BOOK REVIEW: NOVAES, C.D, *The Dialogical Roots of Deduction: Historical, Cognitive and Philosophical Perspectives on Reasoning* (Cambridge University Press, 2020, 271 pages).

BRUNO RAMOS MENDONÇA
https://orcid.org/0000-0002-0583-4042
Universidade Federal da Fronteira do Sul
Department of Philosophy
Erechim, R.S.
Brazil
bruno.ramos@uffs.edu.br

Article info
CDD: 160.1
Received: 10.02.2021; Revised: 24.02.2021; Accepted: 27.02.2021
https://doi.org/10.1590/0100-6045.2021.V44N2.BM

Keywords
Dialogical Logic
Logic and Games

Abstract: In this article, I review the new book by C. D. Novaes, The Dialogical Roots of Deduction: Historical, Cognitive, and Philosophical Perspectives on Reasoning (2020). I reconstruct the main themes and arguments presented in the work and critically assess its results.

If Socrates claims that virtue always presupposes wisdom and that courage is a virtue, then, in a sense, it is fair to say that Socrates *must* commit to the idea that courage presupposes wisdom. Nevertheless, what kind of duty is this? The short answer to this question appeals to the concept of *logical consequence*: Socrates should believe that courageous people are wise because this fact follows logically from the premises 'virtue always presupposes wisdom' and 'courage is a virtue'. This is still not enough, though. Now we need to ask what is the nature of the relation of

deduction.[1] What does logical consequence mean, what is the source of its necessity as well as of its normative force? These are the central themes of C. Dutilh Novaes' new book, *The Dialogical Roots of Deduction* (Novaes, 2020).

To establish a research program, Novaes begins with a minimal account of logical consequence. Under this minimal reading, a deduction is a truth-preserving, perspicuous kind of relation between sentences whose correction criteria are independent of the actual truth-values of the premises being considered (note that the author does not see formality as a definitorial feature of the concept). This minimal account introduces two fundamental questions: first, what is the nature of the necessity associated with the truth-preserving character of deduction? Secondly, what kind of epistemic function does logical consequence play that makes it a normative force governing our intellectual lives?

In the current debate over these questions, some sort of naturalism has gained strength: according to this view, logic is a ubiquitous precondition of our cognitive capacities (in particular, of our discursive capacity). Against this perspective, supported by abundant evidence provided by recent studies in the psychology of reasoning according to which human beings ordinarily exhibit a deficient ability to follow logical inferences, Novaes' solution to those questions is historicist and dialogical. First, the author explores the idea that the relation of logical consequence is not linked to any sort of natural necessity. Rather, it is a type of historically articulated 'cultural technology' such as literacy. Although human beings, when properly instructed, are fully capable of keeping track of deductive relations of consequence, there is no logical structure underlying our discursive practice. Logic is not a ubiquitous condition of our

[1] Following Novaes' own terminological decision, in the following, I use 'deduction' as a synonym of 'logical consequence'.

cognitive faculties, albeit it is a potentiality that humans may develop through specific instruction (Novaes' technological conception of logic is not only in conflict with naturalism but also with inferentialist perspectives, such as Brandom's, which understand implication as *the* fundamental semantic notion).

Secondly, Novaes argues that logical consequence, as a technological kind, is rooted in certain forms of dialogical games which emerged in Antiquity, especially in the context of the then-incipient mathematical practice (hereafter, I sometimes say 'logical games' to refer to such dialogical practices). Therefore, it is by analyzing these discursive games that, presumably, we can find a solution for the philosophical problems related to the concept of deduction. At this point, a historicized version of a 'theory of recapitulation' plays a role: it is expected that, by describing the history of the development of these dialogical games, we might be able to extract an explanation of what it is for an individual to be governed in her discursive practice by the attention to relations of logical consequence.

The philosophical literature provides various attempts of analyzing logic in game-theoretic terms. Lorenzen's dialogical logic (Lorenzen and Lorenz, 1978) and Hintikka's game-theoretic semantics (Hintikka and Sandu, 1997) offer still quite influential paradigms of analysis. However, for Novaes, these classical proposals fail to capture the relevant phenomenon since they define adversarial games where the winning conditions of one of the players (and the existence of a winning strategy for this player) determine logical validity. On the contrary, the author claims that the targeted dialogical practice is not purely adversarial, but also displays cooperative aspects. Moreover, Hintikka and Lorenzen's proposals are poorly philosophically justified. Novaes explains this difficulty in terms of 'Dawkins' question': what do we gain by winning a logical game? Why should we

engage in such a game in the first place? Hintikka and Lorenzen do not furnish an adequate answer to these questions.

Against these proposals, Novaes suggests a treatment of the issue in terms of a *prover-skeptic* model: a cooperative dialogical game. Both players seek to cooperate in establishing the validity/ invalidity of an argument. Notwithstanding, there is an asymmetry in their roles. If, on the one hand, the prover establishes the premises and must articulate the inferential steps to a conclusion, on the other hand, the skeptic controls the validity of the proof by searching for potential counterexamples, asking for elucidation when an inferential step is not sufficiently perspicuous and so on. Hence, prover and skeptic are not exactly rivals, though they aim for distinct utilities in the game. Although the prover's winning conditions still characterize logical validity, the skeptic does not win when the prover loses. Rather, the skeptic is best seen as an indifferent contender who wants to be convinced but not at any cost. For Novaes, in this aspect, the prover-skeptic model offers a more adequate response to Dawkins' question: in this dialogical game, participants cooperate to guarantee an exchange of epistemic resources.

Novaes' proposal results in a quite comprehensive account of logical deduction. The necessity of logical consequence is characterized in adversarial terms as the existence of an absolute indefeasible winning strategy for prover. Perspicuity, on the other hand, is understood as a cooperative aspect of the game: high perspicuity is a value that both prover and skeptic seek to establish, the latter by asking relevant clarificatory questions and the former by answering them correctly. Belief-bracketing (i.e., the fact that, to assess the validity of an argument, we must ignore the actual truth-value of its premises) is described as a necessary condition of the game: to check the existence of

possible counterexamples to a given argument, the skeptic must be able to put herself in the prover's shoes, that is, she needs to make an exercise of imagination by assuming the truth of the premises just for the sake of the argument. Additionally, this dialogical account of logical consequence answers several different problems in philosophy of logic. Especially, Novaes argues that the debate between proof- and model-theoretic definitions of logical consequence is a false dilemma: in her opinion, both approaches offer accurate explanations of distinct aspects of the skeptic's role in the game. Whereas proof-theory furnishes a description of the norms governing skeptic's demands for perspicuity, model-theory defines the norms governing her search for counter-models.

The necessity of logical consequence is, then, conceived dialogically as non-defeasibility in a prover-skeptic dialogical game. Why must deductive necessity be so understood? For Novaes, the reason is historical. In its ancient Greek roots, logical reasoning emerged in the context of an argumentative practice markedly dialogical and at least in part adversarial. First, as a direct democracy, the participation in Athenian political life demanded from citizens the capacity to argumentatively persuade their peers on matters of the city. Persuasion here must be interpreted adversarially: if *x* persuades *y*, then *x's* thesis beats *y's* antithesis. Secondly, Greek mathematical practice as such is originally heavily dialogical (as illustrated in Plato's *Meno*). Therefore, in this partially adversarial and dialogical context of argumentative practice, the supreme virtue of an argument is identified with indefeasibility against any opponent and, consequently, necessary truth-preservation becomes a definitional feature of logical consequence.

However, necessity is just a contingency aspect of logical consequence, as Novaes argues through a comparative analysis of Greek, Indian, and Chinese logical traditions. The

author shows that Indian and Chinese thinkers, in general, did not see necessity as a definitorial aspect of logical inference. Again, the reason is arguably historical: in Indian, and Chinese ancient societies, the oppositional argumentative practice was not promoted as it was in Greece and, consequently, the patterns of correct argumentative practice in those social contexts have crystallized in distinct manners. It is interesting to observe that this conception of the nature of deduction entails a historically informed logical pluralism. Distinct historical developments of the game of giving and asking for reasons constituted different patterns of good argumentative practice (and, so, different logics).

An indispensable feature of Novaes' historicist proposal is non-linearity: in her opinion, throughout its history, the concept of deduction underwent profound changes driven by multiple influences. One major aspect of this process is a gradual de-personalization, that is, step-by-step, fundamental logical concepts have been set apart from their dialogical roots. For instance, Novaes sees dialogical traces in the epistemologically charged Aristotelian definition of syllogism, which were suppressed in medieval resettings of this concept. This process culminates in the modern conception of logic as a formal theory of the laws of thought (sustained by Kant and Boole among others). For Novaes, such reinterpretations do not destroy the original meaning of the concept, but rather create multiple layers of signification. The dialogical comprehension of logic is still an appropriate reading despite its historical concealment. As stated by the author, the modernist conception of logic as a set of rules of monological thinking results from the ignorance about the phenomenon of dialogical internalization: in monological deductive reasoning, the reasoner does perform a dialogue with herself in which she simultaneously plays both roles in the prover-skeptic game. Moreover, drawing upon research in the psychology of reasoning, Novaes displays large

empirical evidence that our logical reasoning skills are enhanced in dialogical settings, a collection of results which confirms the persistence of the dialogical significance of logic.

Now, in this framework, the epistemic functionality of deduction remains a hard puzzle. First, Novaes correctly observes that logical reasoning resists typical naturalistic and evolutive explanations. To appropriately navigate their environment, human beings must strive to produce an as faithful as possible representation of their surroundings. However, for model-theoretic reasons, when logically assessing an argument, a reasoner should move away from preferable models. Rather, she needs to consider all structures which satisfy the premises, even the less plausible ones. Furthermore, to evaluate the validity of arguments, individuals must engage in a kind of discursive practice that contradicts basic pragmatic norms of conversation -- in particular, the principle of charity. According to this principle, in a conversation, a person must assume that her interlocutor has an approximately true set of beliefs. On the other hand, due to the adversarial aspect of the logical game, especially when playing the skeptic's role, a reasoner needs to adopt an anti-charity attitude by actively searching for errors in her interlocutor's game inputs. Therefore, logical reasoning is an unnatural and abnormal (from the perspective of pragmatics) type of discursive practice.

Alongside Descartes and others, Novaes sustains that the epistemic usefulness of logical thinking should not be read in informational terms, that is, a valid argument does not produce new information about its subject matter. In a sense, all the information displayed by its conclusion is already exhibited on the premises. In Novaes' opinion, to rely on logical reasoning to establish knowledge is an overkill: normally, our epistemological methods appeal to less expensive modes of reasoning (e.g., probabilistic reasoning).

In other words, the author bites the bullet of Hintikka's scandal of deduction. According to her, logical validities are not informative, we do not access new epistemically useful information by discovering the validity of an argument. So, what is the point of engaging in such a practice?

Novaes answers this inquiry by appealing to Heyes' notion of cultural gadget (Heyes, 2018). Under this conception, cognitive skills such as linguistic communication (in particular, literacy), mind reading, and so on are not evolutive but rather cultural developments which are possible given three basic features of human beings in contrast to our primate ancestors: namely, we exhibit i) a friendly stance towards others, ii) a disposition to socialize and iii) a basic set of cognitive skills (e.g., associative learning) which seem to be a psychological condition for deductive reasoning. Novaes suggests that logical reasoning satisfies i-iii and, consequently, is a cultural gadget as well. She conjectures that the logical game is a cultural outcome serving an in-between response to conflict: originally, in the face of a disagreement, argumentation presented itself as an intermediary solution between fight or flight. Both extreme responses for a clash of opinions are disadvantageous for human beings given i and ii. Hence, to argue is a kind of "symbolic fight", through which one can overcome disagreements without disrupting social bonds.

Although this dialogical explanation of the epistemic functionality of logical reasoning is quite compelling, one could object that it is fully compatible with a rejection of the scandal of deduction. Contrary to Novaes' opinion, by discovering the validity of an argument, we obtain some sort of epistemic information. Nonetheless, the relevant informational target, in this case, is not the external world. Rather, the discovery of a logical validity provides us information on the logical relation between sentences, the

kind of information necessary for the practice of score-keeping assertional commitments.

Finally, it is not enough to remark that *The Dialogical Roots of Deduction* offers us a brilliant, historically informed, dialogical account of the nature of deduction. In this relatively short book, the author affords a broad overview of all the major issues in the current literature in philosophy of logic and contributes with convincing arguments. It is a must-read, especially for researchers interested in game-theoretic analyses of logic.

References

Heyes, C. (2018). *Cognitive Gadgets: The Cultural Evolution of Thinking*. Cambridge: Harvard University Press.

Hintikka, J., & Sandu, G. (1997). Game-theoretical semantics. In J. van Benthem, & A. ter Meulen (eds.), *Handbook of Logic and Language*. Amsterdam: Elsevier.

Lorenzen, P., & Lorenz, K. (1978). *Dialogische Logik*. Darmstadt: Wissenschafstliche Buchgesellschaft.

Novaes, C. D. (2020). *The Dialogical Roots of Deduction: Historical, Cognitive, and Philosophical Perspectives on Reasoning*. Cambridge: CUP.