



## Variance and Dissent

### Presentation

# THE EMERGENCE OF A NEW SPECIES: THE PROFESSIONAL META-ANALYST

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#### INTRODUCTION

Meta-analysis has become a popular pursuit not only is the number of published meta-analyses growing explosively, groups entirely devoted to the conduct of meta-analyses have come into being. This emergence of the professional meta-analyst may be cause for some reflection, especially since this professional will usually have roots in the field of epidemiology or biostatistics.

#### TYPES OF META-ANALYSES

There are three types of meta-analyses, distinct by motivation. The first just aims at obtaining higher statistical power, i.e. a significant *p*-value, which may not have been achieved in the original studies. This has led to the publication of meta-analyses of only two original studies. The second aims at obtaining the best risk estimate from many, often conflicting or even bewildering, studies. In its best form, it is an attempt to clarify some of the heterogeneity between studies by subgroup analysis. The third form is opportunistic, in the best sense of the word, and attempts to answer a question which the original studies were not aimed at, for instance side-effects where the original studies aimed at specific therapeutic effects.

#### AMOUNT OF ORIGINAL THOUGHT

Most meta-analyses are devoid of original thought, which is not to say that they are completely useless. The first type might come close to uselessness, however, if only a very small number of studies is pooled, of which the overall results could be caught by a cursory glance. Such meta-analyses add very little, if anything, to the original studies, and unjustly capitalize on full homogeneity, which implies that the *p*-values are not only overrated but also overstated. They can only be useful if the overall estimate is no longer apparent from the large set of original studies, as for instance in the cholesterol issue. Still, it is far from original. Original thought may come into the second type of meta-analyses, once they try to elucidate the reason for differences between study results. The third type may be fully original, and may even be the only instance in which meta-analysis is the only option to obtain an answer. If for instance it is hypothesized that bronchodilating drugs cause cardiac arrests, a meta-analysis of the causes of death in trials with these drugs, which were initially performed to look at asthmatic death, is an original solution to the issue at hand.

#### RESEARCH ETHICS

As long as scientific standing follows from publications, there is something intrinsically unfair about meta-analyses. A meta-analysis will

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usually require much less effort, funding and thought, than each of the original studies included in it. Since the meta-analysis combines the results of all these studies, and is thought to give the best estimate, it will subsequently be quoted widely, without any credit to the authors of the original papers.

This is most apparent when the meta-analysis is without original thought. Since these meta-analyses do have a research idea, which is not original, it can only be derived from others, who are not duly credited. This comes close to plagiarism.

Several solutions come to mind. The first is to include original papers only if the original authors consent to this (as well as the copyright holders). This is within reason of the analogy in which a meta-analysis is just a study with papers as the units of observation instead of patients. It seems unattractive, however, and would ask for too much self-restraint of the meta-analyst in case an author refuses "informed consent". The second option is to include all authors of the original papers as co-authors of the meta-analysis. This may cost a journal a page of finely printed author names, but gives credit to all who should receive it. The third option is to publish meta-analyses anonymously. This option has a clear drawback that no one can be held responsible for the writings, which impedes scientific discussion, whereas it also favours meta-analyses by institutions or professional meta-analyst groups.

#### THE PROFESSIONAL META-ANALYST

Inclusion of all authors of the original paper as authors of a meta-analysis has an advantage, other than fairness. It makes all these authors

responsible for the meta-analysis, which ensures the input of those who know the subject matter intimately.

The professional meta-analyst, who may even work in an institute devoted to meta-analysis, might be considered severely handicapped in this respect. He combines the potential handicap of most epidemiologists and biostatisticians, of being isolated from the clinical issue itself, with another handicap: being isolated from research on this clinical issue. Although there may be some compensation in specific methodological proficiency, it may well be that these are more than offset by the double drawbacks of too much distance from the clinical care and the research itself. Professional meta-analysis may lead to higher statistical precision, at the cost of validity.

It is often recognized that a meta-analysis, which is no more than a weighted average of different study results, should employ quality weights instead of only statistical, precision weights. The imprecise (small) but valid study should have more weight than the precise (large) invalid study. It is questionable whether professional meta-analysts can distinguish between valid and invalid studies, since they cannot "read between the lines" to see what is not there, or to judge procedures and questionnaires. Their only resource for assessing validity is by applying statistical and methodological standards, which will not only lead to a circular argument, but also to an undue preference for methodology over clinical soundness.

#### REFERENCES

Following what is stated under "research ethics", no references are made to any meta-analysis. All are free, however, to refer to this paper.