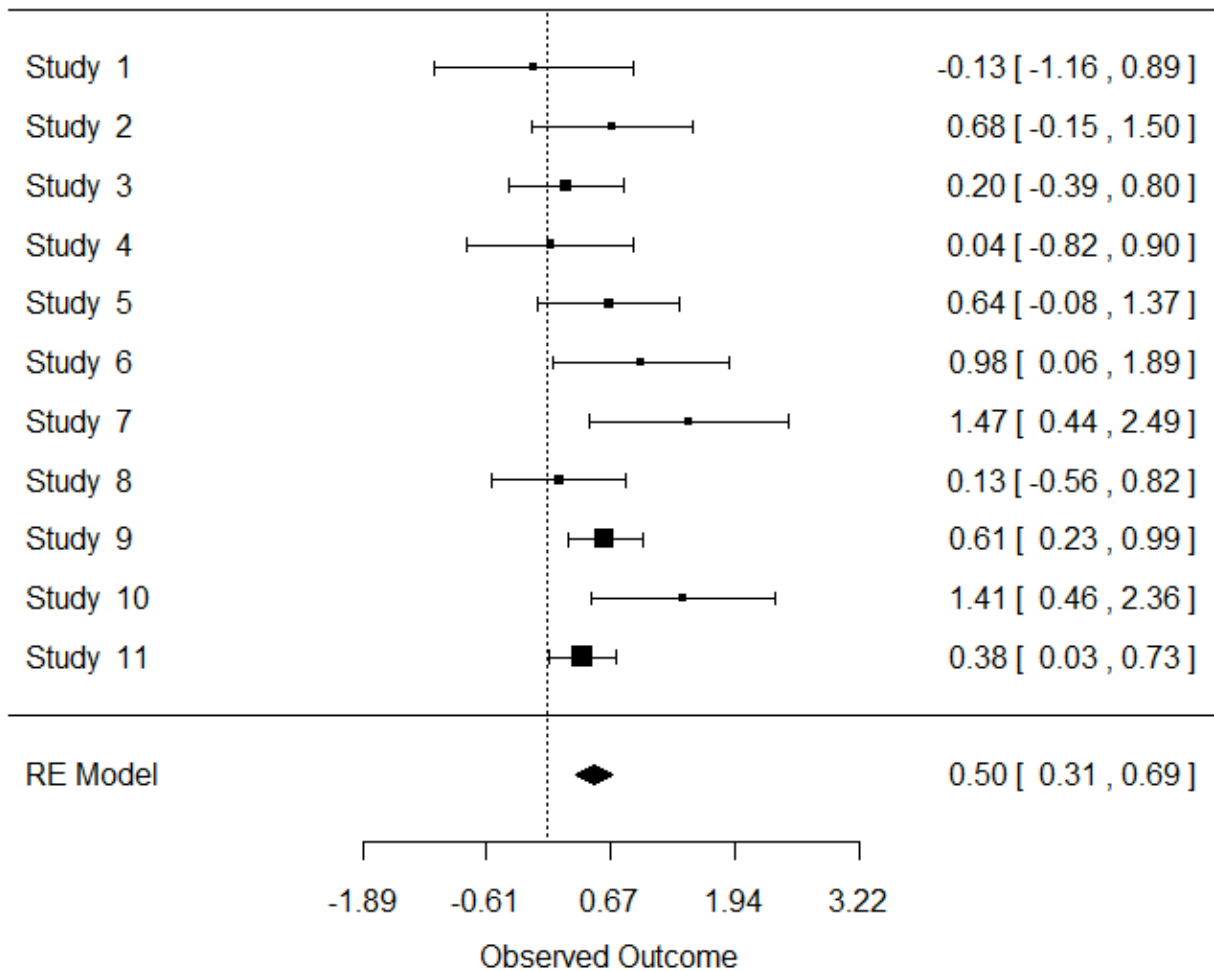


Chapter 21 – Meta-Analysis

The exercises for this chapter are so interrelated that I am giving all of the answers, and not just the odd numbered ones.

21.1 Mazzucchelli et al. (2010) study



21.2 – 21.3

Author	SubGrp	n1	n2	g	sg^2	weight	WG	W*g^2	W^2	W(gi-gbar)^2
Barlow86a	E	12.00	12.00	-0.134	0.2740	3.6495	-0.4891	0.0655	13.3198359	1.4609
Besyner79	E	14.00	16.00	0.675	0.1790	5.5865	3.7709	2.5454	31.21001217	0.1737
Lovett88	E	33.00	27.00	0.204	0.0930	10.7527	2.1935	0.4475	115.6203029	0.9338
Stark	E	10.00	9.00	0.043	0.1930	5.1813	0.2228	0.0096	26.84635829	1.0759
VanDenHaut	E	15.00	14.00	0.644	0.1380	7.2464	4.6667	3.0053	52.5095769	0.1530
Weinberg	E	10.00	9.00	0.976	0.2180	4.5872	4.4771	4.3696	21.04199983	1.0451
Wilson	E	9.00	11.00	1.466	0.2750	3.6364	5.3309	7.8151	13.2231405	3.4025
SUM		103.00	98.00			40.6402	20.1729	18.2580	273.7716	
Barlow86a	M	12.00	13.00	0.133	0.1240	8.0645	1.0725	0.1427	65.0364204	1.0784
Fordyce77	M	50.00	60.00	0.609	0.0380	26.3158	16.0263	9.7600	692.5207756	0.3202
Fordyce83	M	40.00	13.00	1.41	0.2330	4.2918	6.0515	8.5326	18.41993774	3.5644
Reich81	M	49.00	49.00	0.378	0.0320	31.2500	11.8125	4.4651	976.5625	0.4552
SUM		151.00	135.00			69.9222	34.9629	22.9004	1752.5396	
GrandSum		254.00	233.00			110.5623	55.1358		2026.3113	13.6631
						Mean g =	0.4987	Q =		13.6631 which is chi.sq on 10 df
						se(Mean g) =	0.0551	C =		p = .189
						CI-lower =	0.3123	Tau =		
						CI-upper	0.6851			
										0.1993

21.4 The following results are from R using library(metaphor)

Fixed-Effects Model (k = 4)

Test for Heterogeneity:

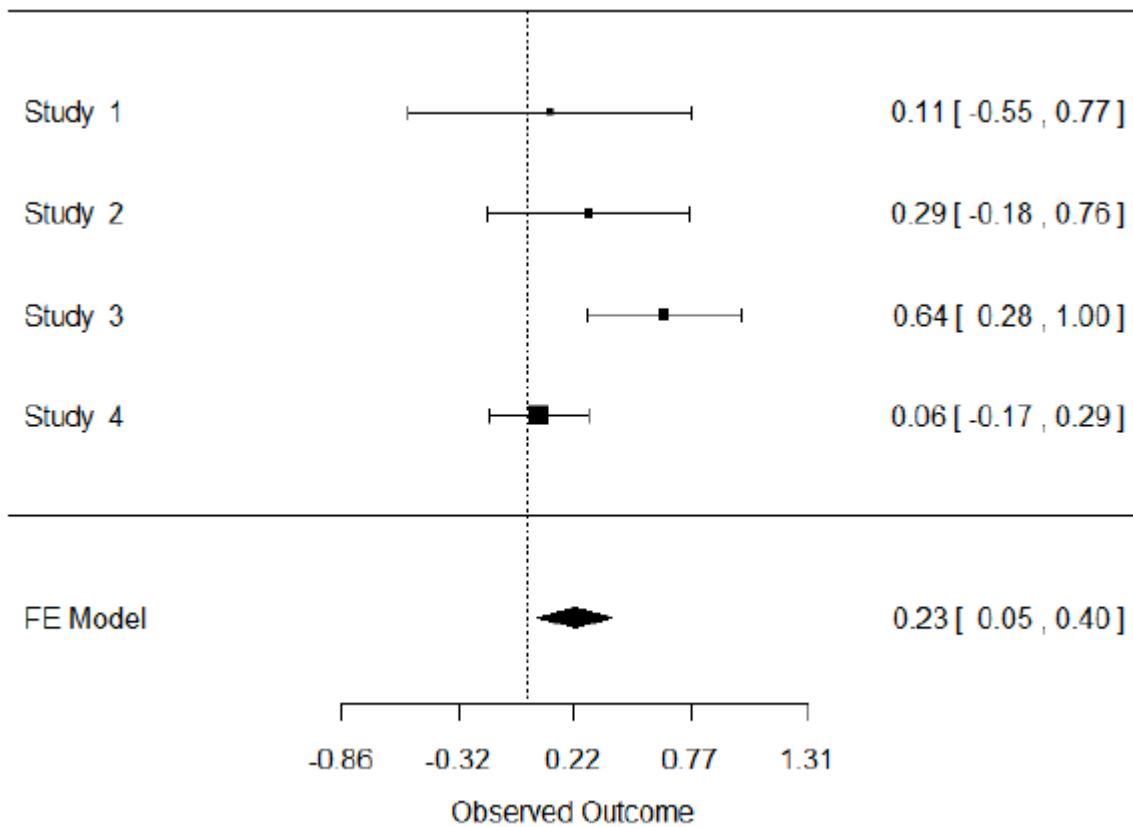
$Q(df = 3) = 7.2655, p\text{-val} = 0.0639$

Model Results:

```
estimate   se   zval   pval  ci.lb  ci.ub
0.2274  0.0881  2.5813  0.0098  0.0547  0.4001  **
```

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

21.5



21.6 The confidence interval does not include 0, and we can safely reject the null hypothesis and conclude that methylphenidate does increase the severity of tics in these children.

21.7 - 21.9

Fixed-Effects Model (k = 3)

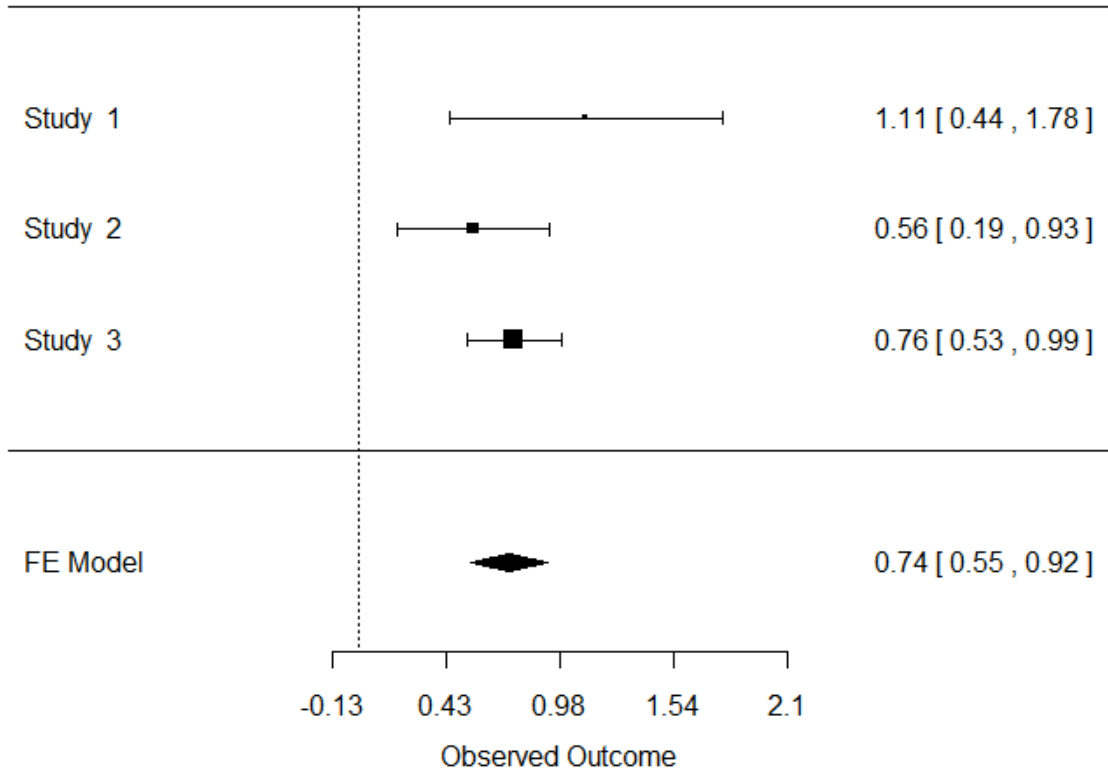
Test for Heterogeneity:

Q(df = 2) = 2.1121, p-val = 0.3478

Model Results:

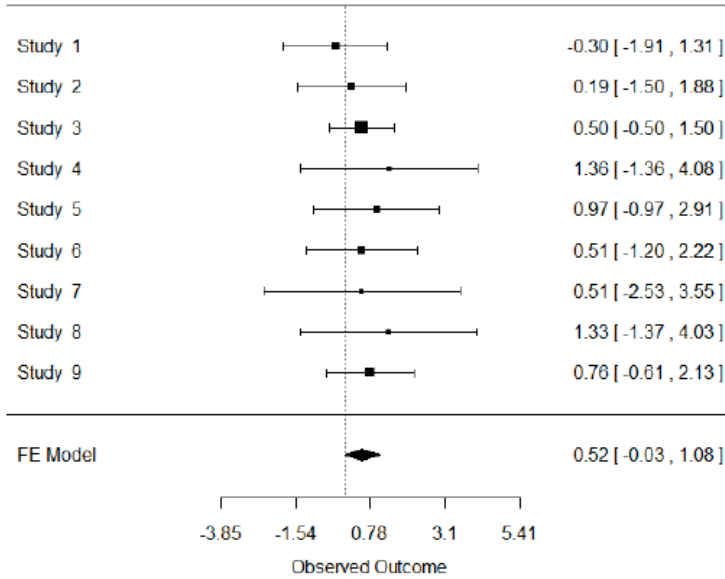
estimate	se	zval	pval	ci.lb	ci.ub	
0.7364	0.0955	7.7109	<.0001	0.5492	0.9236	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1



Again we have too few studies to seriously look at heterogeneity.

21.10 – 21.11



Fixed-Effects Model (k = 9)

Test for Heterogeneity:

$Q(df = 8) = 2.1826$, p-val = 0.9749

Model Results:

```
estimate    se    zval    pval    ci.lb    ci.ub
0.5239  0.2826  1.8542  0.0637 -0.0299  1.0777 .
```

Signif. codes: 0 '****' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

21.12 – 21.16 Kapoor, Rajkumar et al. (2010)

The risk ratios and log risk ratios are

Risk Ratio

4.102326 6.336000 8.212389 1.963636

Log Risk Ratio

1.411554 1.846248 2.105644 0.674798

Mean Risk Ratio and confidence limits

Log Risk Ratio

Estimate	se	zval	pval	ci.lb	ci.ub
1.5747	0.3277	4.8055	<.0001	0.9324	2.2170

Risk Ratio	CIlower	CIupper
4.8293	2.5406	9.1798

Even at the low end of the confidence interval the addition of thalidomide increases the chances of success to 2.5 times the chance of success in the control group.

21.17 Random effects model for Bisson and Martin (2009) study

Random-Effects Model (k = 14; tau² estimator: REML)

tau² (estimate of total amount of heterogeneity): 438.6370 (SE = 189.2833)

tau (sqrt of the estimate of total heterogeneity): 20.9437

I² (% of total variability due to heterogeneity): 94.80%

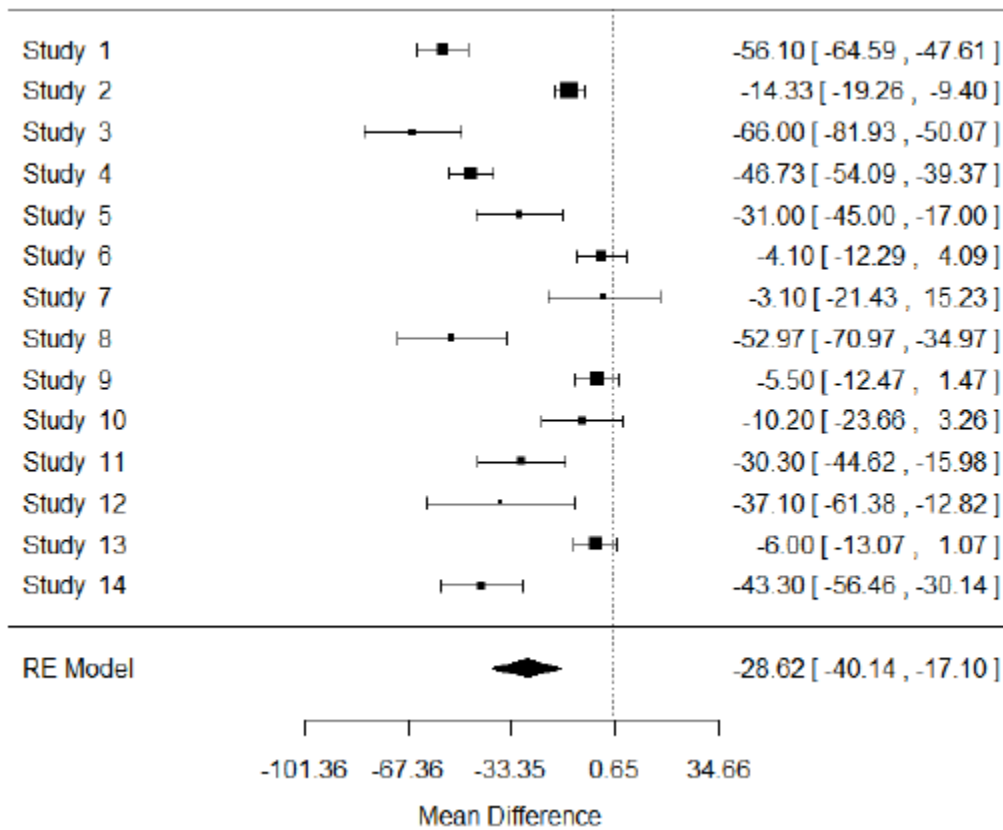
H² (total variability / within-study variance): 19.24

Test for Heterogeneity:

Q(df = 13) = 236.1772, p-val < .0001

Model Results:

estimate	se	zval	pval	ci.lb	ci.ub	
-28.6212	5.8774	-4.8697	<.0001	-40.1407	-17.1017	***



Note that we can reject the null hypothesis in our test for heterogeneity, though we have no specific variable that might explain that variability. We can also conclude that VBT is a more effective treatment than the Control treatment.