

## Against Methodological Fundamentalism: Towards a Science for a Complex Dynamic Psychology

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### Abstract

*Psychological research has generally suffered from methodological fundamentalism, which is an overly strict interpretation of what is considered “scientific” and has created a psychology of triviality. Methodological fundamentalism often constricts the study of a complex dynamic psychology that encompasses both observed and unobserved reality with interacting and interdependent variables. In Against Method, Feyerabend (1993) posits there could be no set scientific method and that great scientists are methodological opportunists who use any methodology that helps with discovery. As opposed to Fisher’s (1925) arbitrary, categorical standard of  $p < .05$ , I suggest as a strength of a scientific finding the review of confidence levels of across various populations, methods, measures and forms of analyses. Eventually, I hope that an unbiased computer analysis of studies can guide researchers as to what theories show high confidence levels across various populations, methods, measures and forms of analyses and suggest the next step to advance the science.*

### Keywords

Philosophy of science, Methodology, Complexity theory, Publication bias, Mixed methods.

### Introduction

Methodological fundamentalism is an overly strict interpretation as to what is considered “scientific” based on the assumption that science is only that, which is verifiable, by certain empirical methods. There is a bias of high impact journals that tend to follow a methodological fundamentalism that defines a scientific finding by such standards as  $p < .05$  and randomization [1].

Somewhere between methodological chaos and methodological fundamentalism, I believe that there is room for hypothesis testing that produces a high degree of explanatory power, utility and ecological validity. However, statistical and laboratory assumptions involve the isolation and manipulation of “independent” variables, which too often demonstrate little external validity. Current developmental and neuropsychology research presents evidence that there are few true “independent variables.” Psychological variables are often interacting and interdependent [2,3].

Methodological fundamentalism constricts the study of a complex psychological science. By complex psychology, I am referring to theories that have useful explanatory value for both concrete observable and inferred reality.

In Against Method, Feyerabend [4] stated that there could be no set scientific method. He felt that great scientists are methodological opportunists who use any methodology that helps with discovery. Kuhn [5], a physicist turned historian of science, wrote that scientists develop rules of doing science that are passed on to students. They protect these rules often at the expense of constricting discovery. Kuhn therefore argued for scientific pluralism.

Psychology’s rigid interpretation of empiricism as necessarily based on randomly controlled laboratory experimentation of observable concrete constructs using a demarcation of  $p < .05$  has helped to produce a psychology of triviality.

Let us look back on the past 200 years to see what we have achieved. The American Psychological Associations’ research literature search engine, PsycINFO, has records of over 4 million scholarly works. If we compare a similar time period with medical

research, we can see how little psychology has produced with the assumptions of logical positivism, and how successful medical research has been using the same methodological assumption. Psychology has assumed that our theories need to be tested the same way biological variables are studied in the laboratory setting.

For example, Cognitive Behavior Therapy (CBT) is the product of psychology's laboratory research. Shedler [6] recently wrote, "...the National Institute of Mental Health (NIMH) Treatment of Depression Collaborative Research Program... claims for the benefits of CBT were based on the finding that CBT was 'statistically significantly' more effective than the placebo control group... The primary outcome measure in the NIMH study was the 54-point Hamilton Depression Rating Scale. The difference between the CBT treatment group and the control group was 1.2 points. The 1.2 point difference is trivial and clinically meaningless" (p.49).

Wampold et al. [7] examined over 2,500 abstracts in psychotherapy outcome research. The authors concluded: "Currently, there is insufficient evidence to suggest that transporting an evidence-based therapy to routine care that already involves psychotherapy will improve the quality of services".

The demarcation between what is or is not scientific has ranged from Popper's [8] belief that the hypotheses must be falsifiable - which is often a subjective test - to Fisher's [9] objective, but arbitrary,  $p < .05$ . Although this confidence level is dimensional, many journal reviewers consider it categorical. They assume that results are a significant scientific finding depending on  $p < .05$ . Also, it is ironic that Fisher's test of what is a reliable finding has not, to my knowledge, been put to an empirical test. We have no idea how many valuable findings were rejected in the 90-95% interval range.

Hopkins [10] is highly critical of p value assumptions and suggests that clinical inference be characterized with a statement about the chance that the results are trivial, harmful or beneficial. Lakens, et al. [11] argue to dispense with significance testing altogether since it is deleterious for the finding of new discoveries and the progress of science. They suggest that inference should not be based on single studies at all, but on cumulative evidence from multiple independent studies.

After analyzing simulated data of 20,000 studies, Van Calster, Steyerberg, Collins, & Smits, [12] concluded that researchers and journals should abandon statistical significance as a pivotal element in most scientific publications and that confidence intervals around effect sizes are more informative.

The  $p < .05$  gate-keeping assumption came at a time when there

were few psychological journals and there were dangers of publishing articles based on false findings that could have a long life. Currently the American Psychological Association lists over 2000 journals in PsycINFO. Considering the high number of journals, we can add another form of scientific demarcation - a non-trivial scientific finding, which is replicated across various populations, measures, methods, and forms of analyses [13].

Journal reviewers should better understand philosophy of science and the dangers of methodological fundamentalism and accept various cumulative designs that realistically explore and test complex hypotheses. Eventually, I hope that an unbiased computer analysis of studies can guide researchers as to what theories show high confidence levels across various populations, methods, measures and forms of analyses and suggest the next step to advance the science.

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