TITLE: Is scientific evidence mainly flawed? The need to assess credibility of scientific evidence with meta-research

ABSTRACT:

Background. Growing evidence suggests that a vast portion of published scientific evidence, including and in particular in the medical evidence, is flawed(Ioannidis, 2018). Major concerns have been raised on the quality, reproducibility, and ultimately validity of results coming from original studies. For example, among several putative risk factors for psychosis (Radua, 2018) or bipolar disorder (Bortolato, 2018), only few survived a comprehensive and quantitative assessment of credibility of evidence.

Many factors play a role in the emerging skepticism on scientific evidence from individual original studies, including but not limited to p value threshold, multiple comparisons correction, study design, calculation of needed sample size, number of events of interest, definitions of exposure and outcome, definitons of the intervention and the control group.

Meta-analysis account, or at least try to account for such heterogeneity present in literature of individual studies. However, similarly to what happens for original studies, even meta-analyses have shown poor quality, and large inconsistencies in terms of quantitative results, and ultimately in derived recommendations. For example, is has been shown that a huge number of meta-analyses is increasingly being published, however with often contrasting results on the very same topic.

In this context, meta-analyses have started to be assessed as original studies are, by means of umbrella reviews. Umbrella reviews provide a quantitative grading of credibility of evidence derived from available meta-analyses of interventions, or observational studies.

Finally, emerging statistical and methodological approaches are being applied and new grading frameworks are being developed to highlight which portion of evidence can be trusted, and viable solutions to improve quality of research need to be proposed.

The PhD project in meta-research aims to extensively to assess the credibility of evidence in neurosciences, by means of meta-analyses, umbrella reviews, novel approaches to detect areas that need to be improved in research methodology, as well as to propose novel approaches to fill the gap in evidence credibility.

REFERENCES

1. Ioannidis JPA. The Proposal to Lower P Value Thresholds to .005. JAMA. 2018 Apr 10;319(14):1429-1430. doi: 10.1001/jama.2018.1536. No abstract available. PMID: 29566133
2. Radua J, Ramella-Cravaro V, Ioannidis JPA, Reichenberg A, Phiphopthatsanee N, Amir T, Yenn Thoo H, Oliver D, Davies C, Morgan C, McGuire P, Murray RM, Fusar-Poli P. What causes psychosis? An umbrella review of risk and protective factors. World Psychiatry. 2018 Feb;17(1):49-66. doi: 10.1002/wps.20490. PMID: 29352556
3. Bortolato B, Köhler CA, Evangelou E, León-Caballero J, Solmi M, Stubbs B, Belbasis L, Pacchiarotti I, Kessing LV, Berk M, Vieta E, Carvalho AF. Systematic assessment of environmental risk factors for bipolar disorder: an umbrella review of systematic reviews and meta-analyses. Bipolar Disord. 2017 Mar;19(2):84-96. doi: 10.1111/bdi.12490. Epub 2017 May 3. Review. PMID: 28470927
4. Fusar-Poli P, De Micheli A, Rocchetti M, Cappucciati M, Ramella-Cravaro V, Rutigliano G, Bonoldi I, McGuire P, Falkenberg I. Semistructured Interview for Bipolar At Risk States (SIBARS). Psychiatry Res. 2018 Apr 14;264:302-309. doi: 10.1016/j.psychres.2018.03.074. [Epub ahead of print] PMID: 29665559

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EXPERIMENTAL DATA:

To be acquired	
Already acquired (ready to be used)	X

ETHICS COMMITTEE:

Obtained	
Conditioned submission	
Not required	*