

Comparing Methodological Quality: Open Access vs. Traditional Journals

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Introduction

- ▶ **Why Open Access Matters:** Open Access (OA) publishing is encouraged by institutions such as European Commission (2012) and universities, as it promotes greater accessibility to research findings.
- ▶ **Research question:** However, a critical question remains unanswered. Do OA articles have a greater methodological quality than non-OA articles?
- ▶ **Previous research findings:** Prior studies have investigated differences in citation (Langham-Putrow et al., 2021) and the risk of bias (McGuire et al., 2023; Pastorino et al., 2016) but yielded inconclusive results.
- ▶ **Addressing the research gap:** Notably, no studies have assessed both the statistical power, one of the most important aspect of methodological quality, and risk of bias in both OA and non-OA articles.

Objectives

In the literature on the efficacy of psychotherapies pertaining to depression, is there a difference between OA and non-OA articles concerning:

1. Risk of Bias (RoB),
2. observed Effect Sizes,
3. sample sizes,
4. and statistical power?

Identification of studies

- ▶ Included studies were identified from the metapsy database (Miguel et al., 2022).
- ▶ Inclusion criteria:
 - ▶ adult patients,
 - ▶ self-reported or clinician rating of depression symptoms intensity,
 - ▶ continuous scales,
 - ▶ primary outcomes.
- ▶ The sample is based on 357 studies including 467 Effect Sizes (ES).

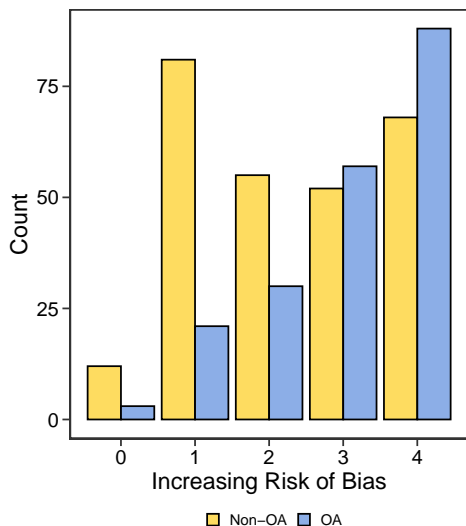
Rating	Number of ES	Number of studies
clinician	147	110
self-report	320	247

Extraction of the publication type

- ▶ Articles were categorized as OA if freely available from editors websites or PubMed.
- ▶ The extraction was done twice.
 - ▶ Six errors were found and corrected during the second extraction.

Publication type	Number of ES	Number of studies
Non-OA	268	190
OA	199	167

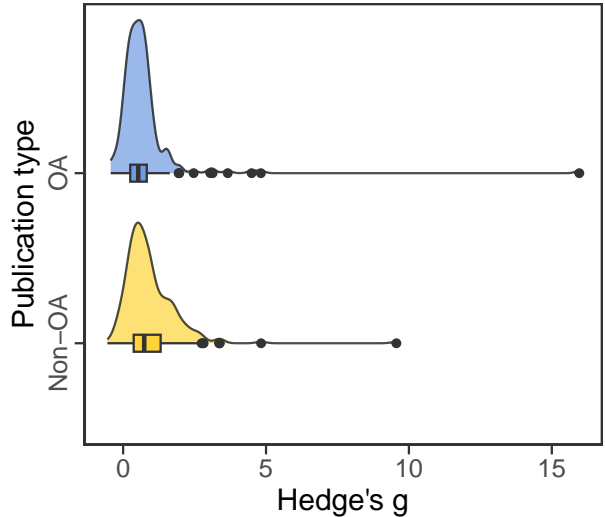
Difference in RoB between OA and non-OA



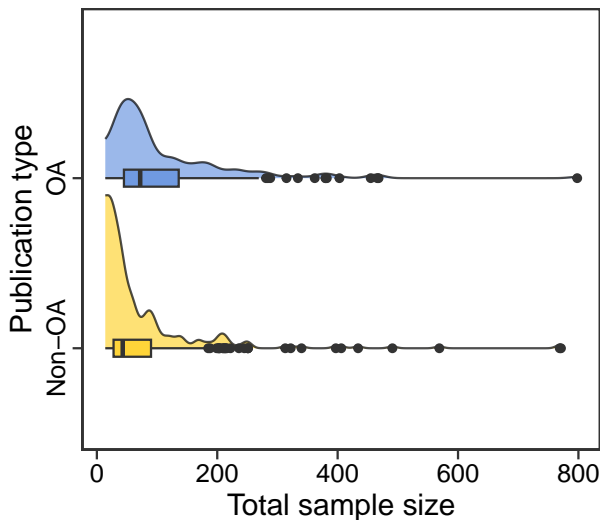
- ▶ A χ^2 test rejected the null hypothesis of independence between Risk of Bias and publication type (OA vs non-OA).
- ▶ $\chi^2 = 41.55$, $df = 4$, $p = 2.06 \times 10^{-8}$
- ▶ Cohen's $\omega = 0.2983$
- ▶ Only Cohen's ω equal to or larger than 0.16 is detectable with a sample size of 467, a power of 80% and an alpha threshold of 0.05.
- ▶ This result can be explained by:
 - ▶ the transparency requirements of certain OA journals,
 - ▶ RoB Tool extends the benefit of doubt to all situations where a clear decision about the level of risk cannot be reached.

Difference in observed ES between OA and non-OA

- ▶ Mann-Whitney U test
- ▶ $U = 32489$, $p = 5.41 \times 10^{-5}$
- ▶ $r = 0.19$, 95%*CI*[0.1, 0.28]
- ▶ The results remain the same without the two most extreme values.
- ▶ Only r equal to or larger than 0.13 are detectable with a sample size of 467, a power of 80% and an alpha threshold of 0.05.



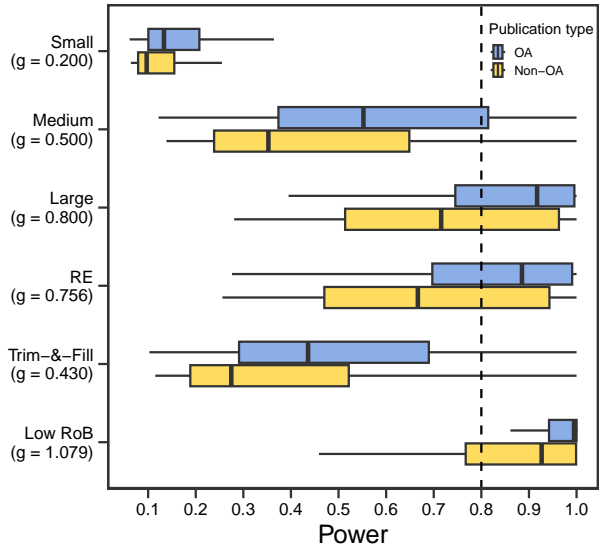
Difference in sample size between OA and non-OA



- ▶ Mann-Whitney U test
- ▶ $U = 18245.5$, $p = 5.25 \times 10^{-9}$
- ▶ $r = 0.27$, 95%CI[0.18, 0.35]
- ▶ Only r equal to or larger than 0.13 are detectable with a sample size of 467, a power of 80% and an alpha threshold of 0.05.

Difference in statistical power between OA and non-OA

- ▶ Six Mann-Whitney U tests were performed.
- ▶ All tests are significant.
- ▶ $r = 0.27$, 95%CI[0.18, 0.35]
- ▶ Only r equal to or larger than 0.13 are detectable with a sample size of 467, a power of 80% and an alpha threshold of 0.05.
- ▶ **Power is larger in OA articles compared to non-OA articles.**



Discussion

- ▶ **Sample Size and Statistical Power in OA vs. non-OA Articles:**
 - ▶ OA articles exhibit larger sample sizes and greater statistical power than non-OA articles;
 - ▶ OA articles display smaller observed ES than non-OA articles.
- ▶ **RoB Assessment:**
 - ▶ OA articles have a higher likelihood of being classified as high RoB;
 - ▶ lack of transparency in non-OA articles may explain this result;
 - ▶ sample size and statistical power are not considered in RoB tool.
- ▶ **Generalizability Across Fields:**
 - ▶ It is unclear whether these findings can be generalized to other fields.
- ▶ **Evaluation of Research and Researchers:**
 - ▶ when evaluating research or researchers, both methodological and statistical quality should be used, as emphasized by *CoARA* (2022).

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