Summary of Appendix 4: lnRR & SMD

Preface: from 66 Evo Eco datasets, I can only find 5 datasets which provide raw data for lnRR or SMD. But one dataset contains negative sign which can not be used to calculate lnRR. So I tried 4 datasets.

Overall: it is hard to find significant slope when using effective sample size, but it is common to find significant slope for sampling variance or standard error

Questions need to chat:

(a) Whether any of the following 4 cases are suitable for example? If none, I will continue

(b) When adding publication year as a moderator (e.g., Eq. 24 or 29), should we use absolute effect size

**See following for 4 cases**

**Case1: ft027**

**Title**

Murphy G E P , Romanuk T N . A meta-analysis of declines in local species richness from human disturbances[J]. Ecology and Evolution, 2014, 4(1):91-103.

**Results**

1. Meta-analytic mean

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | n | k | mean | CI | PI | I2\_obsID | I2\_paperID | I2\_total | Q |
| lnRR | 241 | 322 | -0.17 | -0.22 to -0.13 | -0.89 to 0.54 | 34.2 | 62.9 | 97.1 | 7927.9 |
| SMD | 241 | 322 | -0.52 | -0.68 to -0.37 | -2.69 to 1.64 | 60.1 | 26.4 | 86.5 | 1675.2 |

**2. Publication bias**

2.1 Conventional approach (Eq. 21 & 22)

2.1.1 Results for sampling SE (Eq. 21)

Significant slope both for lnRR and SMD

|  |  |  |  |
| --- | --- | --- | --- |
|  | k | slope | CI |
| lnRR | 322 | **-0.60** | **-1.14 to -0.06** |
| SMD | 322 | **-1.82** | **-2.09 to -1.56** |

2.2.1 Results for sampling variance (Eq. 22)

Significant slope both for lnRR and SMD

|  |  |  |  |
| --- | --- | --- | --- |
|  | k | slope | CI |
| lnRR | 322 | **-0.56** | **-0.96 to -0.17** |
| SMD | 322 | **-3.19** | **-3.75 to -2.63** |

2.2 New method – effective sample size

2.2.1 First stage (Eq.27) – effective sample size based standard error (SE)

Non-significant slope both for lnRR and SMD

|  |  |  |  |
| --- | --- | --- | --- |
|  | k | slope | CI |
| lnRR | 322 | -0.13 | -0.37 to 0.11 |
| SMD | 322 | -0.62 | -1.42 to 0.17 |

2.2.2 Second stage (Eq.28) – effective sample size based sampling variance (var)

Non-significant slope both for lnRR and SMD

|  |  |  |  |
| --- | --- | --- | --- |
|  | k | slope | CI |
| lnRR | 322 | -0.15 | -0.37 to 0.06 |
| SMD | 322 | -0.55 | -1.28 to 0.18 |

2.2.3 All in (Eq.29) – SE + year + moderators (extracted from original paper)

Significant slope both for lnRR and SMD – this is a bit strange to me

|  |  |  |  |
| --- | --- | --- | --- |
|  | k | slope | CI |
| lnRR | 131 | **-1.11** | **-1.58 to -0.65** |
| SMD | 131 | **-3.23** | **-4.84 to -1.63** |

**Case2: ft078**

**Title**

Davidso K E , Fowler M S , Skov M W , et al. Livestock grazing alters multiple ecosystem properties and services in salt marshes: a meta-analysis[J]. Journal of Applied Ecology, 2017.

**Results**

1. Meta-analytic mean

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | n | k | mean | CI | PI | I2\_obsID | I2\_paperID | I2\_total | Q |
| lnRR | 54 | 261 | -0.25 | -0.4 to-0.1 | -1.94 to 1.44 | 19.1 | 80.6 | 99.7 | 20259.1 |
| SMD | 54 | 261 | -0.21 | -0.45 to 0.04 | -3.71 to 3.3 | 2.2 | 94.3 | 96.6 | 3816.8 |

**2. Publication bias**

2.1 Conventional approach (Eq. 21 & 22)

2.1.1 Results for sampling SE (Eq. 21)

Significant slope for lnRR, but not for SMD

|  |  |  |
| --- | --- | --- |
|  | slope | CI |
| lnRR | **-0.94** | **-1.55 to -0.34** |
| SMD | -0.33 | -1.12 to 0.45 |

2.2.1 Results for sampling variance (Eq. 22)

Significant slope both for lnRR and SMD

|  |  |  |
| --- | --- | --- |
|  | slope | CI |
| lnRR | **-0.57** | **-1.11 to -0.04** |
| SMD | **-0.45** | **-0.84 to -0.06** |

2.2 New method – effective sample size

2.2.1 First stage (Eq.27) – effective sample size based standard error (SE)

Non-significant slope both for lnRR and SMD

|  |  |  |
| --- | --- | --- |
|  | slope | CI |
| lnRR | 0.48 | -0.16 to 1.12 |
| SMD | -0.62 | -1.42 to 0.17 |

2.2.2 Second stage (Eq.28) – effective sample size based sampling variance (var)

Non-significant slope both for lnRR and SMD

|  |  |  |
| --- | --- | --- |
|  | slope | CI |
| lnRR | 0.43 | -0.19 to 1.05 |
| SMD | 0.65 | -0.53 to 1.84 |

2.2.3 All in (Eq.29) – SE + year + moderators (extracted from original paper)

Non-significant slope both for lnRR and SMD

|  |  |  |
| --- | --- | --- |
|  | slope | CI |
| lnRR | 0.28 | -0.59 to 1.15 |
| SMD | 0.09 | -1.84 to 2.02 |

**Case3: ft109**

**Title**

Apek P , Manzoni S , Eva Katovská, et al. A plant–microbe interaction framework explaining nutrient effects on primary production[J]. Nature Ecology & Evolution. 2018

**Results**

1. Meta-analytic mean

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | n | k | mean | CI | PI | I2\_obsID | I2\_paperID | I2\_total | Q |
| lnRR | 50 | 467 | 0.23 | 0.14 to 0.33 | -0.88 to 1.35 | 15.5 | 84.1 | 99.7 | 7322.1 |
| SMD | 50 | 467 | 0.54 | 0.38 to 0.69 | -1.48 to 2.55 | 5.9 | 66.9 | 72.8 | 1574.9 |

**2. Publication bias**

2.1 Conventional approach (Eq. 21 & 22)

2.1.1 Results for sampling SE (Eq. 21)

Significant slope both for lnRR and SMD

|  |  |  |
| --- | --- | --- |
|  | slope | CI |
| lnRR | **0.58** | **0.24 to 0.93** |
| SMD | **5.91** | **5.19 to 6.63** |

2.2.1 Results for sampling variance (Eq. 22)

Significant slope both for lnRR and SMD

|  |  |  |
| --- | --- | --- |
|  | slope | CI |
| lnRR | **0.37** | **0.09 to 0.65** |
| SMD | **2.61** | **2.25 to 2.98** |

2.2 New method – effective sample size

2.2.1 First stage (Eq.27) – effective sample size based standard error (SE)

Non-significant slope both for lnRR and SMD

|  |  |  |
| --- | --- | --- |
|  | slope | CI |
| lnRR | 0.33 | -0.33 to 0.99 |
| SMD | 0.21 | -0.92 to 1.34 |

2.2.2 Second stage (Eq.28) – effective sample size based sampling variance (var)

Non-significant slope both for lnRR and SMD

|  |  |  |
| --- | --- | --- |
|  | slope | CI |
| lnRR | 0.27 | -0.20 to 0.76 |
| SMD | 0.18 | -0.67 to 1.02 |

2.2.3 All in (Eq.29) – SE + year + moderators (extracted from original paper)

Non-significant slope both for lnRR and SMD

|  |  |  |
| --- | --- | --- |
|  | slope | CI |
| lnRR | 0.36 | -0.57 to 1.31 |
| SMD | 0.62 | 0.45 to -1.00 |

**Case4: ft030**

**Title**

Piotr K. Rowiński, Björn Rogell. Environmental stress correlates with increases in both genetic and residual variances: A meta‐analysis of animal studies [J]. Evolution. 2017

1.56 [1.36,1.77] [0.3,2.83] 57.8 35 92.9 7592.3

>

**Results**

1. Meta-analytic mean

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | n | k | mean | CI | PI | I2\_obsID | I2\_paperID | I2\_total | Q |
| lnRR | 33 | 555 | 1.56 | 1.36 to 1.77 | 0.3 to 2.83 | 57.8 | 35 | 92.9 | 7592.3 |
| SMD | 33 | 555 | 1.06 | 0.94 to 1.19 | 0.06 to 2.06 | 39.9 | 58.9 | 98.8 | 12010.5 |

**2. Publication bias**

2.1 Conventional approach (Eq. 21 & 22)

2.1.1 Results for sampling SE (Eq. 21)

Significant slope for lnRR, but not for SMD

|  |  |  |
| --- | --- | --- |
|  | slope | CI |
| lnRR | **0.36** | **0.23 to 0.48** |
| SMD | 0.18 | -0.06 to 0.43 |

2.2.1 Results for sampling variance (Eq. 22)

Significant slope for lnRR, but not for SMD

|  |  |  |
| --- | --- | --- |
|  | slope | CI |
| lnRR | **0.02** | **0.001 to 0.03** |
| SMD | 0.20 | -0.15 to 0.55 |

2.2 New method – effective sample size

2.2.1 First stage (Eq.27) – effective sample size based standard error (SE)

Non-significant slope both for lnRR and SMD

|  |  |  |
| --- | --- | --- |
|  | slope | CI |
| lnRR | -0.67 | -1.40 to 0.052 |
| SMD | -0.07 | -0.34 to 0.19 |

2.2.2 Second stage (Eq.28) – effective sample size based sampling variance (var)

Non-significant slope both for lnRR and SMD

|  |  |  |
| --- | --- | --- |
|  | slope | CI |
| lnRR | -1.15 | -2.47 to 0.18 |
| SMD | -0.19 | -0.60 to 0.22 |

2.2.3 All in (Eq.29) – SE + year + moderators (extracted from original paper)

Non-significant slope both for lnRR and SMD

|  |  |  |
| --- | --- | --- |
|  | slope | CI |
| lnRR | -0.37 | -1.39 to 0.64 |
| SMD | -0.01 | -0.41 to 0.38 |