Summary Vidi project
"Making Scientific Inferences More Objective"

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Many policy decisions, be it about combating the debt crisis, saving the global climate or reforming the educational system, are justified by appeal to the **objectivity** of the **scientific inferences** that support them. Here, the label "objective" is crucial: it makes an inference trustworthy and grounds the authority of science in society. For example, the Climategate affair has shown that public trust in a scientific theory diminishes when the objectivity of the underlying inferences comes under pressure. Similarly, economic experts and policy advisors have to make subjective choices in modeling an economic phenomenon (e.g, which factors to include and to leave out). Consequently, their recommendations are often criticized as being "biased". In general, when personal judgment is openly entangled with scientific inference, the inferred theories lose much of their objectivity and authority, and start to look suspect. This may lead to an erosion of public trust in science, and to badly informed and inferior policy decisions.

This problem has an evident political and regulative dimension, relating to the role of science in society. But it also has a salient *epistemological* dimension regarding **inferences from data to theory**: Does scientific objectivity presuppose freedom of subjective perspective? How can we secure scientific inferences against charges of bias? Is there a way to make them more objective? By addressing these questions, our project rethinks the idea of an objective scientific inference.

To illustrate the significance of this approach, consider the widespread use of significance tests and p-values for appraising statistical evidence. Although the shortcomings and misinterpretations of these techniques are well-known, they are frequently defended on the grounds of being "more objective" than rivaling approaches (e.g., Bayesian inference). Those arguments reduce, however, scientific objectivity to generating results by a standardized, a-perspectival inference procedure---an explication that philosophers have thoroughly debunked in the last decades. By contrast, our project engages with the variety of philosophical accounts of scientific objectivity, and integrates them with a detailed study of the logic and practice of statistical inference. In particular, we study how personal attitudes and choices in statistical reasoning can be embedded into an account of objective scientific inference.

The benefits of the proposed research are manifold. First and foremost, it will greatly enhance our understanding of the scope and limits of scientific objectivity. Second, it will improve standard forms of scientific inference, such as hypothesis testing and explanatory reasoning, by pointing out tacit sources of bias and by developing new interpretations for well-known mathematical tools. This will be useful for scientific practitioners from nearly all empirical disciplines. Third, we show that changes in our concept of objectivity remove misconceptions about the virtues and vices of scientific inference procedures, and lead to better and more efficient decisions. In particular, we conduct an extended case study where we apply our theoretical insights to ameliorating the design and interpretation of clinical trials.