Mathematical pluralism as scepticism

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The goal of this talk is to offer a novel perspective on the debate around logical pluralism, based upon the sceptic *problem of the criterion*. In recent years, the possibility that there might be more than one correct logic has gained prominence. There are several ways to spell out this view, the most important being *case-based* pluralism: there are different senses of "validity", and logicians might prefer one or the other ([1]). Opposed to this position is logical *monism*: there could be only *one* correct logic ([3]). Finally, the most recent addition is logical *nihilism*: there are *no* correct logics ([8]). The problem of the criterion is one of the most important problems in the sceptical position regarding our knowledge, and it is traditionally spelled out as the impossibility of knowing *what* we know, and *how* we know it (the classical presentation can be found in [2]). In this talk I rephrase the debate around logical pluralism in terms of the problem of the criterion. In particular, I show that the logical pluralists can appeal to the sceptic position regarding the problem of the criterion to argue in favour of pluralism. The logical pluralist will argue that it is not possible to provide a criterion that picks up a single logic as the correct one, while the logical monist will have the burden of providing a criterion that picks up one logic.

In the case of logical pluralism, it is possible to spell out the problem of selecting the correct logic in terms very similar to the problem of the criterion in epistemology. In particular, the problem consists in providing criteria that provide answers to the following questions:

1. *What* is the set of all valid sentences?

2. *How* do we decide whether a sentence is valid?

An acceptable answer to the first question will define which logical consequence relation (or validity notion) can be used to close sets of sentences under their consequences. For example, closing a set under the classical consequence relation or under the intuitionist consequence relation will yield different results. On the other hand, answering the second question means providing the inference rules (and/or semantic clauses) that

allow us to derive a sentence from the others. The answers to the two questions are clearly connected: if we provide which consequence relation is the correct one to close sets under it, we are then providing the rules that is possible to use to derive the various consequences (and actually close the set). On the other hand, if we provide the rules, we are also defining the consequence relation we are using.

There are several possible ways to approach the search for an answer to these questions. They all involve evaluating and comparing different logical systems under various metrics. For example, the literature on logical anti-exceptionalism (the view that logic is not exceptional if compared to other sciences, and is instead subject to the same dynamics of theory choice and revision like the empirical sciences, see [6]) lists various methods like abduction, weighting pros and cons, etc.. Possible criteria include choosing the logic with the most extensive scope, the one that is most conform to the facts, or the one with the most explanatory power ([7]). Obviously all these criteria and methods can be spelled out in very different ways.

The logical monist needs to argue that any criterion to answer either question (1) or (2) is indeed possible. In this talk, I will argue that this is quite a tall order. On the other hand, the logical pluralist has an easier road to take: all she needs to do is to argue that either there are no criteria to answer the two questions, or any criterion will be not precise enough to single out *the* correct logic, but can only refer to a class of them. In particular, the logical pluralist argument will rest on the problem of *over*- and *under*-generation ([4] and [5]): any criterion provided by the logical monist will inevitably either over-generate the set of all logically valid sentences (i.e. by having some unwanted consequences), or will under-generate it (by missing out some important valid sentence). The monist has two solutions: she can bite the bullet, and choose the "least bad" criterion and live with the (too broad or too little) consequences. Or, she can weaken her criteria, with the risk of ending up in the pluralist camp with more than one acceptable set of valid sentences.

References

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