A MORE DEVASTATING VERSION OF THE RAVEN PARADOX

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Hempel's famous Raven Paradox derives from Nicod's criteria for confirmation and the Equivalence Condition, the unintuitive conclusion that things like white roses, green T-shirts and ice cubes confirm the raven hypothesis 'All ravens are black.' By a small rearrangement of the Equivalence Condition, I show that we can also derive the conclusion, which sounds even more intuitively intolerable, that observation of black ravens fails *to confirm the raven hypothesis. We are left with the contradictory result that black ravens both confirm and do not confirm the raven hypothesis.*

C. G. Hempel's 'Raven Paradox' involves derivation of the intuitively unpalatable conclusion that observation of things like a white shoe or a rainbow confirms the raven hypothesis 'All ravens are black.'[1] Here is how it goes. An earlier author, Jean Nicod, had put forward the following criteria for confirmation of hypotheses of the form 'All *A*'s are *B*'s':[2]

(1) Observation of an object which has the property of being an *A* and also the property of being a *B confirms* 'All *A*'s are *B*'s.'
(2) Observation of an object which has the property of being an *A* but not the property of being a *B disconfirms* 'All *A*'s are *B*'s.'
(3) Observation of an object which does *not* have the property of being an *A* neither *confirms nor disconfirms* 'All *A*'s are *B*'s.'[3]

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Add to these criteria the following highly plausible claim, which Hempel called 'Equivalence Condition': 'Whatever confirms (disconfirms) one of two equivalent sentences, also confirms (disconfirms) the other.'[4] Let me write this condition in a more convenient form for our purposes:

> *Equivalence Condition*: If an hypothesis H_1 is logically equivalent to another hypothesis H_2, then, if an observation O confirms H_1, then O also confirms H_2.

The Equivalence Condition sounds perfectly intuitive, because to say that H_1 and H_2 are logically equivalent is to say that H_1 and H_2, having identical truth conditions, make exactly the same claims about the world. Thus if a piece of evidence confirms one of the logically equivalent hypotheses, it must equally confirm the other one.

Now, let H_1 be the hypothesis 'All non-black things are non-ravens' and H_2 be the hypothesis 'All ravens are black.' Since H_1 is the contrapositive of H_2, H_1 and H_2 are logically equivalent hypotheses. Suppose now that our observation O is the observation of a white shoe. A white shoe being a non-black non-raven, O confirms H_1 by Nicod's criterion (1) above. And by the Equivalence Condition, O also confirms H_2, the hypothesis 'All ravens are black.' This result, of course, is contrary to our intuitions and also contradicts Nicod's criterion (3).

I have just presented a classical, standard exposition of the Raven Paradox (or 'paradox of confirmation', in Hempel's words[5]). Actually matters can be made to look worse. Not only does observation of things like white shoes or red tomatoes or rainbows turn out to confirm the raven hypothesis 'All ravens are black', we can also show that, given Nicod's criteria and the Equivalence Condition, observation of black ravens *fails* to confirm 'All ravens are black.' Let me first add the following condition which is *logically equivalent to the Equivalence Condition* given above:

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> *Contrap Equivalence Condition*: If a hypothesis H_1 is logically equivalent to another hypothesis H_2, then, if an observation O *fails to confirm* H_1, then O also *fails to confirm* H_2.

This condition is obtained by an operation of contraposition on a portion of the original Equivalence Condition. Hence I called it 'Contrap Equivalence Condition'. Next, let H_1 be 'All non-black things are non-ravens' and H_2 be 'All ravens are black.' H_1 and H_2 are, again, logically equivalent hypotheses. By Nicod's criterion (3) above, a black raven does not confirm H_1 (nor does it disconfirm it, for that matter), since a black raven does not have the property of being a non-black thing. It follows by the Contrap Equivalence Condition that a black raven fails to confirm 'All ravens are black.' Combine this result with the standard, classical paradox: black ravens don't confirm the raven hypothesis, but white shoes do!

Our confirmatory intuitions are sure to revolt against this result. But the worst is yet to come. For it follows as a corollary from what we have said that:

> A black raven both *confirms* (by Nicod's criterion (1)) and *does not confirm* (by the result we obtained above) the raven hypothesis.

Thus, the Equivalence Condition together with Nicod's criteria – plus the Contrap Equivalence Condition, which really expresses the same thing as the Equivalence Condition – not only lead to intuitively unacceptable consequences but to outright contradiction as well. Put otherwise, we don't have one raven paradox here but two, and the second paradox sounds more serious or devastating than the original one.

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Notes

[1] C. G. Hempel, 'Studies in the Logic of Confirmation', in C. G. Hempel (ed.), *Aspects of Scientific Explanation* (New York and London: The Free Press, 1970), 3–51, at pp. 11–15.

[2] J. Nicod, *Foundations of Geometry and Induction*, trans. by Philip P. Wiener (London: Routledge and Kegan Paul, 1930), 219.

[3] Nicod is not explicit on this third condition; it is added by Hempel (p. 11).

[4] Hempel, 'Studies in the Logic of Confirmation', 13.

[5] Ibid. 15.

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