Sample dependency

It is often the case that in a meta-analysis several different outcomes from one study are combined, leading to multiple effect sizes from the same study being included in one meta-analysis. If these multiple effect sizes are drawn from the same sample of participants, the effect sizes will be dependent because the same sample is included for more than one outcome, and thus counted more than once (Moeyaert et al., 2016). Research has shown dependent effect sizes are common in meta-analyses, but reporting on and investigation of the phenomenon are low (Ahn, Ames, and Myers, 2012; Cheung and Chan, 2004). We inspected whether dependency among studies is present by investigating pairs of primary studies with the same author and homogeneous effect sizes on whether their samples are independent or not. We expected a reasonable number of meta-analyses to contain dependent effect sizes [1].

We first sorted the complete original meta-analyses by effect size, and a fixed effect model was fitted for each subsequent pair of studies (e.g., study 1 with 2, study 2 with 3, study 3 with 4 and so on). If the p-value of the Q-statistic of a pair of studies is higher than .80, the effect sizes are homogeneous. All pair of studies with a Q-statistic p-value of .80 or higher were retained. Of these pairs of homogeneous studies, we chose the studies where at least one author was the author of both studies. These pairs of studies were retrieved and we checked whether the same samples were used in both studies, by investigating where the study took place and what type of participants were included.

Over all meta-analyses combined, we found a total of 248 possible pairs of dependent primary effect sizes (i.e., homogeneous effect sizes with a p-value of more than .80 for the Q-test, with at least one author being the same in both studies). Of those 248 pairs, we were unable to retrieve 47, leaving 201 pairs to be investigated. If a pair of primary studies *within one primary study* was indicated as possibly dependent (e.g., experiment 1 with experiment 2), we assumed different samples were used and no dependency was reported. Furthermore, since most papers omit specific details of the respondents or the institution where the experiment took place, we can only give an indication of dependency, and cannot be sure whether the data is actually dependent.

Of the inspected 201 pairs, 19 had an indication of having used the same sample of students (e.g., psychology students) from the same institutions (e.g., a specific university). In total, 11 out of 33 meta-analyses contained pairs of primary studies with possible dependent effect sizes.

[1] Our hypotheses, design, and analysis plan were preregistered and can be found at https://osf.io/v2m9j.

References

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