Lecture 8
Keynes's Response to the Contradictions

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Scientific Thought II
Spring 2010

Introduction

- The Principle of Indifference is usually understood as saying:

  If there is no known reason for predicating of our subject one rather than another of several alternatives, then relatively to such knowledge the assertions of each of these alternatives have an equal probability. (42)

- This has been used to justify contradictory conclusions.
- Keynes believed the principle is basically correct, it just needs to be stated more precisely.
- Today: his more precise formulation and how he used it to resolve the contradictions.

More precise statement of the principle

- The usual statement of the principle (simplified):

  > *If there is no known reason for predicating of our subject one rather than another of several alternatives, then . . . each of these alternatives [has] an equal probability.*

- What does "no known reason" mean? Keynes's answer:

  > *There must be no relevant evidence relating to one alternative, unless there is corresponding evidence relating to the other.* (55)

- *Relevant evidence* for an alternative is evidence that makes a difference to its probability. (54)
- *Our knowledge of the form and meaning of the alternatives may be a relevant part of the evidence.* (61)

Contradictories

Review from previous lecture

- It was argued that, if we have no relevant external evidence about a proposition, the probability of that proposition is 1/2.
- *Argument:* If we have no relevant evidence about a then there is no reason to favor a over $\bar{a}$, so their probabilities are equal, hence 1/2 each.
- *Contradiction:* If we have no evidence about the color of Keynes's book then, according to this argument:
  - The probability it is red is 1/2.
  - The probability it is black is 1/2.
  - The probability it is blue is 1/2.

  Impossible!

Keynes's solution (59–61)

- Some *relevant evidence* regarding "this book is not red": it can be divided into alternatives (this book is black, this book is blue, . . .) which have the same form as "this book is red."
- We don't have *corresponding evidence* regarding "this book is red"; it can't be divided into alternatives of the same form.
- Therefore, it is a misapplication of the Principle of Indifference to apply it to "This book is red" and "This book is not red."
- The "evidence" here isn't from perception; it concerns the form and meaning of the alternatives.

> *The apparent contradictions arose from paying attention to what we may term the extraneous evidence only, to the neglect of such part of the evidence as bore upon the form and meaning of the alternatives.* (61)

Ratios vs. constitutions

Review from previous lecture

- The Principle of Indifference is applied to situations in which an urn contains balls that are known to be either black or white (say).
- *Usual method:* We have no reason to favor any possible *ratio* of white balls over the others, so all possible ratios are equally probable.
- *Alternative method:* We have no reason to favor any possible *constitution* over the others, so all possible constitutions are equally probable.
- These two conclusions are contradictory.

Keynes's solution (56–57)

Example: urn with 2 balls that may each be black or white.

- The possible ratios of white balls are 0, 1/2, and 1.
- The ratio 1/2 can be obtained in two ways (2 different constitutions) but there is only one way of getting 0.
- This is relevant evidence regarding 1/2 and we don't have corresponding evidence regarding 0.
- Therefore, it is illegitimate to apply the Principle of Indifference to these alternatives.
- Therefore, the legitimate way to apply the Principle of Indifference is to apply it to constitutions, not ratios.

If all constitutions are equally probable then there is no learning by enumerative induction. This seems wrong, so we should look for a flaw in Keynes's argument.

Criticism of Keynes's argument

- Constitutions differ in their uniformity: WW and BB are uniform, WB and BW aren't.
- Keynes must say:
  - Uniformity of constitutions isn't relevant evidence.
  - Number of constitutions in a ratio is relevant evidence.
- Someone who wants to use ratios can say:
  - Uniformity of constitutions is relevant evidence.
  - Number of constitutions in a ratio isn't relevant evidence.
- No argument has been given why one view is right and the other wrong.
- Conclusion: Keynes's solution rests on an undefended and questionable assumption.

Questions

1. What is "relevant evidence"? According to Keynes, if you have relevant evidence for one alternative, what must be true in order to legitimately apply the Principle of Indifference?
2. In which of the following cases would Keynes allow that the Principle of Indifference can be used to infer that the probability that a book is red is 1/2? Explain.
   (a) You have no relevant external evidence.
   (b) You know that the book is either red or blue and nothing else.
3. If you have no relevant external evidence about the color of a book, is the probability the book is red greater than, equal to, or less than 1/3? Justify your answer.
4. For problems involving balls that may be either black or white, did Keynes believe that the Principle of Indifference can be applied to ratios or constitutions? How did he argue for his view? Is his argument cogent? Explain.

Reference


John Maynard Keynes.
A Treatise on Probability.
Macmillan, 1921.
On Google books.
Numbers in parentheses are page numbers of this book.