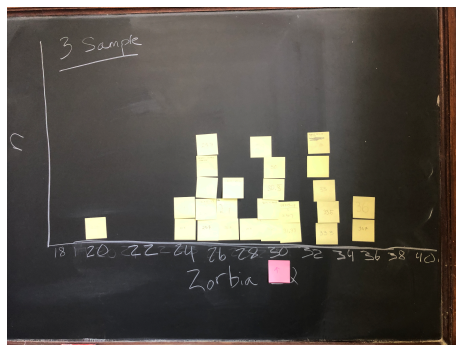
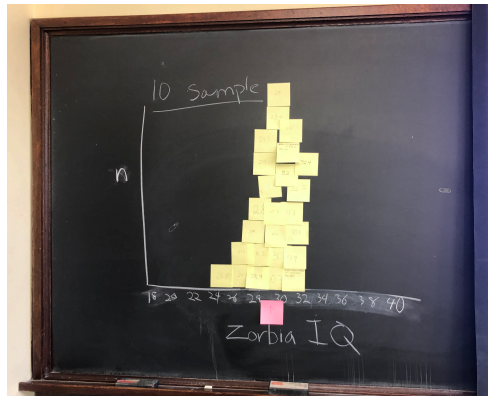
# In class simulation results (from week 6)

Sampling Distributions:



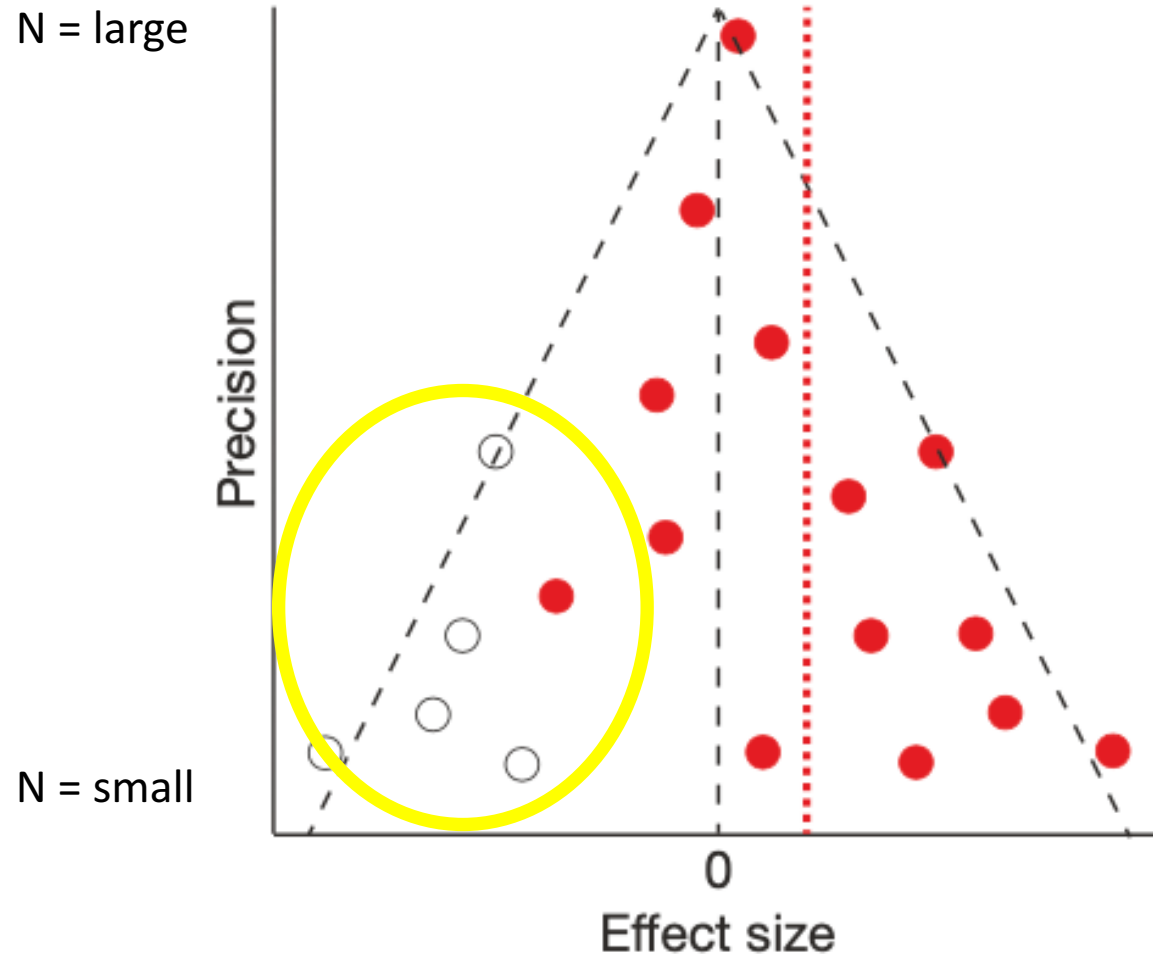
Two samples from the same population will tend to have somewhat different means.  
The bigger the sample size the narrower the sampling distribution gets

# In class simulation results (from week 6)





# Funnel Plots and Publication Bias



What is publication bias?

If all results are published, then studies will deviate from mean in either direction (i.e. be **symmetrical**)

If a field of research systematically ignores a certain direction, then this plot can be **asymmetrical**.

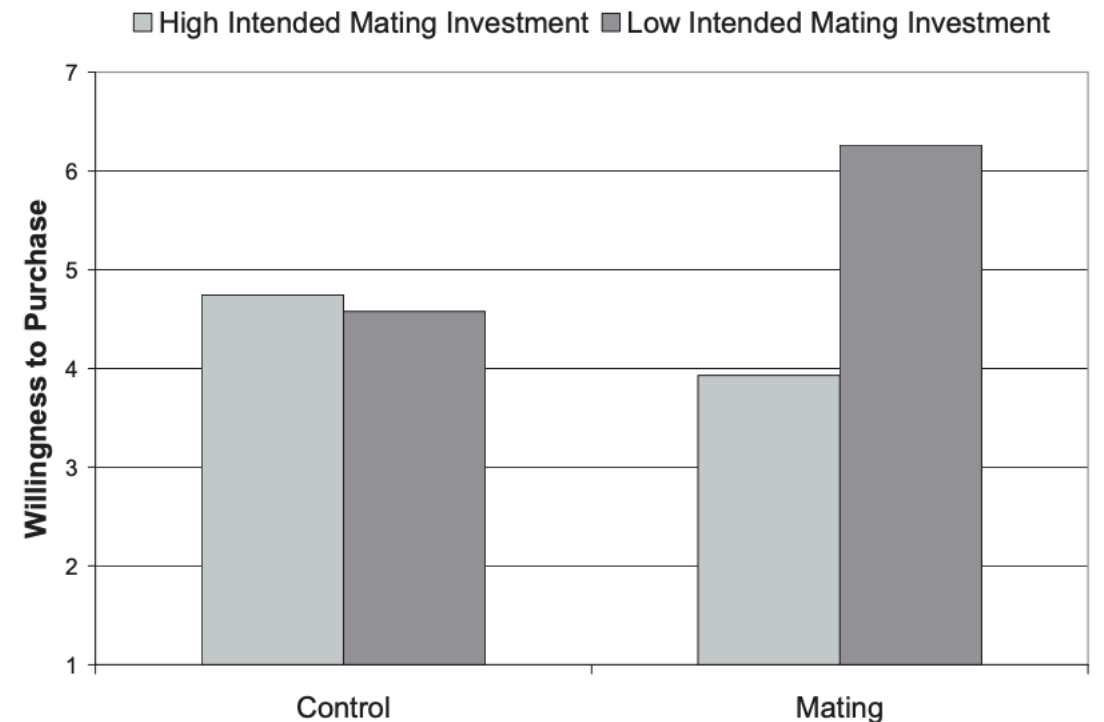
If researchers are not publishing studies that have non-significant ES, we should expect a gap in the lower right hand corner

# Romantic Priming

Evolutionary psychologists have argued that male risk-taking and conspicuous consumption are costly sexual signals intended to attract potential mates (Shanks et al. 2015)



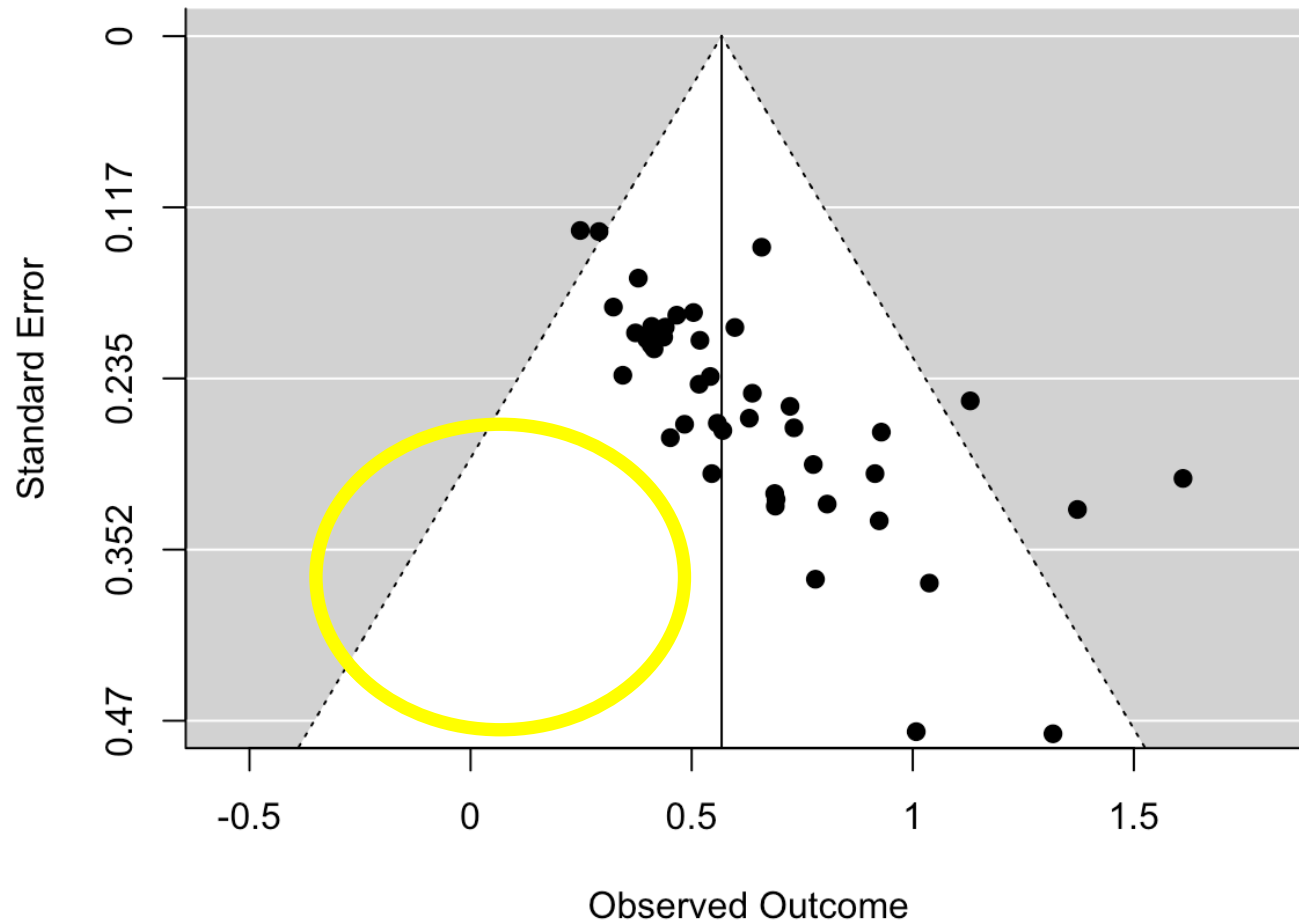
How much do you want to purchase an expensive-looking wallet?



(Sundie et al., 2011; Study 2)

# Meta-analysis of the “Romantic Priming Effect”

$N = 48$  effect sizes



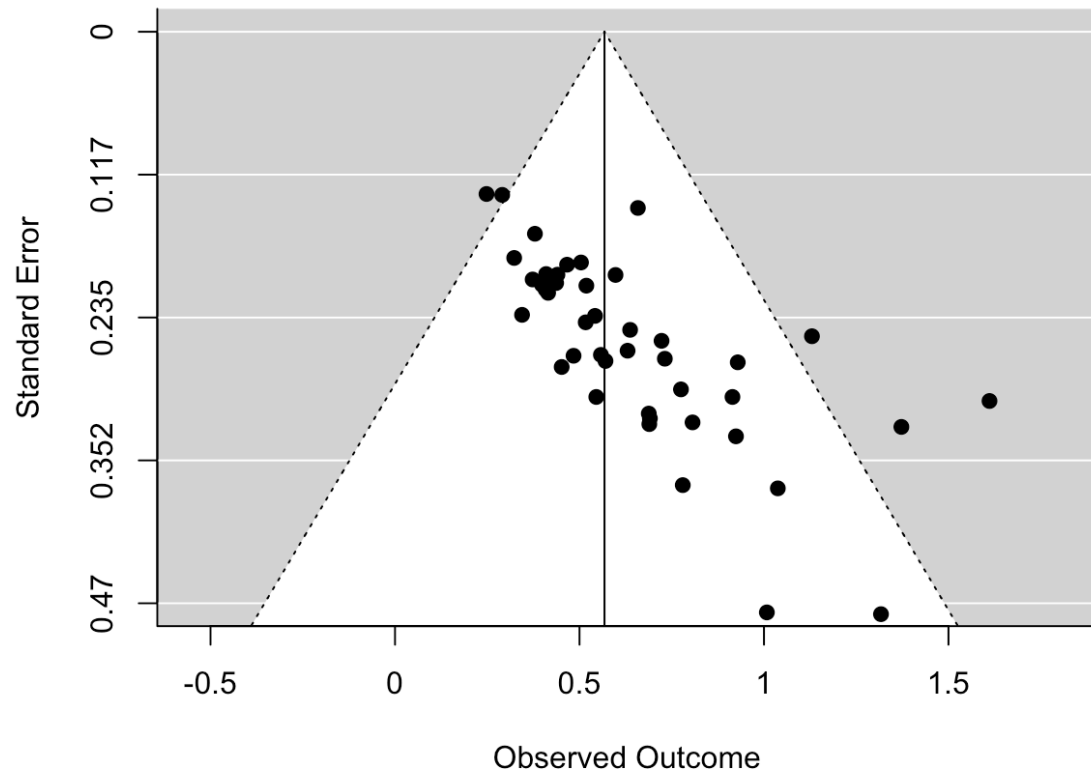
Where are all those studies? Very asymmetrical

Suggests publication bias!

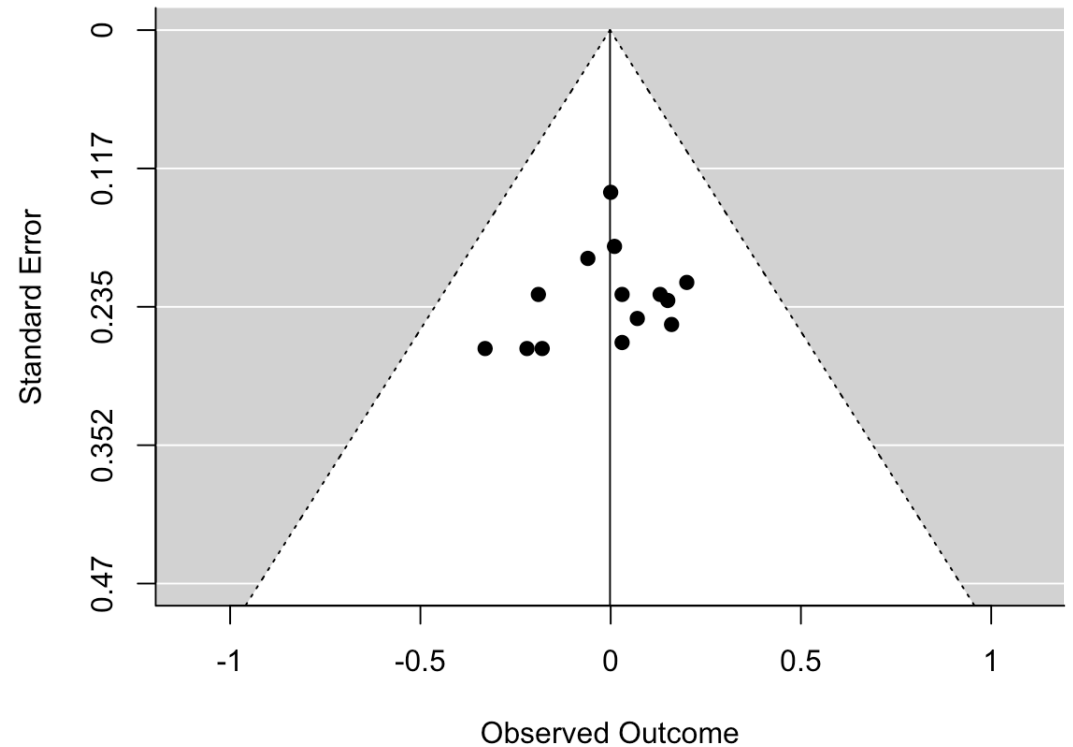
What should be done next?

# Large-scale, pre-registered replications

MA funnel plot (for comparison)

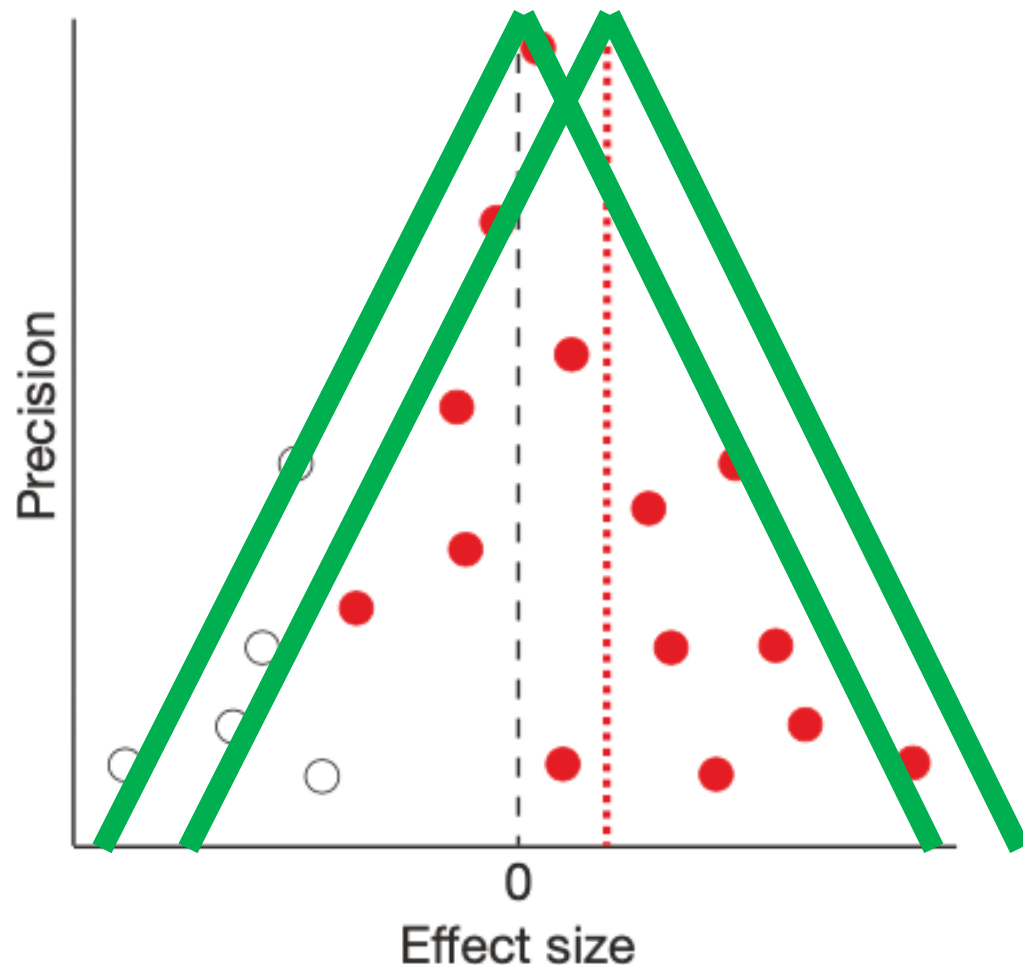


Shanks, et al. 2015: 14 replications



**Suggests there is no effect!**

# Funnel plots – what's with the weird triangle?



This triangle is called a “funnel” (in green)

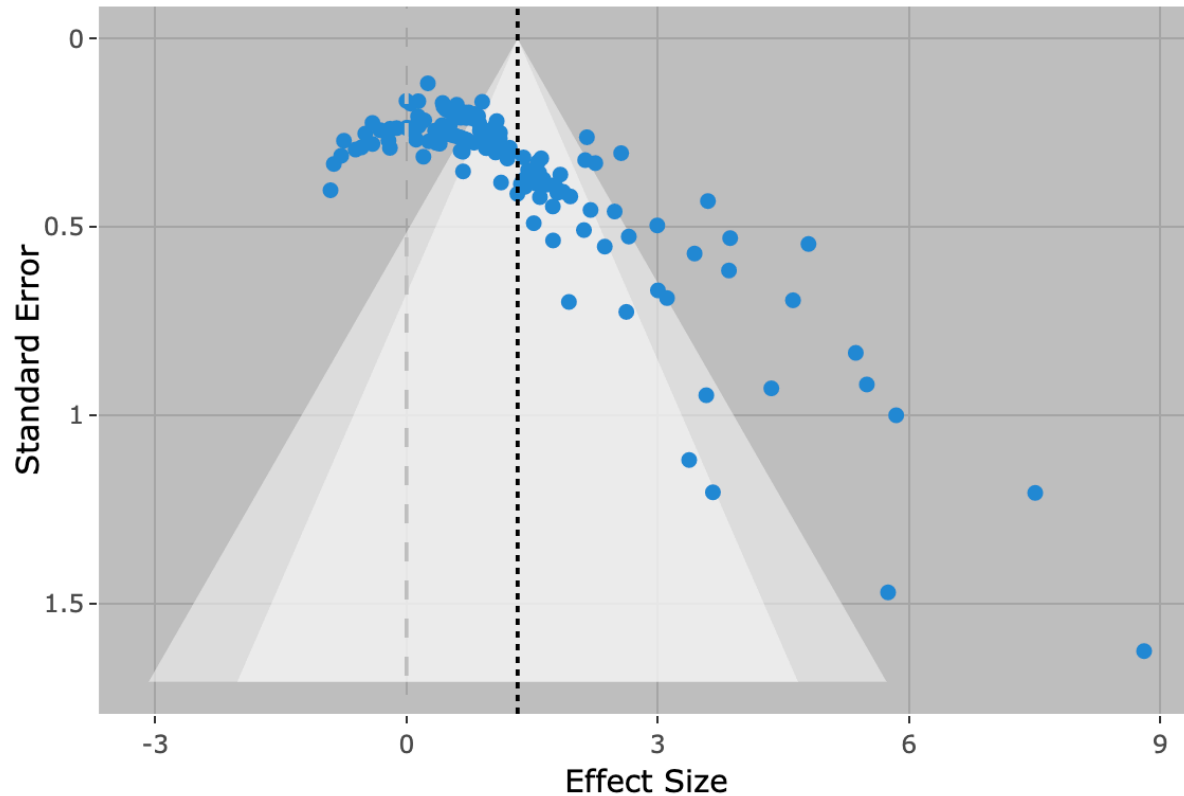
This triangle is for your reference, and corresponds to a 95% confidence interval around the mean

You should expect all points to fall within the 95% confidence interval

This plot shows the 95% confidence interval centered on zero

You could also center the confidence interval on the grand mean effect size

# What if the points fall far outside the funnel?



Funnel plot for mutual exclusivity meta-analysis (Lewis, et al., 2020)

Suggests there may be an important **moderator** for your effect.

What is the most likely moderator in this case?

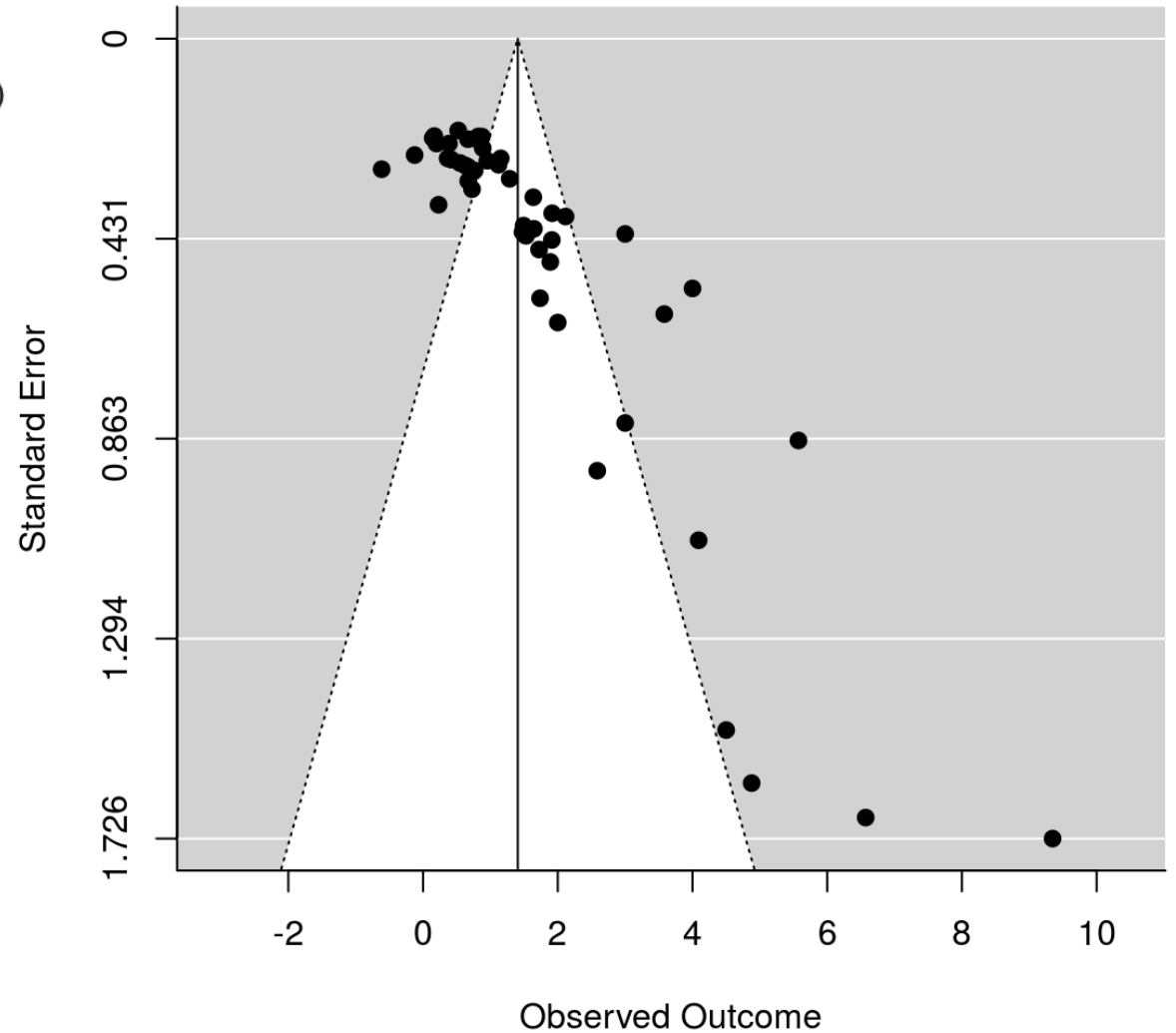
# Funnel Plots: Questions addressed

1. Is there evidence for publication bias/p-hacking?
  - In the absence of bias/p-hacking should expect points to be symmetrical
2. Are there moderators?
  - In the absence of moderators, should expect all points to fall inside funnel

# Making your own funnel plot

```
ma_model <- rma(ma_data$d_calc, ma_data$d_var_calc)
```

```
funnel(ma_model)
```





# Notes on entering search results

- Enter all papers even if you decide to exclude it
- Make sure to include the **apa citation** and **link** – do this as you are going through.
- For **screening\_decision** column, use “include”, “exclude” or “?”
- Add a **notes** column for extra info
- More generally, you will be reading your spreadsheets into R later on, so keep in mind that standardization is important