

DiFoS: Dialogical Foundations of Semantics

Benedikt Löwe



LogI CCC Final Conference.

Berlin, Germany.

16 September 2011; 9:30–10:15

- ▶ **DiFoS Tübingen:** [philosophical focus](#).
 - ▶ Prof. Dr. Peter Schroeder-Heister (Project Leader)
 - ▶ Dr. Luca Tranchini
 - ▶ Dr. Bartosz Więckowski
 - ▶ Thomas Piecha (associated)
- ▶ **DiFoS Amsterdam:** [historical focus](#).
 - ▶ Prof. Dr. Benedikt Löwe (PI)
 - ▶ Dr. Bernhard Fisseni
 - ▶ Dr. Sara Uckelman
 - ▶ Dr. Catarina Dutilh Novaes (associated)
- ▶ **DiFoS Lisbon:** [technical focus](#).
 - ▶ Prof. Dr. Reinhard Kahle (PI)
 - ▶ Dr. Jesse Alama
 - ▶ Prof. Dr. Luís Moniz Pereira (associated)
 - ▶ Dr. Gregory Wheeler (associated)

Dialogical Logic (1).



Paul Lorenzen (1915–1995)

Lorenz, Kuno, Lorenzen, Paul. *Dialogische Logik*. Wissenschaftliche Buchgesellschaft, Darmstadt 1978.

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German wikipedia: *Die dialogische Logik ist ein von den deutschen Logikern und Philosophen Kuno Lorenz und Paul Lorenzen entwickelter spieltheoretischer, semantiknaher Ansatz zur Logik. [Die Regeln für die Junktoren und Quantoren werden ... als Dialogspiel konzipiert.] Die Motivation ist eine im Vergleich zum Ableiten in Logikkalkülen nähere Orientierung am menschlichen Argumentieren.*

Dialogical Logic (2).

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Rückert, Helge. Why Dialogical Logic?, *in*: Wansing, H. (ed.): Essays on Non-Classical Logic, Advances in Logic, 1, World Scientific 2001, pp. 165–185

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Arguments against arguments against dialogical logic.

1. “Dialogical logic is a constructivist logic.”
2. “Dialogical logic is limited to classical and intuitionistic logic.”
3. “Dialogical logic complicates things unnecessarily.”

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Alama, Jesse, Uckelman, Sara L., What is dialogical about dialogical logic?, *submitted*

DiFoS: from our proposal.

Incorporating interaction into the traditionally static picture of logic is one of the most vital and fascinating topics in current logical research. Looking at the current preoccupation of researchers with interaction in logic, it is easy to forget that the use of dialogues in logic goes back at least to Lorenzen's 1958 paper *Logik und Agon*, and has its roots in much older traditions. In the 1950s, dialogical logic was proposed as an answer to the normative question "What is the right logic?" Interest in dialogical logic has recently increased in connection with the rise of game-theoretical approaches in computer science and related disciplines. These approaches to dialogues in logic are vastly different: the philosophical ones are normative, those within computer science are mainly descriptive.

Our project aims to

1. describe the foundational value of Lorenzen's dialogical logic, and
2. embed it into a modern scientific context taking into account its historical roots.

(1.) The foundational investigations consist in (i) discussing and clarifying technical points of dialogue semantics, and (ii) evaluating its philosophical background claims as well as its potential to lay the foundations for logical reasoning in mathematics, computer science and linguistics.

(2.) [...] Concerning the historical roots, we concentrate on medieval theories of *obligationes*. As the foundational problems of the dialogical approach (and also of other game-theoretical approaches) are far from being solved, we consider it essential for our project to look at philosophical discussions of games and dialogues in history, where points similar to those we are addressing have already been raised.

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Dialogical / game-theoretic semantics of logic.

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- ▶ Rules of the game determine the logical meaning of the moves of the game.

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Close connections between various instantiations of the same idea: dialogical logic, game-theoretic semantics (IF-logic), games in logic (Ehrenfeucht-Fraïssé theory).

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Uckelman, Sara L., A dynamic epistemic logic approach to modeling *obligationes*, in D. Grossi, S. Minica, B. Rodenhäuser, S. Smets, eds., LIRa Yearbook 2011, pp. 147-172

Uckelman, Sara L., Medieval *Disputationes de obligationibus* as formal dialogue systems, to appear in: *Argumentation*

Obligationes vs game-theoretic semantics (2).

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Note that the **Meta-Question** methodologically links back to our aim (1.): evaluating the foundational role of Lorenzen's semantics involves making an assessment whether Lorenzen's system is an *adequate* (or *more adequate*) representation of idealized dialogues.

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- ▶ *Formal Mathematics.*

Mathematical proofs are written in **mathematical prose**, not in formal systems. In order to make use of automated theorem provers or proof assistants, you need to render mathematical prose in a formal system. Who is the arbiter of whether a formalized proof is the correct / an adequate representation of a given text in mathematical prose?

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- ▶ *Computational models of narrative.*

Humans have the ability to compare superficially completely different stories and identify those that have the same **narrative structure**. Can this process be formalized? What is the narrative structure of a story? Who decides whether a formalization of a story is correct / adequate?

Löwe, Benedikt, Methodological remarks about comparing formal frameworks for narratives, *to appear in*: P. Allo, G. Primiero, Third Workshop on the Philosophy of Information, Royal Flemish Academy of Belgium.

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- ▶ [Log|CCC@CLMPS XIV](#). Nancy, 21 July 2011. *Logical Modelling: The interface between the formal and the empirical* (cross-CRP with LcpR, LINT, LoMoReVI, and VAAG).

DDAHL: Dynamic and dialogical approaches to historical logic.

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Workshops.

- ▶ **MoFPILE.** *Modern Formalisms for Pre-Modern Indian Logic and Epistemology.* Hamburg; 4–6 June 2010
- ▶ *Formal Models and Indian Logic.* Heidelberg; 23–25 May 2011