

Incompleteness, Aristotelian reasoning, and null hypothesis significance testing

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Probability models are always incomplete; consequently Neyman-Pearson inference is misguided and Bayesian inference needs qualifying (Macdonald 2002). A weak form of Fisherian statistical inference is unaffected by this incompleteness but it has been attacked by Cohen (1994) for being inconsistent with the rules of logic. Aristotle invented logic but held that formal logic was not much use when reasoning on the basis of incomplete information. Under these circumstances he (in Rhetoric) advocated the use of enthymemes, the very form of reasoning that Cohen criticized. In *On the heavens* Aristotle anticipated Fisherian statistical inference, arguing that there were too many cases in which an outcome went in a particular direction for that direction to be plausibly attributed to chance. Those such as Cohen, who gainsay significance testing, gainsay Aristotle as well as Fisher.

References

Cohen, J. (1994). The Earth is round ($p < .05$) *American Psychologist*, 12, 997-1003.

Macdonald, R. R. (2002). The incompleteness of probability models and the resultant implications for theories of statistical inference. *Understanding Statistics* 1, no. 3, 167-189.