Table 1. Distribution of Identified Meta-regression Publications

Publication Category	Number of Articles
Fixed Effects Models	4
Random Effects Models	11
Control Rate Models	9
Bayesian and/or Hierarchical Models	13
Overviews and Challenges	19
Multiple Treatments and/or Outcomes	5
Examples	24
Total	85

Table 2. Simulation Parameters

Parameter	Meaning	Simulation Values			Range of Odds Ratios
ϕ	baseline outcome rate	-0.6	0.0	0.6	0.55 to 1.82
γ_0	additive treatment effect	0.0	0.6		1 to 1.82
γ_1	treatment effect that depends on baseline rate	-0.6	0.0	0.6	0.55 to 1.82
γ_2	treatment effect of a study-level covariate	-0.6	0.0	0.6	0.55 to 1.82
γ_3	treatment effect of a person-level covariate	-0.6	0.0	0.6	0.55 to 1.82
σ_{xi}	within-study standard deviation of a person-level covariate	0.0	0.5		not applicable
$\sigma_{\upsilon i}$	a study-level random effect	0.0	0.5		not applicable
ρ	the correlation between baseline, study covariate and person covariate	0.0	0.3	0.6	not applicable
k	Number of studies	3	10	30	not applicable
tilt	Variability in sample sizes across studies	0	1		not applicable

Table 3. Example of Data Layout for Logistic Meta-regression

Study	Treatment	Outcome	Number of cases (weight)	Study-Level Covariate	Arm-Level Covariate
1	0	0	25	40	45
1	0	1	25	40	45
1	1	0	20	40	35
1	1	1	30	40	35
2	0	0	40	38	39
… and so on					

Table 4. Simulation Results Tables

Table Number	Interaction	Meaning	Method(s) for which this interaction was practically important	Sum-of-Squares
5	γ_3 by *tilt*	treatment effect of a person-level covariate by variability in sample sizes across studies	Fixed Effects Control Rate Random Effects	88.55 55.99 47.17
6	σ_{xi} by γ_3	within-study standard deviation of a person-level covariate by treatment effect of a person-level covariate	Fixed Effects + Covariates	58.64
7	γ_2 by k	treatment effect of a study-level covariate by number of studies	Random Effects Control Rate Fixed Effects	47.08 40.70 31.33
8	γ_1 by ϕ	treatment effect that depends on baseline rate by baseline outcome rate	Random Effects + Covariates Fixed Effects Fixed Effects + Covariates	44.24 43.69 42.50
9	γ_3 by ϕ	treatment effect of a person-level covariate by baseline outcome rate	Control Rate Random Effects Fixed Effects	36.18 32.59 30.02
10	γ_2 by ϕ	treatment effect of a study-level covariate by baseline outcome rate	Control Rate	33.69

Table 5. Percent bias in γ_o associated with the γ_3 by *tilt* interaction

		γ_3 = -0.6		γ_3 = 0		γ_3 = 0.6	
Method	**Std. Error**	*tilt* = 0	*tilt* = 1	*tilt* = 0	*tilt* = 1	*tilt* = 0	*tilt* = 1
Fixed Effects[a]	1.9	21.8	-14.1	1.6	-3.3	-30.1	-6.2
Fixed Effects + Covariates	5.0	-9.7	5.8	2.2	-2.1	6.9	-4.7
Random Effects[a]	1.6	23.2	-9.9	2.3	-7.6	-18.1	-3.9
Random Effects + Covariates	1.9	-3.3	-11.8	3.4	-7.1	6.8	NR[b]
Control Rate[a]	1.6	23.6	-9.9	3.8	-8.4	-17.3	-2.7

The following parameters are held constant: $\phi = 0$, $\gamma_0 = 0.6$, $\gamma_1 = 0$, $\gamma_2 = 0$, $\sigma_{xi} = 0$, $\sigma_{vi} = 0$, $\rho = 0$, $k = 30$.

[a] This table corresponds to an interaction that was practically important for these methods.

[b] NR=not reportable. This method does not converge for this combination of simulation parameters.

Table 6. Percent bias in γ_o associated with the σ_{xi} by γ_3 interaction

		σ_{xi} = 0			σ_{xi} = 0.5		
Method	**Std. Error**	γ_3 = -0.6	γ_3 = 0	γ_3 = 0.6	γ_3 = -0.6	γ_3 = 0	γ_3 = 0.6
Fixed Effects	1.9	21.8	1.6	-30.1	19.5	0.9	-32.8
Fixed Effects + Covariates [a]	5.0	-9.7	2.2	6.9	58.0	-10.2	-8.3
Random Effects	1.6	23.2	2.3	-18.1	20.9	1.8	-21.2
Random Effects + Covariates	1.9	-3.3	3.4	6.8	-5.2	2.2	1.4
Control Rate	1.6	23.6	3.8	-17.3	21.2	3.2	-20.0

The following parameters are held constant: ϕ = 0, γ_0 = 0.6, γ_1 = 0, γ_2 = 0, σ_{vi} = 0, ρ = 0, k = 30, *tilt* = 0.

[a] This table corresponds to an interaction that was practically important for these methods.

Table 7. Percent bias in γ_o associated with the γ_2 by k interaction

Method	Std. Error	γ_2 = -0.6		γ_2 = 0		γ_2 = 0.6	
		k = 10	k = 30	k = 10	k = 30	k = 10	k = 30
Fixed Effects [a]	1.9	38.9	-8.1	14.9	1.6	-25.3	2.3
Fixed Effects + Covariates	5.0	35.2	9.8	34.3	2.2	32.2	-2.6
Random Effects [a]	1.6	50.8	0.6	19.5	2.3	-11.7	9.8
Random Effects + Covariates	1.9	39.3	8.3	39.7	3.4	33.0	-2.3
Control Rate [a]	1.6	49.7	1.7	20.9	3.8	-10.6	9.4

The following parameters are held constant: ϕ = 0, γ_0 = 0.6, γ_1 = 0, γ_3 = 0, σ_{xi} = 0, σ_{vi} = 0, ρ = 0, *tilt* = 0.

[a] This table corresponds to an interaction that was practically important for these methods.

Table 8. Percent bias in γ_o associated with the γ_1 by ϕ interaction

Method	Std. Error	γ_1 = -0.6			γ_1 = 0			γ_1 = 0.6		
		ϕ = -0.6	ϕ = 0	ϕ = 0.6	ϕ = -0.6	ϕ = 0	ϕ = 0.6	ϕ = -0.6	ϕ = 0	ϕ = 0.6
Fixed Effects[a]	1.9	-19.0	-6.2	14.4	-2.5	1.6	7.7	26.4	5.4	-8.5
Fixed Effects + Covariates[a]	5.0	-33.4	-7.1	45.0	-9.7	2.2	23.6	30.3	1.9	-15.0
Random Effects	1.6	-12.5	-5.2	8.0	-3.6	2.3	6.0	25.6	5.2	-3.8
Random Effects + Covariates[a]	1.9	-16.3	-0.8	21.2	-3.1	3.4	7.9	29.4	1.8	-13.6
Control Rate	1.6	-8.8	-2.9	6.3	-2.8	3.8	7.9	12.7	-0.6	6.8

The following parameters are held constant: γ_0 = 0.6, γ_2 = 0, γ_3 = 0, σ_{xi} = 0, σ_{vi} = 0, ρ = 0, k = 30, *tilt* = 0.

[a] This table corresponds to an interaction that was practically important for these methods.

Table 9. Percent bias in γ_o associated with the γ_3 by ϕ interaction

		γ_3 = -0.6			γ_3 = 0			γ_3 = 0.6		
Method	**Std. Error**	ϕ = -0.6	ϕ = 0	ϕ = 0.6	ϕ = -0.6	ϕ = 0	ϕ = 0.6	ϕ = -0.6	ϕ = 0	ϕ = 0.6
Fixed Effects[a]	1.9	19.6	21.8	23.6	-2.5	1.6	7.7	-23.5	-30.1	-28.4
Fixed Effects + Covariates	5.0	-25.4	-9.7	21.2	-9.7	2.2	23.6	5.5	6.9	7.2
Random Effects[a]	1.6	18.6	23.2	24.9	-3.6	2.3	6.0	-21.6	-18.1	-17.7
Random Effects + Covariates	1.9	-10.6	-3.3	4.0	-3.1	3.4	7.9	3.2	6.8	9.8
Control Rate[a]	1.6	18.9	23.6	25.4	-2.8	3.8	7.9	-21.1	-17.3	-16.9

The following parameters are held constant: γ_0 = 0.6, γ_1 = 0, γ_2 = 0, σ_{xi} = 0, σ_{vi} = 0, ρ = 0, k = 30, *tilt* = 0.

[a] This table corresponds to an interaction that was practically important for these methods.

Table 10. Percent bias in γ_o associated with the γ_2 by ϕ interaction

		γ_2 = -0.6			γ_2 = 0			γ_2 = 0.6		
Method	**Std. Error**	ϕ = -0.6	ϕ = 0	ϕ = 0.6	ϕ = -0.6	ϕ = 0	ϕ = 0.6	ϕ = -0.6	ϕ = 0	ϕ = 0.6
Fixed Effects	1.9	-8.7	-8.1	-7.8	-2.5	1.6	7.7	12.7	2.3	3.7
Fixed Effects + Covariates	5.0	-8.4	9.8	32.7	-9.7	2.2	23.6	-13.7	-2.6	22.0
Random Effects	1.6	-8.2	0.6	1.5	-3.6	2.3	6.0	11.2	9.8	13.2
Random Effects + Covariates	1.9	-2.9	8.3	12.5	-3.1	3.4	7.9	-4.1	-2.3	6.8
Control Rate[a]	1.6	-7.6	1.7	2.4	-2.8	3.8	7.9	10.9	9.4	12.7

The following parameters are held constant: γ_0 = 0.6, γ_1 = 0, γ_3 = 0, σ_{xi} = 0, σ_{vi} = 0, ρ = 0, k = 30, *tilt* = 0.

[a] This table corresponds to an interaction that was practically important for these methods.