

Lecture 8: “The Doctrine of Chances”

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1 *Précis*

This lecture treats Peirce ([1992b](#)), the third of a series of 6 essays collectively entitled “Illustrations of the Logic of Science”.

Driving questions (not all of which will be answered already in this essay; some will be answered in subsequent ones):

1. What role does the idea of continuity play in science?
2. What is probability?
3. What role does probability play in reasoning?
4. What must be in place, epistemically, for such reasoning to qualify as justified, sound, in accord with the scientific methods, ...?

Outline:

§1 continuity

1. introduces deepest form of quantitative reasoning into science
2. thus extends and deepens the logic employed by science

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3. this is shown partly by the way it forms a basis for sophisticated concept formation in science
4. makes possible a certain form of ubiquitous, useful “fiction” in science

§II general problem of probability

1. probability is logic ($\approx$ the scientific method, extending continuously into reasoning in the pedestrian, workaday world) “quantitatively treated”
2. for the general problem of probability is to assign numerical weight to the possibility of a fact given other facts
3. so we must make the concept “probability” clear, using the scientific method of Peirce (1992a)

§III a clear idea of “probability”

1. the only “real and sensible” differences between assignment of different numerical probabilities to the consequents of two inferences is that the the inference assigning higher probability will “carry truth” more often than the other
2. this constitutes a “real fact”, for the numerical probability is the ratio stably fixed in the long run of the occurrence of such inferences
3. it follows that there is no such thing as “the probability” of an event *simpliciter*, but only the *conditional* probability given assumptions and a form of inference

§IV the epistemic warrant of probability

1. probability assignments to unrepeatable events are meaningless—or at least not rationally justifiable—without the possibility of being able to conceive of them as in fact being an instance of a wider class of possible, relevantly similar events
2. the wider class of possible, relevantly similar events is in part characterized by a widening of one’s interests beyond one’s own immediately narrow scope
3. thus, one must identify one’s interests with that of a potentially unlimited community of relevantly similar agents in order for one’s reasoning to be epistemically warranted

§V the rules of the probability calculus

1. numerical probabilities are “relative numbers”, the limiting ratio of successful to total number of inferences of a given kind (where “inference” here means essentially “conditional probability of consequent given the premises”)
2. Rule I: $p(A|B) := \frac{p(A \cap B)}{p(B)}$ (or, more precisely, $p(A|B) := \frac{\#(A \cap B)}{\#(B)}$, where ‘#’ is a cardinality operator), where A and B are considered classes of events
3. Rule II: if $A \cap B = \emptyset$, then $p(A \cup B|C) = p(A|C) + p(B|C)$
4. Rule III: $p(C|B \cap A)p(B|A) = p(C \cap B|A)$ (*N.b.*: this is really what Peirce *should* be saying; I find the exposition in this part of the paper so confusing that the claim that Peirce *is* saying this can be supported only by the most charitable and inventive of textual reconstructions)

2 Invitation to a Short Essay

As usual, I invite you to write me a short discussion (no more than 2 pages, *i.e.*, no more than 1000 words) on any issue discussed in this week’s reading. You can raise further questions, propose answers or interpretations, or whatever seems of most interest to you. If you get it to me by the start of next lecture (21. July), then I will return it to you with my comments the following week.

References

- Peirce, C. S. 1992a. “How to Make Our Ideas Clear”. In Peirce 1992c, chapter 8.
- . 1992b. “The Doctrine of Chances”. In Peirce 1992c, chapter 9.
- . 1992c. *The Essential Peirce: Selected Philosophical Writings*. Edited by N. Houser and C. Kloesel. Volume 1 (1867–1893). Bloomington, IN: Indiana University Press.