

OPEN SCIENCE FACTSHEET NO. 5

based on the 60th online seminar:

Preregistration – The panacea for trustworthy and useful science? ([Slides](#))

DEFINITION: PREREGISTRATION

- Specifying research plans in advance of conducting research, e.g., by submitting them to a public registry
- Hypotheses, methods, and analyses can be externally verified.
- Prioritization of theory, analysis, and methods over results.
- Particularly common in biomedical research
- Preregistration was initially introduced for clinical trials.

WHAT DOES PREREGISTRATION AIM TO REMEDY AND HOW?

		Preregistration helps achieve more trustworthy and useful science by:
Inflation Bias	<p>p-Hacking (selective reporting, data dredging): Misrepresenting patterns as statistically significant.</p> <p>HARKing: Hypothesizing after the results are known; falsely presenting a post hoc hypothesis as if it were a priori; outcome switching.</p>	<p>Specifying theory, analysis, and methods beforehand.</p> <p>In the particular field of “registered reports”, peer-reviewing twice: prior to data collection and before final (see).</p>
Publication Bias	Publishing in favor of positive results and failing to document and communicate negative results.	Providing “scoop(ing) protection” – i. e., allowing researchers to publish findings identical to ones already published in a similar timeframe.
Replication Crisis	Problematic number of scientific studies that cannot be replicated or reproduced.	Placing an emphasis on theory and not solely on novelty (see Factsheet No. 2).
Epistemological Limitations	<p>Many unexplored alternative research hypotheses prevail in the data collection and analysis.</p> <p>Confusion between research approaches: From confirmation, exploration can develop; but one cannot simply step from exploration into confirmation.</p>	<p>Limiting unwarranted and/or undisclosed researcher’s degrees of freedom.</p> <p>Fostering a clear distinction between exploratory and confirmatory research (see).</p>

QUESTIONS AND ANSWERS

Is preregistration also of interest to disciplines outside of medical research, e.g., for analysis of existing datasets?

- Observation studies (or other types of research) can also benefit from preregistration under the condition that clear hypotheses are established at the beginning of the research process.



What role does preregistration currently play in studies on COVID-19?

- Especially in the field of clinical epidemiology, preregistration entails the benefits of creating more findable and accessible research, esp. also concerning negative results that can be helpful resources when designing new studies.
- While preregistration carries great potential for COVID-19 research and has led to research successes, e.g., in England and the Netherlands, in Germany this development is still very tentative (see, German only).

OUR SPEAKER PROF. DR. ULRICH DIRNAGL

- Founding Director of the [QUEST Center](#) for Responsible Biomedical Research at the Berlin Institute of Health
- Professor of Clinical Neuroscience and Director of the [Department of Experimental Neurology](#) at the [Charité Berlin](#)
- [Mail](#) | [ORCID iD](#) | [Twitter: @dirnagl](#) | [Web](#)



HOW TO PREREGISTER RESEARCH

- [Research Preregistration 101](#) (incl. FAQs about Preregistration)
- [Preregistration FAQs](#) by the Center for Open Science
- [Step-by-step Guide](#) to create a preregistration in OSF Preregistration
- [Journals offering Registered Report format](#)
- [Examples: Preregistrations by discipline and study type](#) (by the [OSF Registry](#))