

# **A dialogical, multi-agent account of the normativity of logic**

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# Introduction

- “In what sense (if any) is logic normative for thought?”
- But does logic really have a normative import at all?
- If yes, is *thought* specifically within the remit of logic’s normative grip? Or perhaps something else?
- Proposal: logic is originally a normative theory of specific dialogical practices, but with applications for scientific inquiry in mono-agent situations.

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## **Plan of the talk**

- 1- Brief recap of the debate
- 2- The forgotten dialogical origins of logic
- 3- The built-in component conception of deduction
- 4- Back to the normativity of logic

# Brief recap of the debate



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## The contenders

- ‘Traditional’ view: logic is the science of correct reasoning  $\Rightarrow$  correct *thinking* – Kant, Frege, dictionaries, textbooks.
  - Laws of logic as laws of truth.
- Harman (1986): logic has no more of a connection to rationality than any other important discipline.
  - Logic is the science of truth-preserving forms of arguments.
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## But what do we mean by ‘logic’?

- There are many logics available in the market: classical, relevant, defeasible etc.
- A weakness in the debate: ‘logic’ is used as if it was a sufficiently homogeneous generic term.
- What is under discussion is the property of *necessary truth-preservation*, which underpins some but not all logical systems.
- Necessary truth-preservation as *necessary* and *sufficient* for validity  $\Rightarrow$  classical logic.

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## Bridge principles (MacFarlane 2004)

*If  $A, B \Rightarrow C$ , then (normative claim about believing  $A, B$ , and  $C$ ).*

- Variations: type of deontic operator, polarity, scope.

Wr+ you have reason to see to it that if you believe  $A$  and you believe  $B$ , you believe  $C$ .

- Seemingly, an uncontroversial bridge principle has yet to be formulated.
- Should we go probabilistic? But would it really change the terms of the debate?

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## Milne on assertion (2009)

- Milne is the only one who approaches the issue with a detour via *assertion* (public sphere).
- He then wants to make his way back to belief, but ends up with a rather confusing discussion.
- “Amongst the conventions governing assertion one stands out dramatically for present purposes: that one stands by the logical consequences of what one asserts.”
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# The forgotten dialogical origins of logic



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- Background: dialectical practices in the early Academy (Marion & Castelnerac 2009)
- Aristotle's 'older' logical texts (*Topics* and *Sophistical Refutations*) are explicitly about debating.
- Syllogistic is less obviously about debating, but: "A deduction is a discourse..."
- Latin Middle Ages: *logica = dialectica*
- Domingo de Soto (16<sup>th</sup> century): "Dialectic is the art or science of disputing".

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## The birth of deduction in Greek mathematics

“Greek mathematics reflects the importance of persuasion. It reflects the role of orality, in the use of formulae, in the structure of proofs ... But this orality is regimented into a written form, where vocabulary is limited, presentations follow a relatively rigid pattern... It is at once oral and written...” (Netz 1999, 297/8)

- The deductive method emerged as an approach to argumentation (against e.g. Sophists).
- **A proof is and isn't a dialogue:** a hybrid entity between orality and writing.



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## When logic abandoned its dialogical origins

“After that, he should study logic. I do not mean the logic of the Schools, for this is strictly speaking nothing but a dialectic which teaches *ways of expounding to others what one already knows* or even of holding forth without judgment about things one does not know. Such logic corrupts good sense rather than increasing it. I mean instead the kind of logic which teaches us to direct our reason with a view to discovering the truths of which we are ignorant.” (Preface to French edition of the *Principles*, in (Descartes 1988, 186))

## Kant and the internalization of logic

- The idea of logic as pertaining to *thinking* rather than *arguing* culminated in Kant.
- He takes as his starting point the transcendental question, “what are the a priori conditions for the representations of objects in general?”, and reconfigures the logic of his time for the transcendental project.
- He modifies the notions of “judgment,” “form,” and “categories”, and uses them to describe the very conditions of possibility of our thinking and perceiving.

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## Kant and the internalization of logic

- The concept of judgment, for example, traditionally a linguistic concept, is transformed into the mental act of the understanding for the apperception of objects.
- (General) logic deals with “*absolutely necessary rules of thought without which there can be no employment whatsoever of the understanding.*” (KrV: A52/B76)
- The laws of general logic are “*without content and merely formal*”; general logic “. . . *abstracts from all content of knowledge . . . and . . . treats of the form of thought in general.*” (KrV: A152/B19)

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# The built-in opponent conception of deduction



## A long quote

Logic originated as a model of what we might call **adversarial** communication – at least in a technical sense of adversarial. What *follows* in deduction is anything that is true in *all* interpretations of the premises – that is the definition of logically valid inference. Our job, as speaker or hearer of a discourse that purports to be a deduction, is to test the drawing of inferences to destruction, to ensure that what is inferred is true in *all* models of the premises, not just the intended one. It is in this technical sense that logic models adversarial discourse. We may actually be socially co-operating in testing a deduction for validity [...], but there is a core of seeking out all possible assignments of things, not simply finding one intended one. This is perhaps not accidentally related to the fact that logic arose as a model of legal and political debate. (Stenning 2002, 138)

## Deduction as a dialogical notion

- Proofs as **adversarial** dialogues of a special kind.
- The participants have opposite goals:
  - Proponent: establishing the conclusion.
  - Opponent: blocking the establishment of the conclusion.
- The dialogue starts with mutually accepted statements (premises), and proceeds in successive argumentative (inferential) steps.
- The property of *monotonicity* can be explained in terms of the concept of a *winning strategy*.

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## Indefeasibility and necessary truth-preservation

- A *winning strategy* for proponent consists in a sequence of inferential steps to which there are no counterexamples: **indefeasible** steps.
- No matter what external information an ideal opponent brings in, in a winning strategy it will not defeat the individual inferential steps.
- Validity ‘come what may’ as strategic component.
- Thus, necessary truth-preservation can be accounted for in terms of indefeasibility.

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## The 'built-in' opponent (BIO) conception

- The role of opponent is to look for counterexamples, i.e. situations where the premises hold but the conclusion (of each individual step) does not.
- But the deductive method has **internalized** opponent: every inferential step must be immune to counterexamples.
- The *strategic* goal of formulating indefeasible arguments becomes a *constitutive* feature of the method itself: necessary truth-preservation.
- No need for an active opponent, once the strategic desideratum becomes a constitutive feature.

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## The BIO conception of proofs as hybrid entities

- The conception of a (deductive) proof emerged against the background of certain dialogical practices, but it was then modified and regimented.
- The opponent has been *internalized* by the proof method, no longer playing the same active role.
- (The roles were asymmetric all along.)
- A proof reveals its dialogical origins in the properties of necessary truth-preservation and monotonicity, but it is no longer a dialogue with two active participants.

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# Back to the normativity of logic



## Necessary truth-preservation and belief management

- Necessary truth-preservation is prima facie not a reasonable norm for the management of one's beliefs.
- Harman's arguments: mind-cluttering, logical omniscience etc.
- A few more: deductive reasoning is
  - costly: a lot of input for little output.
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## From strategic to constitutive norms

- According to BIO, the concept of necessary truth-preservation arose as a *strategic* component of specific dialectical games: indefeasibility.
- With internalization of opponent, it became a *constitutive* norm of the deductive method.
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- But contrary to e.g. Brandom, the claim is that necessary truth-preservation has a normative import only for rather specific, contrived forms of dialogical interaction: circles of specialists.
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- But contrary to e.g. Brandom, the claim is that necessary truth-preservation has a normative import only for rather specific, contrived forms of dialogical interaction: circles of specialists.
- Geach: a set of norms only works if it is followed most of the time (performance/competence gap).
- Empirical results from psychology suggest that untrained people are not extensively familiar with the game of deduction.

## Dialogical, multi-agent bridge principles

- If  $A, B \Rightarrow C$ , then (if Opponent has granted A and B, then Opponent must concede C if asserted by Proponent)
- If  $A, B \Rightarrow C$ , then (if Opponent has granted A and B, then Proponent may assert C)

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## Back to mono-agent thinking

- As Milne (2009), we may inquire into the possible transposition of these dialogical norms to mono-agent thinking situations.
- While it has its origins in multi-agent situations, the *internalization of opponent* makes it so that the canons of logic may also be fruitfully applied in at least *some* mono-agent situations.
- In situations of scientific inquiry, it becomes relevant to counter our natural tendency towards doxastic conservativeness: deductive method allows for that.

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# The de-biasing effect of deductive reasoning

- A ‘fundamental computational bias’ (Stanovich): “the tendency to automatically bring prior knowledge to bear when solving problems.”
- As an upshot of internalization of opponent, the deductive method forces the agent:
  - to reason only with information explicitly ‘on the table’.
  - to consider *all* the situations in which premises are the case, not only her preferred ones.
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# Conclusions

- It is a mistake to start with the normative import of deductive logic for *thought*.
- Instead, originally logic emerged as a normative theory of specific dialogical practices: multi-agent setting.
- With the internalization of opponent, the deductive method is in between multi- and mono-agency.
- Deductive logic can be viewed as having normative grip on some mono-agent thinking situations: to counter doxastic conservativeness when needed.

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