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Simulation checks

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Simulation checks

Supplemental Material 3

In order to insure the reliability of our calculation method, for all scenarios where $G_1 = G_2 = 0$, we compared empirical means and variances of all estimators (i.e. means and variances of all estimates) with theoretical means and variances (i.e. expected means and variances, computed based on equations in Tables 1, 2 and 3). We will first present results for **biased estimators** (Cohen's d_s , Glass's d_s using either sd_1 or sd_2 as standardizer, Shieh's d_s and Cohen's d'_s) and second, results for **unbiased estimators** (Hedges' g_s , Glass's g_s using either sd_1 or sd_2 as standardizer, Shieh's g_s and Hedges' g'_s). For both biased and unbiased estimators, results will be subdivided into 4 conditions: - When population variances and sample sizes are equal across groups (condition a);

- When population variances are equal across groups and sample sizes are unequal (condition b);
- When population variances are unequal across groups and sample sizes are equal (condition c);
- When population variances and sample sizes are unequal across groups (condition d).

Because the equations for theoretical means and variances of Cohen's d_s and Hedges' g_s rely on the assumption of normality and equality of population variances, we expect empirical and theoretical parameters to be very close only in conditions a and b. For all other estimators, the equations for theoretical means and variances rely solely on the assumption of normality and therefore, we expect empirical and theoretical parameters to be very close in all conditions.

Biased estimators

When population variances and sample sizes are equal across groups (condition a), according to our expectations, empirical and theoretical parameter are very close for all

²⁹ estimators.

30 When population variances are equal across groups and sample sizes are
31 unequal (condition b).

32 When population variances are unequal across groups and sample sizes are
33 equal (condition c).

34 When population variances and sample sizes are unequal across groups
35 (condition d).

³⁶ Unbiased estimators

³⁷ When population variances and sample sizes are equal across groups
³⁸ (condition a).

³⁹ When population variances are equal across groups and sample sizes are
⁴⁰ unequal (condition b).

⁴¹ When population variances are unequal across groups and sample sizes are
⁴² equal (condition c).

⁴³ When population variances and sample sizes are unequal across groups
⁴⁴ (condition d).

Table 1

$|E[\hat{\delta}] - \mu_{\delta}|$

	δ_{Cohen}	δ_{Glass_1}	δ_{Glass_2}	δ'_{Cohen}	δ_{Glass_3}
max	0.012	0.022	0.023	0.012	0.022
min	0.000	0.000	0.000	0.000	0.000
mean	0.002	0.004	0.005	0.002	0.004
sd	0.003	0.006	0.007	0.003	0.006

$ E(\hat{\delta}) - \mu_{\delta} $	Cohen	<i>Glass</i> ₁	<i>Glass</i> ₂	Cohen'	Shieh
Max	tableA[1,1]				
Min	tableA[2,1]				
Mean	tableA[3,1]				
Standard deviation	tableA[4,1]				

$\frac{S^2_{\hat{\delta}}}{\sigma_{\delta}}$	
Cohen	
:—:	:—:
Cohen	Glass1
Cohen	Glass1