Logical Connectives and Global Epistemological Skepticism

Majid Amini
Department of History and Philosophy
Virginia State University
1 Hayden Dr., VA 23806, USA
Email: mamini@vsu.edu

Abstract:

In Aristotle's *Metaphysics* there is an interplay between metaphysics and metalogic in his attempt to undermine universal skepticism through the foundational laws of logic and, in particular, the law of non-contradiction. However, recently, the debate has shifted from logical laws to the ubiquitous elements of modern logic, namely, logical connectives. By drawing on Arthur Prior's (in)famous "tonk" connective, Paul Boghossian contends that the issues arising from this type of connective transcend matters logical and, ominously, open the floodgates of radical skepticism. This discussion note is an examination of Boghossian's attempt to delegitimize logical connectives of "tonk" ilk for the purpose of averting the calamity of global epistemological skepticism.

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There is a notable consensus that Aristotle's *Metaphysics* is intentionally concerned with the problem of skepticism as an integral part of a universal or special science of being. Indeed, his discussion of the Protagorean doctrine, arising out of the problem of conflicting appearances, is tied to the denial of the law of non-contradiction which in turn epitomizes itself in the Aristotelian corpus as radical skepticism.

Prima facie, one may suspect a dissonance here as any discussion of the law of non-contradiction seems to be more ensconced in the domain of logic and its foundation in contrast with a study of the content and details of a universal or special discipline dedicated to the overarching subject of being and existence. However, Aristotle in his pioneering role as the first *metalogician* (Lear 1980; 1988) attempts to shed light on the nature of proof and consequence and, in particular, the status of the law of non-contradiction in his *Metaphysics* with the ultimate aim of demonstrating the *intelligibility* of the broad structure of *reality* in the same breath. In Aristotle's own articulation, this metaphysical and metalogical interplay and interaction takes place in the following manner:

> Obviously then it is the work of one science to examine being *qua* being, and the attributes which belong to it *qua* being, and the same science will examine not only substances but also their attributes ...

> We must state whether it belongs to one or different sciences to inquire into the truths which are in *mathematics* called axioms, and into *substance*. (Emphasis added) Evidently, the inquiry into these also belongs to one science, and that the science of the philosopher; for these truths hold good for everything that is, and not for some special genus apart from others. ...
> Evidently then it belongs to the philosopher, i.e. to him who is studying the nature of all substance, to inquire also into *the principles of syllogism*. (Emphasis added) But he who knows best about each genus must be able to state the most certain principles of his subject, so that he whose subject is existing things *qua* existing must be able to state the most certain principles of all things. ... Evidently then such a principle is the most certain of all; which principle this is, let us proceed to say. *It is, that the same attribute cannot at the same time belong and not belong to the same subject and in the same respect* (Emphasis added) ... This, then, is the most certain of all principles ... *that all who are carrying out a demonstration reduce it to this as an ultimate belief; for this is naturally the starting-point even for all the other axioms.* (Emphasis added) (McKeon 1941, 1005^{a} 13-1005^{b} 34, pp. 735-737)

Thus, in Aristotle's ontology, what ultimately underwrites being and existence is logic, or, more specifically, the law of non-contradiction, and thereby metaphysics and metalogic seem to be intrinsically coextensive in the Aristotelian architecture. In a somewhat anachronistic characterization, one may even venture to think of Aristotle as an early proponent of *logicism* on a grander scale than its circumscribed mathematical variety as presented in the works of Gottlob Frege and Bertrand Russell when it comes to the overall ontological structure of reality.

Nonetheless, what seems clear and incontrovertible in Aristotle's *Metaphysics* is that a defense of the foundation of logic, *viz.*, the law of non-contradiction as conceptualized in the Aristotelian architectonic, holds the key to mounting a successful challenge to radical skepticism. However, more recently, the boundaries of extreme skepticism have been pushed beyond logical laws to the omnipresent and cardinal character of modern logic, namely, the ubiquity of logical connectives and their status. The debate was initially introduced by Arthur Prior (1960) as a critique of logical conventionalism and specifically against the conventionalist reading of logical connectives; yet, somewhat ironically, the criticism has now spilled beyond logical and mathematical conventionalism to the far greater domain of epistemological skepticism. Nonetheless, Prior's scathing attack has been of such an impact that any doctrine or stripe of conventionalism, whether in logic and mathematics, needs to visit and find a way of responding to it. (Warren 2020)

In this exceedingly pithy paper, for the purpose of highlighting a number of issues including what constitutes a logical connective and what constitutes a justification of logical laws, Prior introduces his (in)famous connective "tonk" by the following introduction (I-Rule) and elimination rules (E-Rule):

I-Rule:	A	E-Rule:	A tonk B
	A tonk B		B

Then he points out how such a construal of logical connectives shows the problematic nature of an inferentialist approach that imputes the truth of logical laws to the meanings of logical vocabularies whose definitions are given in terms of some deducibility rules. Specifically, Prior shows how through the "tonk" connective we can generate inferential forms whose application leads to absurdity and *Falsche Spitzfindigkeit*.

Recently, however, it has been argued by Paul Boghossian (2001; 2003; 2014) that the problem of "tonk" goes beyond the problem of justifying deduction and can be easily extended to the larger issue of *global* epistemological skepticism: that is, how there could be objectively correct epistemic principles of any kind. Basically, so goes the argument, if deduction is in trouble for its justification, given the ineluctable involvement of *deductive* reasoning in any account of how we might know the correctness of any *non-deductive* epistemic principles, then there arises the specter of global epistemological skepticism.

The preamble to Boghossian's approach is the observation that:

> If there are no objectively correct facts about how one ought to reason deductively, much of what we take to be knowledge would not be binding on those who would prefer to reason differently. (Boghossian 2001, 14)

And, then, he sketches the argument in outline thus:

> All the points about the inadequacy of observational or default reasonableness accounts would carry over to the non-deductive case. That means that any justification for the principles governing non-deductive reasoning would have to be inferential. As inferential, they would either have to be non-deductive or deductive, or a mixture of the two. If non-deductive, then the justification would be rule-circular ... If deductive, then ditto. If a mixture, then ditto. (*Ibid.*, 15)

Boghossian, finally, caps the argument by the following iteration:

> To put matters another way, it seems to me that all we really need, in order to raise a serious problem about the possibility of objectively correct epistemic principles, is the simple and seemingly inescapable claim that *reasoning* of some sort will be involved in any putative knowledge that we might have of any high-level epistemic claim. Once that simple thought is in place, seemingly insuperable problems are upon us virtually immediately. (*Ibid.*, 15)

However, to stave off global skepticism, Boghossian mounts a defense of deduction by arguing against the legitimacy of "tonk" type connectives as they apparently fail to be truth-preserving. The argument is buttressed by the semantic stipulation that there must be a semantic value for any logical constant which makes its corresponding inferential laws truth-preserving. In other words, "tonk" is not only not truth-preserving but also meaningless. However, given the *deductive* nature of the

argument, Boghossian readily concedes the circularity of the reasoning but contends that the rule-circularity involved in the argumentation is of a virtuous than a vicious variety.

The rest of this epigrammatic discussion is, therefore, an outline of a number of critical concerns about Boghossian's contention.

(1) If rule-circularity is permissible in the justification of deduction, why cannot the same latitude be shown towards inductive justification of induction? Indeed, there has been a renewed flurry of justifying induction *à la* Hans Reichenbach through meta-induction and optimality. (Schurz 2019) Thus, there appears to be no cause for global skepticism.

(2) Notwithstanding the rule-circularity issue, in view of the existence of many competing and mutually exclusive deductive systems, one is left in dark as to how to choose between them. Boghossian's wherewithal to justify deduction is not sufficiently discriminatory to adjudicate among such *competing* deductive calculi.

(3) In pursuit of his meaning-theoretic concerns, Boghossian appeals to the forgoing semantic stipulation to delegitimize "tonk" type connectives. Yet, what exactly is the status of such meaning stipulations? That is, would not an appeal to such constraints embroil one either in a vicious circle or in an infinite regress? This seems to be somewhat reminiscent of Lewis Carroll's (1895) famous dialogue between the tortoise and Achilles.

(4) Moreover, the imposition of the semantic stipulation on the construction of any logical framework seems to blur the boundaries between *logicality* and *meaningfulness* of connectives. It can be shown that there are perfectly decent logical connectives that can operate in the absence of such semantic constraints: that is, though such cases are unhelpful by obscuring the meaning of those connectives, the absence of the semantic stipulation neither engenders incoherence nor renders their rules incapable of defining the meaning of the connectives as logical. (Read 2008; Warren 2020)

(5) Furthermore, the converse of the preceding point about Boghossian's possibly unintended blurring of the boundaries between logicality and meaningfulness can be expressed in the form of the following question: why should the mere possession of semantic value be sufficient to figure in valid patterns of inference? A poignant example here is Frege's problematic principle, Basic Law V, involving the term "extension" that ultimately led to the discovery of Russell's Paradox.

(6) There have been attempts at exploring the possibility of contexts where the addition of "tonk" would not lead to absurdity and failure of truth-preservation. The attempts can be divided into two broad categories: syntactical as in Cook (2005), Maruyama (2016), Ripley (2015) and Teijeiro (2020), or semantical as in Ripley (2015) and Warren (2015; 2020).

(7) It seems that the grounds for the *virtuous* rule-circularity claim in Boghossian's argument include *inter alia* an espousal of non-crude *externalism* which presumably provides an opportunity to break out of the *vicious* circle of *internalism* that relies on *a priori* reasoning, self-knowledge, or reflection. The idea here seems to be that we can acquire a warrant for an inference despite its circularity since it is not required for us antecedently to possess a *reflectively appreciable warrant* for that inference rule. Thus, in line with externalism, the requirement to first reflectively acknowledge

the truth-preserving nature of the inference to be warranted is obviated. Now, besides the considerable concerns surrounding externalism, the critical question to ask in the context of logic is: does an external warrant furnish a proper and apposite ground for justifying logical laws? Specifically, does not externalism deprive logic of its most cherished and cardinal characteristic, namely, *necessity*?

(8) In contrast with Boghossian's method, another approach to solving the problem of justification for both deduction and induction has been to claim the need for a disambiguation in the concept of justification. It is contended that there are at least two senses of justification here: justification *simpliciter* (my term) and justification *relative to a cognitive end*, and the problem of justification of deduction and induction concerns the latter not the former which can be overcome *inductively for deduction* and *deductively for induction*. (Huber 2017) Although the approach fails to appeal to justification purists, at least it is not more problematic than Boghossian's.

(9) Historically speaking, Boghossian's rule-circular justification of deduction diverges drastically from the initial emergence and treatment of the issue. Specifically, it flies against the earliest extant attempt at such a justification by Aristotle in *Metaphysics Γ*. Aristotle's method of *elenchus* (negative proof or proof by refutation) in his version of the justification of deduction brings the problematic nature of Boghossian's approach into further focus and light.

(10) Finally, whether Prior's "tonk" connective is truth-preserving and meaningful or not, the more fundamental and pressing issue is the question of what constitutes a logical connective. That is, what is it that separates logical vocabulary from the non-logical ones? This is a problem of demarcation of an utmost significance. In this context, it is sobering to recall Alfred Tarski's skepticism about the bifurcation of lexicons into logical and non-logical. (Tarski 1956) He contended that that there are no objective grounds to permit one to draw a sharp boundary between the two groups of terms.[1] Now, if Tarski happens to be right in his contention that there are no decisive demarcations between logical and non-logical lexicons, not only the justification of deduction is in peril but also the Aristotelian project of defeating skepticism through the vindication of the law of non-contradiction for the purpose of establishing his prized universal or special science of being *qua* being. By the same extension, it seems Boghossian's anti-skeptical enterprise is in jeopardy too and the global epistemological skepticism is back in business.

Endnotes:

1. In view of Tarski's later innovative work on logical constants in terms of *invariant permutations*, it is important to bear in mind that the problems still persist. Generalizing Felix Klein's Erlanger Programm in geometry, Tarski attempts to explicate the class of logical lexicons in terms of notions that remain invariant under all transformations: 'we call a notion 'logical' if it is invariant under all possible one-one transformations of the world onto itself.' (Tarski and Corcoran 1986, 149) However, Tarski readily admits that his proposal is just 'about a possible use of the term' where 'the term is used in several different senses that my suggestion gives an account of one of them.' (*Ibid.*, 145) That is, without a 'monistic conception of logic' (*Ibid.*, 153), in Tarski's own words, what

turns out to be a logical notion differs and diverges. In other words, Tarski's proposal invites the problem of either circularity or regress in one's identification of logical notions. In fact, early in the paper, he explicitly states that in his endeavor to characterize what a 'logical notion' is, he has no truck with 'people [who] speak of catching the proper, true meaning of a notion, something independent of actual usage, and independent of any normative proposals'. (*Ibid.*, 145)

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