Instance Confirmation and Ravens

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Today, we are going to consider a problem that is related, but easier than, the problem of induction. The *problem of confirmation* asks how observational evidence provides support for a scientific theory. This problem is not about whether things will continue to be similar in the future to how they were in the past. Rather, it about how we can know what theory is true *now*.

When do observations support, or confirm, a theory? The notions of support and confirmation allow for error. The question is not about when we can irrefutably prove that the theory is true but rather when we have some evidence that the theory is true.

Deduction and Induction

First, we need to distinguish between inductive logic and deductive logic. Deductive logic tells us when one set of facts guarantees the truth of another fact. For example, If all men are mortal and Socrates is a man, then this guarantees that Socrates is mortal.

This is a *deductively valid* argument. The premises might be false, but if they are true, then this guarantees, with certainty, that the conclusion is true.

But *inductive logic* is about when one set of facts give support to another, even though this might not lead to certainty. The issue we are focusing on is about inductive logic.

PGS uses the term *induction* 'only for inferences from particular observations in support of generalizations'. He uses the term *projection* to mean inferring from a 'number of observed cases to arrive at a prediction about the next case, not to a generalization about all cases.'

Induction (and projection) are types of arguments where one set of facts gives evidence for another without leading to certainty. And so, is *explanatory inference*, or *inference to the best explanation*. There is lots of debate about how these are related.

Hypothetico-Deductivism

One classic approach to confirmation is *hypothetico-deductivism*. The core idea is that an hypothesis is (partially) confirmed when we observe the logical consequences of that hypothesis. Example: Imagine your phone doesn't charge and you are trying to find out what's wrong, whether it's your phone, the usb cord, the usb wall port, or the socket. What do you do?

The H-D approach implies that a theory is confirmed when it makes true predictions because predictions are logical consequences of the theory. Notice, though, that we typically need to make background assumptions for a hypothesis to imply observable predictions.

Counterexample: T implies T-or-S, for any S. But T-or-S is true if S is true. So H-D would imply that any observation supports any theory.

Ravens

H-D, and other approaches to confirmation, imply that instances confirm the generalization. For example, repeatedly seeing black ravens (and no other types of ravens) confirms the generalization that all ravens are black. But how does this confirmation work?

We might think that (i) any time we see and F which is also a G this confirms 'all Fs are Gs'.

Here is another principle which seems even more obvious – (ii) any time we have evidence for a hypothesis H then we have evidence for all logically equivalent hypotheses.

But 'all ravens are black' is logically equivalent to 'all nonblack things are non-ravens'. But by (i) observing a white shoe confirms 'all nonblack things are non-ravens'. and by (ii) this confirms 'all ravens are black'.

This seems wrong though, observing a white shoe doesn't confirm 'all ravens are black'. So it looks like (i) and (ii) together lead to the wrong results.

Possible responses

We could think that observing a white shoe does give *some* support for the generalization, though presumably very little. Most have found this unattractive.

Another idea: Whether observing a white shoe confirms the generalization is dependent on background information. (The natural question: what information?) This view suggests a kind of *holism*. We will discuss holism much more in upcoming weeks.

Wason Task

Sometimes seeing an observation that fits a hypothesis doesn't help us test the hypothesis.