Beppe Brivec
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AN ASYMMETRY IN THE RAVEN PARADOX

Peter Godfrey-Smith writes in the section 3.3 “The Ravens Problem” of his book “Theory and Reality” [chapter “Induction and Confirmation”]:
“First, the logical empiricists were concerned to deal with the case where generalizations cover an infinite number of instances. In that case, as we see each raven we are not reducing the number of ways in which the hypothesis might fail”.

Infinite sets and finite sets have different properties and follow different rules.
For example: let’s call “bag X” a specific bag that contains 90 marbles; the generalization A “All marbles in bag X are red” covers a finite number of instances. By contrast, the generalization AE “All things that are not red are not marbles in bag X” covers an infinite number of instances. The propositions A and AE are logically equivalent, but there is an asymmetry due to the fact that A can only have a finite number of instances (since the set of the marbles contained in bag X is a finite set); by contrast, AE can have an infinite number of instances (since the set of the things that are not red is an infinite set and the set of the things that are not marbles contained in bag X is an infinite set).
Because of the aforementioned asymmetry, even though A and AE are logically equivalent propositions, it is wrong to equate an instance of A with an instance of AE.

Another example involving a finite set: let’s call “barrique X” a certain 205-liter (54.1553 US gal) barrique.
In the following generalization, the expression "all minerals" should not be understood as "all types of minerals", but should be understood literally as "all minerals".

B “All minerals are in barrique X”.
BE “All objects that are not in barrique X are not minerals”.

Of course, a 205-litre barrique cannot contain an infinite number of minerals; the set of objects contained in barrique X is a finite set: therefore in the generalization B we

refer to a set that is assumed to be an infinite set (the set of minerals) and to a set (the finite set of minerals contained in barrique X) that is not assumed to be an infinite set.
By contrast, in the generalization BE we refer to two sets that are assumed to be infinite sets (the set of all objects that are not contained in barrique X and the set of all objects that are not minerals).
The generalization B covers a finite number of instances, while the generalization BE covers an infinite number of instances: therefore, although B and BE are logically equivalent propositions, an instance of BE cannot be equivalent to an instance of B.

Let's now return to the quote reported at the beginning of this paper: Peter Godfrey-Smith writes in the section 3.3 "The Ravens Problem" of his book "Theory and Reality" [chapter "Induction and Confirmation"]:
"First, the logical empiricists were concerned to deal with the case where generalizations cover an infinite number of instances. In that case, as we see each raven we are not reducing the number of ways in which the hypothesis might fail".

C "All the elements of the set of ravens are elements of the set of black ravens".
CE "All the things that are not elements of the set of black ravens are not elements of the set of ravens".
It is assumed that the number of ravens is infinite, but it is not assumed that the number of black ravens is infinite: that the number of black ravens is infinite is only a hypothesis (for which confirmation is sought), it cannot be assumed as true that the number of black ravens is infinite.
Therefore, in the generalization C we refer to a set that is assumed to be an infinite set (the set of ravens) and to a set (the set of black ravens) that is not assumed to be an infinite set.
By contrast, in the generalization CE we refer to two sets that are assumed to be infinite sets (the set of all objects that are not elements of the set of black ravens and the set of all objects that are not elements of the set of ravens).

Someone could argue that in the generalizations C "All the elements of the set of ravens are elements of the set of black ravens" and CE "All the things that are not elements of the set of black ravens are not elements of the set of ravens" only the set of ravens is assumed to be infinite: but even in this case an asymmetry would remain because C " All the elements of the set of ravens are elements of the set of black ravens" refers to a set (the set of ravens) that is assumed to be an infinite set and to a set (the set of black ravens) that is not assumed to be infinite; by contrast, CE "All the things that are not elements of the set of black ravens are not elements of the set of ravens" in this case would refer to two sets that are not assumed to be infinite sets.

Because of the aforementioned asymmetries, an instance of C cannot be equivalent to an instance of CE.

In other words:
C “All the elements of the set of ravens are elements of the set of black ravens”.
CE “All the things that are not elements of the set of black ravens are elements of set of the things that are not ravens”.
It is assumed that the number of ravens is infinite, but it is not assumed that the number of black ravens is infinite: that the number of black ravens is infinite is only a hypothesis (for which confirmation is sought), it cannot be assumed as true that the number of black ravens is infinite.
Therefore, in the generalization C we refer to a set that is assumed to be an infinite set (the set of ravens) and to a set (the set of black ravens) that is not assumed to be an infinite set.
By contrast, in the generalization CE we refer to two sets that are assumed to be infinite sets (the set of all objects that are not elements of the set of black ravens and the set of all objects that are not elements of the set of ravens).

Someone could argue that in the generalizations C “All the elements of the set of ravens are elements of the set of black ravens” and CE “All the things that are not elements of the set of black ravens are elements of set of the things that are not ravens” only the set of ravens is assumed to be infinite: but even in this case an asymmetry world remain because C “ All the elements of the set of ravens are elements of the set of black ravens” refers to a set (the set of ravens) that is assumed to be an infinite set and to a set (the set of black ravens) that is not assumed to be infinite; by contrast, CE “All the things that are not elements of the set of black ravens are elements of set of the things that are not ravens” in this case would refer to two sets that are not assumed to be infinite sets.
Because of the aforementioned asymmetries, an instance of C cannot be equivalent to an instance of CE.

beppebrivec@gmail.com