Introduction to Theories of Confirmation

LoPSE

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Introduction to Confirmation

Deductive Reasoning

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Example: Modus Ponens

Premise 1: If I am blushing, I feel guilty.

Premise 2: I am blushing.

Conclusion: I feel guilty.

B (premise 2)	G (conclusion)	$B \to G$ (premise 1)
T	**T**	**T**
T	F	F
F	T	T
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Conclusion: All swans are white.

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3. The same idea applies to confirmation. We want to know what properties confirmation should and can have without running to paradoxical conclusions.
4. To find such properties has proved to be difficult. Let us take a look at some examples.

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2. Two condition he accepted are Nicod's Criterion and Equivalence Condition, but they proved to be difficult to combine.
3. Their combination leads to the Paradox of Ravens.

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Example: White Swans

Think of the predicate S as being a swan and W as being white. Suppose that the constant a stands for a particular swan.

Nicod's criterion then says that the hypothesis that "all swans are white" e.i. $(\forall x)(Sx \rightarrow Wx)$ is confirmed by an instance of a white swan e.i. Sa & Wa and disconfirmed by an instance of a black swan e.i. Sa & $\neg Wa$.

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   Equivalence Relation: Suppose H and H' in $\mathcal{L}$ are logically equivalent ($H \equiv H'$). Then any E in $\mathcal{L}$ that confirms H also confirms H'.

2. When evidence E confirms a hypothesis H and H is equivalent to H', then E confirms also H'.

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4. By the Nicod's Criterion $\neg Ba \ \& \ \neg Ra$ confirms $(\forall x)(\neg Bx \rightarrow \neg Rx)$.
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6. By Equivalence Relation $\neg Ba \,\&\, \neg Ra$ confirms $(\forall x)(Rx \rightarrow Bx)$.

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4. This result is counterintuitive.

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   1.6 Suppose that we randomly pick things from the universe one by one and we know that picking a non-black raven falsifies our hypothesis that all ravens are black. Picking a thing that is a non-black raven somewhat confirms our hypothesis that all ravens are black.

Evidence of Evidence

What Are Other Confirmation Conditions

Entailment Condition: For any consistent E, H, and K in $\mathcal{L}$, if $E \& K \Rightarrow H$ but $K \nRightarrow H$, then E confirms H relative to K.

1. Entailing a hypothesis H is a method of supporting or providing evidence for that hypothesis (given some background knowledge K).
2. It works only if K itself does not imply H

What Are Other Confirmation Conditions

Confirmation Transitivity: For any A, B, C and K in $\mathcal{L}$, if A confirms B relative to K and B confirms C relative to K, then A confirms C relative to K.

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5.) A entails B and by Entailment, A confirms B. But B also confirms C. If we take confirmation to be transitive, then A should confirm C. But it sounds strange. If a white swan is a curiosity, it rather disconfirms that all swans are white.

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2. Imagine I read a police transcript of interrogation. In the transcript, the interrogate admits commuting the crime (I do not have the actual evidence – I did not hear him saying that). Does the transcript constitute an evidence against the perpetrator?

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1. **Problem:** Any relation of confirmation satisfying 1, 2, and 4 is trivial in the sense that every evidential proposition E confirms every hypothesis H.

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5. Hempel rejects the converse consequence condition as the culprit rendering the triviality result.

HD-Confirmation and Underdetermination

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evidence An interference pattern is displayed on the screen.

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iii e is HD-neutral for hypothesis h relative to k otherwise.;

HD-Confirmation Examples

Example 1

Our best theories about the atmospheric system suggest that emissions of greenhouse gases such as CO_2 and Methane lead to global warming. That hypothesis has been vindicated by its successful (qualitative) predictions, such as shrinking arctic ice sheets, increasing global temperatures, its ability to backtrack temperature variations in the past, etc.

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Example 2

Einstein's General Theory of Relativity predicted that light would be bent by massive bodies like the sun. The vindication of Einstein's forecasts by Eddington during the 1919 eclipse contributed a lot to the general acceptance of GTR.

HD-Confirmation and the Paradox of Ravens

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4. Similarly, $\neg black(a)$ HD-disconfirms h relative to the same assumption $k = raven(a)$.
5. An object that is found not to be a raven HD-confirms h, but only relative to $k = \neg black(a)$, that is, if a is assumed to have been taken among non-black objects to begin with

HD-Confirmation vs. Hempel I

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0.4 The observation of a black swan turns out to be HD-neutral for the hypothesis that black swans exist

HD-Confirmation vs. Hempel II

Confirmation Complementarity: For any $h, e, k \in \mathcal{L}$, e confirms h relative to k if and only if e disconfirms $\neg h$ relative to k.

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0.4 While HD-neutral for h, e HD-disconfirms $\neg h$, and thus does not meet confirmation complementarity.

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6. This is simply because, if $h \wedge k \Rightarrow e$, then $h \wedge k \wedge q \Rightarrow e$, too, by the monotonicity of classical logical entailment.

Popper's Falsificationism

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    3.1 We only need to find a piece of metal that does not conduct electricity in order to know that our hypothesis is fals.
4. Popper suggested that all science should put forth bold hypotheses, which are then severely tested (where 'bold' means to have many observational consequences). As long as these hypotheses survive their tests, scientists should stick to them. However, once they are falsified, they should be put aside if there are competing hypotheses that remain unfalsified.

Thank you!