

A note on logical pluralism

Uma nota sobre o pluralismo lógico

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ABSTRACT

In this paper we are going to characterize the idea of logical pluralism according to Beall and Restall. In order to do that, this paper is divided into three sections. In the first section, we shall define briefly what Beall and Restall's theory is about. In the second, we shall deal with some problems with the theory and some possible answers. Finally, three objections will be raised.

Keywords: logical pluralism, logical monism, Beall, Restall, Priest.

RESUMO

Neste artigo caracterizamos a ideia de pluralismo lógico de acordo com Beall e Restall. Para fazer isso, este artigo é dividido em três seções. Na primeira seção, definiremos brevemente o que é a teoria de Beall e Restall. Na segunda, trataremos de alguns problemas da teoria e algumas possíveis respostas. Finalmente, três objeções serão apontadas.

Palavras-chave: pluralismo lógico, monismo lógico, Beall, Restall, Priest.

Logical pluralism is the thesis that there are at least two logics that are equally valid. But this could be understood in different ways. There are ways in which it is evident that there is pluralism. In contrast, there are other ways that are more questionable. It is unquestionable that the twentieth century has brought us many different logics: intuitionistic logic, relevant logic, many valued logics, etc. In this sense, it is obvious that there is a plurality of logics. But as Priest (2006, p. 195) argues, logical pluralism acquires significance and interest when we talk about the applications of such logics in a specific domain. In that case, *pure* logics, mathematical logic systems, become theories of that domain. In such a way, logics acquire the status of scientific theories and the problem of whether or not there is more than one valid logic for a certain domain turns into an important issue. Later we will see why this is interesting.

The version of logical pluralism that we are going to discuss here is that stated by Beall and Restall in "Logical Pluralism" (2000). According to them, there are at least two ways to understand deductive validity and these two ways are equally good (Beall and Restall, 2001, §1). Their pluralism is a pluralism about logical consequence. The main idea is that there are different formal ways to understand the pre-theoretical notion of logical consequence, (V), according to which a conclusion, *A*, follows from premises Σ , if and only if any case in which each premise in

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Σ is true is also a case in which A is true (Beall and Restall, 2000, p. 476). As there are at least two precisifications of such cases, there are at least two equally valid logics. One type of case could be a Tarskian first-order interpretation; another could be a possible situation, or an inconsistent or incomplete interpretation.

II

At this point, let's analyse some objections that have been raised to this theory. A first objection argues that logical pluralism is an empty position since there are not many logicians that would adopt it. For instance, the law of the excluded middle is necessary for the classic logician, but it is not for the intuitionist—just as *ex falso quodlibet* is valid for both of them, but it is rejected by the relevantist. As all of them believe in their own notion of logical consequence, none would adopt a logical pluralism. Hence, we could conclude, logical pluralism is a position that would be maintained by few logicians. Beall and Restall (2006, p. 87-88) answer this objection by arguing that this fact is not surprising. The reason why it is not surprising is because most intuitionists, relevantists, etc. are monists and consider their own logic as the only valid form. However, this aspect is not a necessary and essential feature of their theories. It could be said that relevantists develop their logic because they deny the classical notion of logical consequence, but as the authors claim, this is not necessary. One could develop a relevant logic with the motivation of formalising *that other notion* of logical consequence according to which the premises must be relevant for the conclusion. Assuming and accepting this, there are thus other ways to understand it.

Another objection refers to our logical preferences. The objection says that if we prefer a particular logic, we are not actually defending a logical pluralism (Beall and Restall, 2006, p. 99). Beall and Restall reply that logical pluralism is not inconsistent with the idea of having *favourite* logics. Their validity has nothing to do with individual preferences. This is why, since both logics are products of different ways of understanding the pre-theoretical notion of logical consequence, we keep on being pluralists.

Russell (2013) argues that we can deduce two things from Beall and Restall's theses: (i) the meaning of the term 'case' is undefined; (ii) as it is undefined, we could find more than one precisification, which would make us pluralists. However, according to the author, none of them is unavoidable. As for the first thesis, Russell maintain that philosophy of language has showed us that we could find an approach that captures exactly what we mean by the notion of logical consequence. One possible way, she suggests, could be making use of mathematical techniques. But this seems unsatisfactory. It is not clear how the concept of 'case' or 'logical consequence' in general could be analysed (even less with mathematical tools) for it to reach a completely defined meaning. The vagueness of the term and its possible interpretations happen to be a

part of its meaning. Otherwise, we will have an artificial concept that is unlikely to reflect our pre-theoretical notion.

As for the second case, the author argues that even assuming that the term is indefinite, this does not necessarily mean that we are going to find more than one precisification of 'cases'. This objection may be valid in general, but it is not valid in this case, since Beall and Restall have already offered three such possible specifications.

The last objection begins by noting that in the principle (V) there is a universal quantifier. Regardless of the precisifications of cases, the conclusion must follow from all of them. So the true logic would be the intersection of all systems accepted by (V). Beall and Restall (2006, p. 92) answer this objection by saying that the only inference that would really survive the intersection is the law of identity. If A , then A . And it seems that to conclude that the law of identity is the only valid argument is somewhat implausible and demotivating.

Priest argues that this might be the case for pure logics, but it seems unlikely when we talk about applied logics, particularly in the canonical application of logic: the analysis of human reasoning. Priest thus provides an example of an inference that would not fail in any case: "For example, any situation in which a conjunction holds, the conjunction holds, simply in virtue of the meaning of \wedge . [...] As long as meanings are fixed, one can't vary them to dispose of valid inferences" (2006, p. 203). However, there are reasons to think like Beall and Restall in this respect. Inferences are valid thanks to the meaning that has been assigned to the connective from each precisification of (V). In this manner, an intuitionist denies the law of the excluded middle by virtue of the meaning of the connectives \neg and \vee . And for this reason it seems implausible that his example may count as a valid inference for any logic. A similar response is offered by Russell (2013).

III

Finally, we will outline three objections. The first consists in defending the idea that Beall and Restall actually discuss theoretical pluralism, not applied pluralism. In this sense, it would not be an interesting pluralism. The second objection would consist in pointing out that, even assuming that the position defended by Beall and Restall was an applied pluralism, the canonical application of logic is inaccurate. At this point we will attempt to distinguish between different domains of reasoning and defend the implausibility of a logical pluralism in them. A third objection, independent of the other two and hypothetical, would be to argue that the theoretical pluralism (not applied pluralism) defended by Beall and Restall is compatible with (and under some interpretations leads to) logical monism.

Let's start with the first objection. What Beall and Restall argue is that there are different, equally acceptable ways to understand and theorize the pre-theoretical notion of logical consequence. This therefore leads us to accept other formal systems. But this kind of pluralism would be a non-inter-

esting pluralism because it simply creates different logics from different precisifications of cases. What we are establishing are *pure* logics, in the sense described by Graham Priest.

Thus, we have an immense number of pure logics (classical logic, modal logics: S_4 , S_5 , T , etc.), characterised as well-defined mathematical structures. Then we would have a subset of such logics consisting of those that adequately characterize our pre-theoretical notion of logical consequence—at least three: classical logic, intuitionistic logic, and logic of relevance. To talk about a pluralism of this kind would simply mean that such logics are mathematical structures with the property of fitting with our pre-theoretical notion of logical consequence. This is indisputable but not interesting.

Someone might object that Beall and Restall do not actually advocate for a theoretical pluralism, but for an applied pluralism. In this way, one could argue that as this is a pluralism about the notion of logical consequence, it has been already specified that its scope is the analysis of human reasoning. Nevertheless, there are reasons to think otherwise, namely that Beall and Restall maintain a purely theoretical pluralism. Here we can find proof. In Chapter 8 of *Logical Pluralism* (2006) the authors address some objections to their theory, including the following.

What logic is the logical pluralist using when defending his theory? Like every reasoning, logical pluralism is argued following inference patterns. What then is the logic behind the pluralistic reasoning? According to the objection, this will lead to logical monism. The response of the authors is as follows:

As anyone who applies formal logics knows, the fit between deductive validity and analysis of actual reasoning is not always an easy one. [...] The pluralist claim is that, given a body of informal reasoning [...], you can use different consequence relations in order to analyse the reasoning. As to which relation we wish our own reasoning to be evaluated by, we are happy to say: any and all (admissible) ones! Our arguments might be valid by some and invalid by others, good in some senses and bad in others (Beall and Restall, 2006, p. 99).

We can tell from the first sentence that deductive validity does not exactly fit with the analysis of the actual reasoning. In addition, in their theory they speak of deductive validity. Therefore, we can conclude that their logical pluralism is a purely theoretical pluralism.

But let's suppose that Beall and Restall talk about applied pluralism. In that case, we would pass to the second objection: the one of the various areas of application. The scope of application, we remember, is the canonical analysis of human reasoning (Priest, 2006, p. 196). A pluralist position on this

application (following the tenets of Beall and Restall) would say that at least two precisifications of cases are compatible with our notion of logical consequence, and would be equally valid in order to analyse human reasoning.

As a matter of fact, there is a variety of types of discourse, and in order to formalize them, we need different logics, focusing on the special features of each type of discourse. For instance, modal logic is more appropriate than classical logic in order to speak of necessity and possibility. And classical logic may be more appropriate than logic of relevance in certain situations. For instance, it seems that the principle of explosion is used in our ordinary language. It does not seem absurd to say that if a contradiction is true, then we can conclude anything. "What do you mean? If it is true that you were in Barcelona and in Madrid at the same time, then I am a Martian." What this is trying to show is that the way we understand the canonical application of logic is wrong and that human reasoning cannot be understood as a single field. Instead, we need to specify the types of speech that are in it. The *canonical* application should not be understood as the analysis of reasoning in order to see if a conclusion, A , follows from a set of premises, Σ . What we must take into account is that the content of these premises and their context is relevant to see what logic we should use. Therefore, the main claim at this point is that there is no canonical application, namely, human reasoning, but there are many applications depending on the content of the discourse that we are treating.

Thus, different discourses may require different logics. For instance, modal discourse would require a different logical analysis to temporal discourse. In this sense, it is clear that there is a plurality of equally valid logics, since they simply try to analyse different areas of application. However, this would not be an interesting but an obvious pluralism. We can remind ourselves of Beall and Restall at this point. They remarked that their arguments could be valid in one logic but invalid according to another. They argue that the logic that we should apply will depend on the type of verification we need for the task we are performing².

Instead, a type of logical pluralism that might be interesting, as we anticipated at the beginning, would follow if in a particular type of speech there was more than one equally valid logic. For example, focusing on necessity and possibility, we might ask whether there is more than one equally valid modal logic. As Priest (2006, p. 195) says, in its scope, logic is no longer a pure mathematical structure that does not talk about the world as an explanatory theory of its field. However, it seems implausible that we could be talking about logical pluralism when we talk about enclosed fields of reasoning, since we understand this logic as an empirical theory that attempts to account for a universe of discourse. In this way, as in other sciences, we do not accept various theories as valid in the same sense. We try to see which one is the best under dif-

² "It depends, of course, on whether the given kind of verification preservation is important to the task at hand. [...] perhaps the classical invalidity is merely an artefact of the expressive weakness of classical first-order logic" (Beall and Restall, 2000, p. 99-100).

ferent criteria (for its simplicity, its lack of *ad hoc* postulates, etc.). For instance, in the realm of necessity and contingency, a modal theory will be the best theory that fits in that particular realm. Ties could be possible, but momentary. In the end, for one criteria or another, we would end up choosing one theory (logic) over another.

Finally, we shall turn to the third objection. Here we will focus on the possibility of understanding the relation of logical consequence as we could understand negation or conditional if our language use was ambiguous. If our use of negation is ambiguous such that, for instance, sometimes we use it with the meaning of classical negation and other times with the meaning of the intuitionistic negation, then we actually have two legitimate meanings of negation that therefore should be treated differently. We should have two signs in formal language to represent both meanings, as we have different symbols for the conditional depending on its truth conditions.

In such a way, $\neg_1 \neg_1 p \vdash p$, meaning \neg_1 as the intuitionistic negation, would be an invalid inference. While $\neg_2 \neg_2 p \vdash p$, meaning \neg_2 as the classical negation, would be a valid inference. As we can see, we are not changing between logics and arguing that in classical logic stating that $\neg \neg p \vdash p$ is a valid inference while in intuitionistic logic it is not. We are just treating two connectives with different truth conditions in a different way within the same logic (Priest, 2006, p. 198-199).

Now, we have two possibilities: either our pre-theoretical notion of logical consequence relation is ambiguous, or it is not. If not, then we would conclude that there is only one way to understand it, one precisification of cases; therefore, we would maintain logical monism. However, if it is ambiguous, then this notion could be instantiated in different ways. An example of this is offered by Beall and Restall.

Nevertheless, another possible way of putting this ambiguity is the following. If there is more than one precisification of cases, because of the ambiguity of the notion of logical consequence, then we can keep both the truth of, for example, $\vdash_1 p \vee \neg p$, and the falsity of $\vdash_2 p \vee \neg p$, meaning \vdash_1 as the relation of logical consequence maintained by classical logicians, and \vdash_2 as the relation of logical consequence maintained by intuitionist logicians. Since there is no single way of understanding

the relation of logical consequence, we should act in the same way as with conditional or negation and establish that there are at least two types, with their own logical symbols. Thus, we are not saying that $p \wedge \neg p$ is valid and invalid at the same time,³ but that it is valid for a type of logical consequence and invalid for another.

What, then, is the difference from the logical pluralism developed by Beall and Restall? Beall and Restall's logical pluralism assumes the ambiguity of the notion of logical consequence, but solves it by validating different and mutually incompatible logics. According to the hypothesis given above, it would be possible to create a new logic that, providing different signs for different ways of understanding this concept, could be a consistent theory.

However, we should not conclude that all kinds of logical pluralism could entail monism. This objection works against the idea of a pluralism based on the breadth of possibilities that arise from a pre-theoretical conception of logical consequence. Thus, there could be other ways of understanding logical pluralism.

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³ It is useful to remember the law of noncontradiction as it was stated by Aristotle: nothing can both exist and not exist at the same time and in the same respect.