Table 1: Variance in reliability inflates true heterogeneity

| | | Observed Effect Sizes | | | |
|---|---|---|---|---|---|
| | | Study 1 | Study 2 | Study 3 | |
| Meta-Analysis | $\rho_{xy}$ | $\sqrt{R_{xx'}} \times \sqrt{R_{yy'}} = .6$ | $\sqrt{R_{xx'}} \times \sqrt{R_{yy'}} = .7$ | $\sqrt{R_{xx'}} \times \sqrt{R_{yy'}} = .8$ | SD(ES) |
| I | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 |
| II | 0.3 | 0.18 | 0.21 | 0.24 | 0.03 |
| III | 0.5 | 0.30 | 0.35 | 0.40 | 0.05 |

*Note:* Reproduced from Olsson Collentine et al. (2020). The values under Study 1, 2 and 3 are observed effect sizes for that study given its measurement reliability $\sqrt{R_{xx'}} \times \sqrt{R_{yy'}}$ and the true effect size $\rho_{xy}$ when within-study sample size is infinite. SD (ES) is the standard deviation of the observed effect sizes for meta-analysis I, II and III, equivalent to heterogeneity given infinite within-study sample sizes. As true heterogeneity is absent, any SD(ES) values above zero represent bias. Code to reproduce table: LINK

## Table 2

### Imperfect reliability suppresses true heterogeneity

Table 2: Imperfect reliability suppresses true heterogeneity

| | Observed Effect Sizes | | | |
|---|---|---|---|---|
| $\sqrt{R_{xx'}} \times \sqrt{R_{yy'}}$ | Study 1 | Study 2 | Study 3 | SD(ES) |
| 1 | 0.1 | 0.15 | 0.2 | 0.05 |
| 0.8 | 0.08 | 0.12 | 0.16 | 0.04 |
| 0.6 | 0.06 | 0.09 | 0.12 | 0.03 |

*Note:* The values under Study 1, 2 and 3 are observed effect sizes for that study given the measurement reliability $\sqrt{R_{xx'}} \times \sqrt{R_{yy'}}$ and the true effect size of that study (first row) when within-study sample size is infinite. SD (ES) is the standard deviation of the observed effect sizes, equivalent to heterogeneity given infinite within-study sample sizes. Code to reproduce table: LINK