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ABSTRACT SUBMISSION

Title: An Analysis of Statistical Power in Studies on Mild Cognitive Impairment

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Abstract

Objectives. There has been considerable interest in mild cognitive impairment (MCI) as a possible predictor of dementia. There has also been increasing interest in the reproducibility and statistical power of scientific studies more generally. The objective of this study is to determine whether the power of MCI studies is significantly different than the recommended guideline of 0.80.

Method. Following the lead of Button et al. (2013), we searched for all available meta-analyses on MCI. We analyzed a total of 23 meta-analyses (215 studies). For each meta-analysis, we treated the summary effect (Cohen's d, odds ratio, or risk ratio) as the population effect and then computed the power that each of the individual studies in that meta-analysis would have to detect its summary effect. To determine whether the median statistical power estimate was significantly different than 0.80 we computed its 95% confidence interval using a percentile bootstrap method.

Results. The median statistical power of each individual study to detect the summary effect of its parent meta-analysis was 0.59. The 95% CI (0.49, 0.73) did not contain 0.80 indicating that the median is statistically significantly lower than 0.80. Power estimates varied considerably across the 215 studies, ranging from 0.05 to 1.

Conclusion. The median statistical power of MCI studies included in our analysis was significantly lower the typically recommended value of 0.80. Low powered studies have a number of negative effects on the scientific process, reducing the reliability of published findings. More work needs to be done on this important topic.

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