

## Accepted Manuscript

Confidence is epistemic probability for empirical science

Tore Schweder

PII: S0378-3758(17)30173-8

DOI: <https://doi.org/10.1016/j.jspi.2017.09.016>

Reference: JSPI 5602

To appear in: *Journal of Statistical Planning and Inference*



Please cite this article as: Schweder T., Confidence is epistemic probability for empirical science. *J. Statist. Plann. Inference* (2017), <https://doi.org/10.1016/j.jspi.2017.09.016>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Confidence is epistemic probability for empirical science

Tore Schweder  
Department of Economics  
University of Oslo  
Norway

August 18, 2017

## Abstract

In its orthodox standard frequentist statistics deals only with aleatory probability, suppressing the intuitive epistemic probability representing inferential uncertainty. Confidence distributions, which are posterior distributions not based on any Bayesian priors, are discussed in nontechnical terms, with emphasis on the confidence curve. The correspondence between confidence curves and likelihoods allows independent confidence curves and confidence intervals to be integrated. Confidence and (serious)  $p$ -values are interpreted as epistemic probabilities, which do not fully follow ordinary probability calculus. Dimension reduction and other operations might be done on the likelihood related to the confidence curve. Confidence distributions and objective Bayes have much in common.

**Keywords** Confidence distribution; Confidence curve;  $P$ -value; Neyman-Pearson; Likelihood; Objective Bayes

## 1 Introduction

In this short essay I suggest that the confidence of confidence intervals and confidence distributions is a concept of epistemic probability. A  $p$ -value for significance testing being a confidence obtained from a confidence distribution is also understood as an epistemic probability. These epistemic probabilities are interpersonal since they only depend on the model and the data. Whenever the model and the data are accepted, confidence is the appropriate probability representing inferential uncertainty – in the context of statistical inference in empirical science.

The word ‘probability’ has a long and complex history. Before the Renaissance *Probability*, from the Latin ‘probabilitas’, was used as an ordinal measure of authority: “worthy of approbation” (Hacking 1975, p. 18). The German *Wahrscheinlichkeit* is ‘true-seemingness’, the same as the Scandinavian *Sannsynlighet*. Probability was originally a purely epistemic concept. It was mostly qualitative, ordering statements with respect to degree of belief, and their epistemic probability or their weight was based on knowledge and/or authority.

Download English Version:

<https://daneshyari.com/en/article/7547249>

Download Persian Version:

<https://daneshyari.com/article/7547249>

[Daneshyari.com](https://daneshyari.com)