

# LECTURE 7

## Epistemology of Expertise and Expert-Based Decision Making



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## Helmer and Rescher

- In the 50s and 60s, a Californian global policy think tank, the RAND corporation was faced with the task of improving technology and geo-political forecasting.
- In that context, it was assumed, for example, that forecasting the capacity of US effective retaliation after a Soviet nuclear first strike, could not be obtained by looking at previous statistical data (there is no such data), nor that such data could be simulated in a mathematical model.
- What was needed, or what was left to rely on, were the judgments of engineers, military strategists, political analysts, etc.
- It was further assumed that the *aggregate judgment* of groups was to be preferred to other methods, such as, for instance, selecting the one individual considered the best expert, or selecting, for each questionnaire, the response from a randomly selected expert, etc.
- The problem, recognized at the time from *industrial and organization psychology* was that experts, individually or in groups, can be heavily biased, therefore leading to poor judgment.

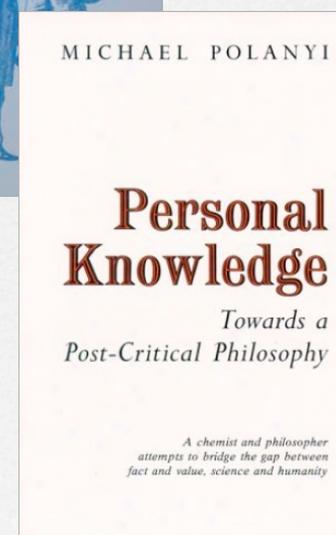
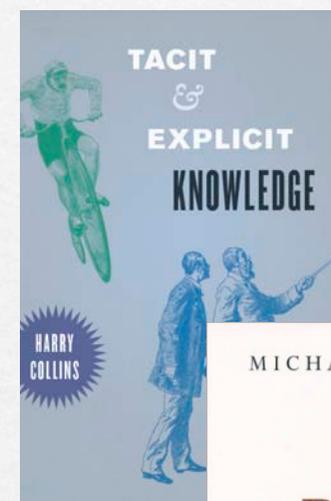
➔ *IN THE REST OF THIS LECTURE WE WILL GO IN MORE DETAIL THROUGH EACH OF THE POINTS ABOVE.*

- Recall, from Lecture 1, Collins, Evans, Polanyi and others: experts possess a type of knowledge that is not easily formalizable, transmissible, etc.
- This knowledge is what characterizes experts, as opposed to mechanical or automated systems, where all the knowledge has to be made explicit, that is, written into a program, a physical device.

➔ *SUGGESTION: For those who are interested, there is a workshop on “tacit knowledge” in Nancy on Dec. 12, 2011.*

- Helmer and Rescher on the advantages of expertise over mechanical and statistical prediction: readings, page 38.
- Tacit knowledge, however, is also to a large extent “inscrutable”. I can give numerous examples, which most educated people can understand, of several regularities: unprotected sex leads, with a certain probability, to venereal diseases; winter tires provide better traction in snow or similar conditions. But, how to *justify* expertise?

## Expertise and tacit knowledge



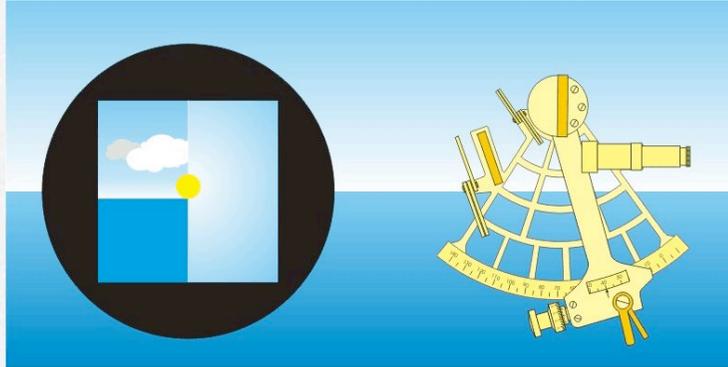
## Experts and Biases

- J.D. Trout, argues claims that expert judgment, as reliance on intuition, understanding and in general what could be called “tacit knowledge” is highly fallible.
- Some examples:
  - Time management - how many weeks do you need to finish a paper?
  - Outwit the market - will your portfolio yield more than the average one? By definition, no more than half of all portfolios can do that, but research shows that far more than half portfolio-holders believe theirs is better than average.
- Is there is distinction between laymen and experts? Research shows that experts are not immune from biases; even though they fare better, in comparative terms, than laymen in very specific fields of expertise, they still commit the exact same biases of judgment as laymen. For reference, see: David Faust (1984) *The Limits of Scientific Reasoning*, University Of Minnesota Press.
- What are the viable strategies out of experts’ fallacies and biases of judgment?

## J.D. Trout's "outside strategies"

- When it comes to judgment and prediction, Trout argues, we should rely on statistical data, past performance, social experiments and so on.
- Examples:
  - Selecting students for college admission
  - Selecting convicts eligible for parole
- Statistical data performs better, as a predictor of future success, than personal expert judgement.
- The literature on this issue was initiated, in the field of psychology, by Meehl. For reference, see: Paul E. Meehl (1954) *Clinical versus statistical prediction: A theoretical analysis and a review of the evidence*. Minneapolis: University of Minnesota Press.

## Availability of data



- Helmer and Rescher argue that statistical data or models are not available at all times.
- Some questions:
  - Is the problem of lack of data and models a purely contingent problem? (Trout argues that much more research in the social sciences is needed, in order to supply them with “good prediction tools”.
  - Is it possible to think of paradigmatic situations, in which purely predictive matters cannot be settled by a mechanical device: e.g. a statistical model, a computer simulation, a set of mathematical equation, etc.?

## Why use expert judgment? - Engineering and risk assessment



- Aspinall advocates the Cooke Method when data is sparse, conflicting, or unavailable.
- Examples:
  - Monitoring a volcano's activity: what is the probability that "mild" volcano activity result in catastrophic eruption?
  - Dam risk-assessment. How long can an earth-dam withstand a leak?
  - \*\*\*What is the probability of failure of an airplane's engine when flying in an dense ash-could?
  - \*\*\*What is the risk of being infected with E. coli O104:H4, by eating cucumbers produced at 10, 50, 100, and 500 miles from location X?
- The Cooke Method (more in the next lectures), is claimed to *reliable* (better than unweighted averages, Delphi, etc.), *speedy* (it takes little time to set up, a few days, or weeks for more complex problems), *trusted* (experts feel at ease in the panels - neutral procedure, freedom from personal responsibility, etc.)

# W6 - ASSIGNMENTS - HELMER AND RESCHER

- Helmer and Rescher define the term 'scientific' at the very beginning of their article. What does the definition imply? Note that the key components of the definition are "prediction", "explanation", and "intersubjectivity"; the latter as an indicator of "reasonableness". With which epistemological positions (cf. Goldman's chapter 3 of *Knowledge in a Social World*) is the definition compatible? Do you think the definition is satisfactory?
- How are exact and inexact sciences defined, if they are defined at all? How do Helmer and Rescher explain the notions of 'exactness' and 'inexactness', when they are applied to special sciences, as for example psychology, economics, physics, etc? In particular, can we assign each of these sciences, or special areas within them, to one or the other of two categories 'exact' and 'inexact'?
- Quasi-laws are statements that are "law-like" and "loose", in Helmer and Rescher's words. Law-like statements are such that they are general (they can provide explanation for cases that are outside the specific domain they describe), and have counterfactual force (the statements are true of any object that is similar enough to the ones about which the statement was originally made). "Loose" statements are such that they cannot be "exhaustively articulated", or "spelled out fully and completely" (see page 28). According to these definitions, is it possible to postulate an epistemological divide between physical sciences and social sciences? What do Helmer and Rescher say, in section 3 of their paper, about the physical sciences?
- What is the distinction between prediction and explanation? (refer to section 4)
- In sections 6-8 Helmer and Rescher hint at the presence of at least two levels of predictive inference, one based (mostly or fully) on statistical evidence, and one based (mostly or fully) on background information. Observe however, that both types of inference involve the use of experts! What difference does it make, for an expert, to use one or the other type of evidence?
- When referring to the justification of the use of what he calls "intrinsic expertise" for prediction, Helmer and Rescher claim that "the selection of appropriate experts is not a matter of mere personal preference but is a procedure governed by objective criteria." What are the criteria Helmer and Rescher are referring to? Can you find any parallelisms or difference with the criteria that are given in Goldman's article *Experts, which ones should we trust?*
- Please summarize the criteria that Helmer and Rescher provide, for the selection of predictive experts.
- With Helmer and Rescher's article, the discourse about experts in this class will start considering the empirical conditions under which expert judgment is used, evaluated for its utility, and justified for its epistemic value. In other words, the considerations, from now on, will be mostly "context dependent". How do Helmer and Rescher introduce the problem of the context? What are the problems that a wrong approach to expert judgment, one that takes a one-size-fits-all approach, has to face?

