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Logic and the World

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To Andrea Loparic, in memoriam

Abstract

On its received view, logic—including logical principles and rules—is universal, necessary, and topic neutral (and, in this respect, formal). Logical principles hold without exception or restriction (universality); they are also the case in every way the world could be (necessity), and they do not depend on any particularity of the domain in which they used (topic neutrality). When applied to reasoning, logic is supposed to provide information about what does (or does not) hold in the world. Yet, understood in these terms, how is it possible for logic to be about the world at all? Its topic neutrality (formality), universality, and necessity seem to suggest that logic has very little content—if any at all. In this paper, I consider the connections of logic and the world and examine whether, on the received view, it is possible for there to be any such connections between them. However this is answered, a dilemma emerges that puts some pressure on the received view. A nonclassical alternative is then sketched.

Keywords: Logic, world, universality, necessity, topic neutrality.

1 Introduction

Logic and logical principles have traditionally been understood as comprising a topic-neutral (and, in this sense, formal), universal, and necessary enterprise. A salient feature of the resulting received view consists in the fact that logic does not depend, in any manner, on what is the case in the world. Despite changes in the way the world could be, logical truths remain the same: they are invariant under any transformations in the world. On the model-theoretic conception, these variations are characterized by transformations in the domain of interpretation of the relevant models (Tarski [1986]). The result is logic's topic neutrality. It does not matter which topic is under consideration,

the validity of an argument is secured by the form and universality of logical principles and rules, thus resulting in their wide applicability—irrespectively of what goes on in the world.

In this paper, I consider whether it is possible for logic to be about the world at all given the salient features it has on the received view. After all, if logic—including logical principles and rules—is necessary, universal and topic neutral, it becomes unclear how it could, even in principle, concern reality. For on the traditional conception, logical principles (and rules) hold in every way the world could be (and, thus, are necessary); the principles are also the case without exception (being, in this way, universal), and they do not depend on any features of the domain they are applied to (which makes them topic neutral). Nevertheless, principles that hold in every way the world could be do not seem to depend on the world (necessity), since they are what they are irrespectively of what goes on among worldly variations. The same goes for principles that hold with no exception (universality), as there is no context in which they fail, that is, there seems to be no aspect of the world that undermines them. Finally, if the principles go through independently of any specific features of the domains to which they are applied (topic neutrality), it becomes unclear how could they possibly be about the world at all.

After considering these three central features of the received view, I examine the possibility of logic being about the world. I conclude that the received view faces a dilemma. If logic is not about the world, given its neutrality, it becomes unclear how it can tell us anything useful about the world. If logic is about the world, it is difficult to see how it can be topic neutral, and a key component of the received view needs to go. In the final part of the paper, I propose to embrace the second horn of the dilemma and consider the benefits that denying topic neutrality brings to our understanding of logic.

2 Logic and the World: A Classical Perspective

2.1 Logic's received view: classicality

On the received view, logic has three distinctive features—necessity, universality, and topic neutrality. (I will consider them below.) On this conception, logic is also typically identified with classical logic. W.V. Quine [1986] famously resisted attempts to revise logical principles by insisting that they amounted to changes in subject matter (in stark contrast with the more openly revisionist proposal previously advanced in Quine [1951]). On his view, if a statement and its negation are both the case, one is no longer considering negation (and, *a fortiori*, logic), but something else altogether. The systematic application of this move to other logical constants would ensure the preservation of classical

logic. After all, none of its principles would ever be revised nor could they be. The identification of classical logic with the entire field of logic guarantees that classical logic is maintained no matter what (for a critique of Quine's move, see Priest [2006b]).

Quine's maneuver would not only guarantee that classical logic is preserved but also would lead to the conclusion that this logic is universally applied (universality), for there is no context in which any of its principles fail. Any attempted refutation of a logical principle would be diverted to some other assumption that was not part of logic but belonged to another field altogether. Since the other assumption would be held responsible for the alleged failure, classical logic is ultimately preserved intact. Moreover, on Quine's approach, since it does not matter the specific topic to which logical principles are applied—they hold "come what may"—topic neutrality results. Such neutrality is reinforced by the changing the logic/changing the subject matter maneuver, given that no possible change of a logical principle can ever be implemented. Attempted revisions are deflated by changing the topic under consideration. As a result, classical logical principles remain unscathed throughout.

Finally, on Quine's view, the situation regarding the necessity of logical principles is somewhat more nuanced. Quine is notoriously ill-disposed toward modal notions and would resist classifying classical logic as necessary—certainly in the context of Quine [1951]. In fact, in this context, given the centrality of logic to the entire conceptual framework, even if revisions of logical principles were entertained, they would require such a massive reworking of the entire conceptual setting that, for pragmatic reasons, it is unlikely that such an overhaul would have been implemented. Although this move does not establish the necessity of logical principles, it suggests a way in which the principles are pragmatically held fixed. One of the key outcomes of characterizing logical principles as necessary is the resulting constancy: logical principles, if necessary, will remain invariant over time—or, at least, they ought to remain. Now, the two outcomes—the stability and constancy of logical principles—are basically the same, whether they result from metaphysical or pragmatic reasons. (Admittedly, the source of stability matters from a metaphysical standpoint; however, from a pragmatic perspective, the difference is immaterial.)

2.2 Logic's received view: necessity, universality, topic neutrality

A logic is typically identified with a relation of logical consequence in a particular language. In this way, it offers a way of organizing and providing some structure to the statements of the language regarding what follows from what.

Each logic specifies logical dependence relations among statements.

Typically, a logic—and, consequently, a logical consequence relation—demands more than this. Additional requirements are usually imposed on a consequence relation. Arguably, one can trace back the extra features to the pioneering work done by Aristotle. Logic is conceived as a discipline that specifies a relation among premises and conclusion(s) of arguments that, in virtue of the resulting logical form alone, is necessary, universal, and topic neutral.

(a) *Necessity*: The consequence relation is necessary in that, on pain of inconsistency, the truth of the premises guarantees the truth of the conclusion. In other words, in a valid argument, it is not possible for the premises and the negation of the conclusion to hold. Since the relation does not obtain only contingently, the validity of an argument guarantees that the specific connection between premises and conclusion could not be otherwise.

(b) *Universality*: Given the necessity of the consequence relation, it results that the relation is the case universally, that is, with no restrictions or exceptions. After all, any violation of the characteristic property of the consequence relation, connecting premises and conclusion in the way just described, would undermine its necessity. The absence of exceptions, in turn, guarantees the consequence relation's universality.

(c) *Topic Neutrality*: Given that the consequence relation holds universally, what follows from what does not depend on any particularity, or specificity, of the subject matter, or the topic, to which the consequence relation applies. The result is the topic neutrality of the consequence relation and one sense of logic's formality (see Dutilh Novaes [2012]). In this way, logic's necessity, universality, and topic neutrality are tightly connected.

These considerations suggest that a conception of logic, broadly understood, is more than just a logical consequence relation in a language but comes with a certain conceptualization of the field itself—as something that holds necessarily, universally, and independently of the topic at hand. As noted, in the case of Quine, classical logic is added to the view, together with a pragmatic reconceptualization of the necessity constraint (logical principles are held fixed for pragmatic reasons, rather than metaphysical ones).

2.3 The possibility that logic is about the world

Given these features, it becomes unclear how logic could be about the world at all. If logical principles hold without any restrictions or exceptions (universality), there is nothing in the world that undermines them. If such principles hold under any circumstances (necessity), then nothing in the world could undercut them. If the particularity, or specificity, of the subject matter makes no difference as to whether the logical principles hold or not (topic neutrality),

then nothing in the world makes any difference to the principles at stake. Logic seems to have been completely severed from the world.

Faced with a potential counterexample to a logical principle, defenders of the received view can always invoke the strategy of identifying a hidden assumption and resist the claim that the counterexample is genuine. In this way, logical principles can be kept untouched; what fails are the assumptions that support the counterexample.

Consider, for instance, the principle of explosion, according to which a contradiction of the form 'A and not-A' entails B, for every statement B. On a three-valued semantics, such as the one for LP (the Logic of Paradox), there are three truth-values: *true*, *false*, and both *true and false*—with *true* as the designated value (see Priest [2006a]). Consider now a sentence such as the Liar, which states its own lack of truth, that is, '$L = L$ is not true'. Clearly, 'L' is both true and false. Now, suppose that 'B' is a false, but not inconsistent, sentence, such as that the Moon is made of blue cheese. Given that 'L' is both true and false, it is, in particular, true, and so is its negation, 'not-L' (Priest [2006a]). Thus, the premise of explosion—'L and not-L'—is also true, since it is the conjunction of two true statements. Yet, the conclusion 'B' is false. As a result, explosion is violated.

The received view theorist—who also adopts classical logic—may resist the counterexample by insisting that there are only two truth-values (*true* and *false*). Hence, the premise of explosion, being a statement and its negation, is false, and no counterexample results. Crucial to this response is the semantic assumption of bivalence, regarding the existence of only two truth-values. Clearly, the classical logician is entitled to it. The key assumption that there is an additional truth-value—both *true and false*—is, thus, denied. In the absence of this assumption, the counterexample does not get off the ground. In fact, from the perspective of classical logic, the counterexample is impossible. It is not only that a statement and its negation are not true; they *cannot* be. Since bivalence rules out any third truth-value, and the truth-conditions for negation and conjunction ensure that the any contradiction of the form 'A and not-A' is false, there is no possible additional truth-value assignment that would change this outcome. A contradiction is not only false, but necessarily so—independently of anything that goes on in the world.

Classical logic is thereby preserved, and so are topic neutrality, necessity, and universality. Nothing specific to a domain is invoked in this reasoning, so it goes through irrespectively of the topic under consideration (topic neutrality); there are no exceptions to the logical principles (universality), and the principles hold in every possible situation (necessity). As a result, logic is not about the world in the end.

In response, those who defend the aptness of the counterexample insist that

a possibility is being foreclosed by classical logic. The logical space is such that additional configurations not recognized in classical logic are still possible. The configurations involve the recognition of at least one additional truth-value—both *true and false*. (Of course, a fourth one is similarly possible: *neither true nor false*. But we need not explore this possibility in this context.) Nothing in the logical space rules out this additional truth-value—only the commitment to bivalence does that, but this assumes is the very point in question. Although consistent from classical logic's perspective, the restriction to two-truth values assumes a much poorer logical space than it is, in fact, possible, since it fails to recognize perfectly coherent possibilities. Once such possibilities are acknowledged, a richer underlying logical space becomes salient, and the violation of explosion ensues.

If explosion is violated, there is something about the world—a possibility in logical space—that matters when reasoning in inconsistent contexts. This means that, at least in these contexts, the topic under consideration makes a difference. It matters that we are reasoning about objects that may have inconsistent properties, such as infinitesimals from the original formulation of the calculus, which are both different from zero, since they are positive numbers, and identical to zero, since they are smaller than any positive number (da Costa, Krause, and Bueno [2007] and Bueno [2025b]). It matters that we are considering the need to formulate sentences, such as the Liar, that may be both true and false. But if it matters which objects we are considering in order to determine which logical inferences can be properly employed to reason about them, then topic neutrality no longer goes through in general. Logic, in a clear way, is about the world, and the received view cannot be maintained generally.

This raises a dilemma for the received view. (i) Either logic—including logical principles and rules—is about the world or it is not. (ii) If logic is *not* about the world, given topic neutrality, it is mysterious how it can provide any information about the world at all. (iii) Alternatively, if logic *is* about the world, it is difficult to see how it can be topic neutral, and a central component of the received view must be abandoned. (iv) Therefore, either it is mysterious how logic can provide any information about the world, or topic neutrality needs to be rejected. In either case, troubles for the received view arise.

The argument is logically valid, given classical logic. Since the received view typically identifies logic with classical logic, this form of argument is accepted and is fully sanctioned by the view. The only issue to be considered then concerns the truth of the premises. I will address this next.

(i) The first premise of the dilemma is logically valid, given classical logic. It is, therefore, true, according to the defender of the received view.

(ii) The second premise is also true. After all, on the received view, it does

not matter which features of the world are considered. The validity of inferences is supposedly unaffected. It is then unclear why inferences that do not concern any topic at all should be reliable, for they need not preserve truth. Consider, for instance, the necessitation rule in modal logic: If T is a theorem, then Necessarily T. Whether a statement is a theorem or not is a highly context-sensitive matter—it depends on the underlying logic, the assumptions that are adopted, the relevant characterization principles. In a different context, in which these assumptions, logic, and principles may not hold, the relevant statement T even if true need not be necessary. Clearly, an empirically true statement is not necessary. So, the necessitation-based inference need not be (empirical-)truth-preserving, even if it preserves necessary truth (Hintikka [1996], p. 5).

Moreover, under different assumptions, a distinct logic, and other principles, not only the statement T need not be a theorem, but it may well be false—even if with the original assumptions, logic, and principles it was indeed a theorem. Therefore, T is not necessary either—at best, it is conditionally necessary, that is, necessary given the relevant assumptions, logic, and principles. For example, that every set can be well-ordered follows from the axiom of choice. By necessitation (and modus ponens), the well-ordering result is necessarily true. However, if the axiom of choice is false, the well-ordering result need not be true, and, thus, is not necessary. Once again, one cannot conclude that the inference is truth-preserving. The inference—assuming necessitation and modus ponens—supports the conclusion to the effect that 'every set is well-ordered' is necessary. Nonetheless, the conclusion is not necessary as there are contexts in which it fails—without the axiom of choice, not every set can be well-ordered. The validity of the inference depends on the context to which it is applied—the kinds of sets under consideration. Without such context-dependent, world-specific logical principles, it is unclear how logic can provide any information about the world.

(iii) If logic is about the world, it depends on specific features of the domain. But in this case, topic neutrality does not hold in general. For depending on aspects of the domain, certain inferences will go through, others will not. The case involving the necessitation rule just discussed provides an illustration of this scenario. In the end, the received view needs to be reconsidered.

3 Logics and the World: A Non-Classical Setting

The difficulty of making room for logic to be about the world ultimately requires rethinking key features of logic's received view. Here I focus on only one of these features and sketch an approach to change the received view accordingly. The crucial move is the denial of logic's topic neutrality (see also

Bueno and Colyvan [2004] and Bueno [2025a]). The received view's remaining features—necessity and universality—also eventually need to be recast but addressing them is a task for another occasion. Resisting topic neutrality is the focus instead.

It is important to recognize that, despite appearances to the contrary, logical principles do have content. After all, there is something they rule out—there is something they are incompatible with. In this respect, logical and scientific principles are alike. Since both kinds of principles rule something out, it is possible to characterize their content in terms of what they exclude—that is, in terms of their incompatibility with a certain situations or states of affairs.

Incompatibility, it might be argued, is itself a logical concept and, thus, some logic is already presupposed in the characterization of the content of logical principles. This is ultimately correct. A better way of expressing it, however, is by realizing the role of modality in the formulation of logical concepts—including their content. The very concept of logical consequence, that is, what follows from what—which, arguably, is the central concept of logic—is an inherently modal concept. Here is a way of spelling this out:

> (Val) An argument is valid if, and only if, it is impossible for the premises and the negation of the conclusion to hold.

The impossibility in question is taken to be primitive (Shalkowski [1994], and Bueno and Shalkowski [2009] and [2013]). After all, attempts to characterize the impossibility in nonmodal terms—such as *via* possible worlds—end up presupposing the very concept that one aims to formulate. Suppose that what is possible is analyzed as what is true in some world (Lewis [1986]). Consider now the structure of the logical space—the structure of all possibilities. Why is it that nowhere in that space a contradiction of the form 'A and not-A' is found? The obvious answer consists in noting that the situation in question is an impossibility. However, since this is an impossibility about the entire logical space—an impossibility about all worlds—it cannot be characterized in terms of worlds. A primitive concept of possibility is, therefore, in order—even for the modal realist (Shalkowski [1994]).

It might be argued that the impossibility could be construed as being about *each* specific world, and since for *each* world, it is not the case that 'A and not-A' is true in that world, it follows, from classical logic, that the same holds for *all* worlds. Thus, one can avoid referring to the structure of the logical space altogether, and focus only on what goes on in each world.

The problem with this response is that it does not fully capture the modal content of the claim under consideration. Even though, for all worlds, no contradiction is true in a world, the original concern still remains, since it is

unclear why there is no contradiction *in the logical space as a whole*. The idea that contradictions could only hold in a world (if they could hold at all) assumes the very point at issue, namely, that it is not possible for there to be contradictions in the logical space, that is, if none are present in any world, then none are present at all. Note, however, that this is still a possibility *about worlds*—it is not *possible* for any world to have a contradiction in it. Yet, on the modal realist construal, possibilities are supposed to be expressed in terms of worlds, not the other way around. This highlights an expressive limitation of the modal realist's reductive program. A primitive modality—one that can be applied, *inter alia*, to worlds—is ultimately needed.

It might be objected that David Lewis defends a principle that, by and large, allows for the expression of the relevant possibility. On his view, for every way the world could be, there is a world that is that way (Lewis [1986]). This principle does express a form of plenitude for *world-bound* possibilities. Nonetheless, this is not the same as expressing plenitude for all *possibilities*. (To insist that all possibilities are world-bound possibilities is to assume the very point in question.) After all, the plenitude principle above is restricted to worlds and cannot cover all possibilities, such as those about what is, or is not, possible in a world—or about it. Consider the possibility that some world is inconsistent and, thus, for some A, 'A and not-A' is the case in such a world. Clearly, classical logic rules out this possibility by fiat. Nevertheless, the modal realist is not in a position to express it, since, once again, it is a possibility about worlds rather than a possibility to be formulated in terms of them.

Perhaps one could insist that the modal realist is in a favorable situation since the issue involves the *denial* of a possibility. So, there is nothing for the modal realist to be committed to when the possibility is rejected. The problem, however, cannot be resolved in this way. The issue concerns the need to express, in modal realist terms, the possibility in question so that it can subsequently be denied. Otherwise, the modal realist cannot articulate the content from which to dissent. It is not a matter of one's ontological commitment, but rather of the modal realist's expressive resources. Given that ersatz modal realism is criticized for its inability to express all possibilities (Lewis [1986], Chapter 3), it is curious that modal realism itself faces similar concerns.

Maybe this difficulty could be avoided by invoking an advanced modalizing strategy (Divers [1999]; see also Divers and Parry [2018] for extensions of advanced modalizing for *de re* and *de dicto* modal claims). The approach offers a redundancy interpretation in which talk of worlds included in worlds is, in key contexts, considered redundant. As Divers notes:

> in cases where the quantifiers were not formerly world-restricted, the possibility operator has no semantic effect on the content of the sentence within its scope. The possibility operator is semantically redundant in such a context, a semantically vacuous expression on a par with "It is the case that" (Divers [1999], p. 229).

By eliminating the redundancy, nothing is lost, and the modal realist avoids the embarrassment of being unable to express the possibilities in question.

There is a concern. Applying the advanced modalizing strategy to quantifiers that "were not formerly world-restricted" is a way of stating, in a modal realist setting, that the quantifiers in question have no modal content. They are not world-bound, after all. But this is precisely the problem. Items that are not world-bound still have modal content, even though the modal realist lacks resources to recognize, or express, this fact. Some worlds are possible, others are impossible; some portions of the logical space may contain unrecognized possibilities, others may not. These modal claims have content and can be straightforwardly expressed in natural language. (This has just been done.) The claims are not restricted in any way by modal realist constraints—including by any redundancy of quantifiers. Rather than being redundant, the quantifiers in question express some modal content. This content needs to be characterized and, to achieve this goal, some primitive modality is called for.

This raises the issue of whether there are additional possibilities hidden in the logical space given the adoption of a specific framework, such as classical logic or modal realism. The answer seems to be positive. Consider, for instance, the possibility of investigating properties of inconsistent objects, which classical logic forecloses because of its identification of inconsistency and triviality. After all, in light of the principle of explosion, everything follows from a contradiction of the form 'A and not-A'. One is, thus, unable to distinguish which properties an object has from those that it does not, since in the system in question objects both have and lack all properties. Hence, no content is forthcoming as nothing is, in effect, ruled out. Given the circumstances, nothing could be. This is the price of triviality.

The possibility of nontrivially investigating inconsistent objects is recognized once another possibility is acknowledged, namely, that there might be inconsistent but nontrivial objects. This is precisely the context in which paraconsistent logics are introduced (da Costa [1974] and [2008]; for further discussion, see Priest [2006a], and da Costa, Krause, and Bueno [2007]). These logics implement and articulate a possibility in the logical space that classical logic had foreclosed, the possibility of objects that both have and lack a certain property but for which only some properties hold (Bueno [2021], [2022], and [2025a]). These logics allow for the investigation of properties of inconsistent objects, such as the Russell set—the set of all non-self-membered sets—or the

original formulation of infinitesimals in the calculus—positive numbers that are smaller than any positive number. The Russell set is both a member of itself and is not a member of itself. Infinitesimals are both different from zero and are identical to zero. Neither the Russell set nor infinitesimals can be formulated in classical set theories, such as Zermelo-Fraenkel set theory with the axiom of choice (see Jech [2003]), assuming their consistency. Nevertheless, in suitable paraconsistent set theories, the Russell set and infinitesimals can be investigated. Despite their inconsistency, these objects are not trivial. They have some properties and lack others (see da Costa, Krause, and Bueno [2007] and references therein).

Objects such as the Russell set and infinitesimals highlight the respect in which classical logic does have content. It rules out the possibility of inconsistent but nontrivial objects. It excludes the possibility that some statement in the language does not follow from a contradiction of the form 'A and not-A'. By recognizing the possibility of what was excluded by classical logic, and by designing corresponding logics that allow for the exploration of this possibility, inquiry into the inconsistent becomes salient and can be implemented. A portion of the logical space has been uncovered.

Nonetheless, this is not the only portion of the logical space that can be revealed. Consider the case of excluded middle, according to which

$$\forall x(Px \vee \neg Px),$$

that is, for every object, it has a given property P or it does not. Ruled out here is the possibility that, for some object, it may be undetermined whether it has or does not have the property in question. In the case of vague objects, it is arguably so. After all, for these objects, there is a given property for which it is neither definitely the case that the objects have the property, nor that they do not have it. If a person is not bald, taking one hair of this person's head would not turn that person into someone who is bald. There is no precise number of hairs that need to be removed from the head to transform a person who is not bald into a bald person. There are clear cases of being bald, clear cases of being not bald, and cases in which it is indeterminate whether the person is bald or not. In other words, there is a region of indeterminacy in which it is unclear whether the property holds or not. (Note that this is not the case for the predicate 'definitely bald', which is not vague. By removing all the hairs from someone's head, the person becomes definitely bald, and no vagueness is involved.) Excluded middle seems to rule out vague or indeterminate objects. This highlights its content.

The classical logician may insist that excluded middle has no content by arguing that it is compatible with vague objects. This compatibility is one of the central features of epistemic views of vagueness (see Williamson [1994]).

According to this view, there is always a sharp divide between an object having a given property and not having it—there is a precise number of hairs in someone's head that makes that person bald (or not). We just do not know exactly where the divide lies—we do not know what that number of hairs is. As a result, for the epistemic theorist, excluded middle applies throughout and nothing is ultimately ruled out.

Excluded middle's lack of content comes with a price. Commitment to the existence of sharp boundaries for vague predicates is part of this cost. Positing items that play an explanatory role and which, even in principle, cannot be known raises a significant concern (Bueno [2025a]). To avoid the charge that introducing unknowable boundaries is *ad hoc*, the epistemic theorist would need to provide independent grounds for their existence, that is, grounds that do not assume precisely what needs to be explained. It is unclear, however, that this can be achieved given how crucial sharp boundaries' unknowable nature is for the view. The only reason to maintain the existence of these boundaries is to preserve excluded middle in the presence of vagueness. A better alternative, which does not incur the cost of embracing the existence of unknowable items, is to acknowledge that excluded middle has content and that it fails when applied to objects that lack sharp boundaries. Contrary to the epistemic theorist, the specific domain to which logical principles are applied does matter in the end.

Describing the formulation of logical principles as uncovering regions in the logical space does not require interpreting these regions in platonist terms. The possibilities in question are objective—they are what they are independently of what one may take them to be. But they should not be reified. They should not be thought of in terms of abstract objects, possible worlds, universals, tropes, or states-of-affairs, among other items of metaphysical theorizing. There is no need to posit any such entities to understand what happens when the limitations of the application of logical principles are recognized. Once it is acknowledged that logical principles have content, it becomes clear that topic neutrality needs to be abandoned. Depending on the domain one considers applying a logical principle to, different principles about what follows from what are in play (see da Costa [2008] and Bueno and Shalkowski [2009]). Reasoning about inconsistent objects without triviality demands nonexplosive logics; reasoning about vague objects without turning them into sharp items calls for logics in which excluded middle fails.

In this way, the dilemma presented in the previous section is addressed by embracing its second horn. Logics are indeed about the world—they do have content, after all—and as a result, one can explain how they can be informative about the specific domains they are applied to. Certain possibilities are ruled out by certain logical principles, and to investigate these possibilities, one needs to undermine the principles in question. The result are principles that are

relevant to the domain under consideration. As a result, logic is not topic neutral in the end (see Bueno [2025a]).

Although topic neutrality does not hold in general, *within* each domain it is still the case. Logical inferences and principles are formal, and this is a significant trait that these principles and inferences have. Formality is *restricted*—it holds within domains rather than across them.

4 Conclusion

The considerations provided indicate that the received view of logic needs to be significantly revised. To make sense of how logical principles can be informative about the world, it is unclear that they can be topic neutral. Indeed, it is difficult to reconcile these principles' dependence on certain features of the domains they apply to with their alleged topic neutrality. By embracing the conclusion that logical principles have content—since they rule out possibilities—we can make sense of how these principles can be about the world. Because it reflects significant modal features of reality—those that the rejection of other principles helped to expose—logic goes hand in hand with the world.

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