

Univerzita Karlova v Praze

Filozofická fakulta

Katedra logiky

logika

Svatopluk Nevrkla

Logic, form and argument

Logika, forma a argument

T E Z E

vedoucí práce - Doc. PhDr. Petr Jirků, Csc.

2012

ABSTRAKT

Cílem mé disertace je obhájit a vysvětlit tezi, že tradiční logická analýza není vhodným nástrojem ke zkoumání argumentace v přirozeném jazyce.

Nejčastější kritika formální logiky jako nástroje pro analýzu přirozeného jazyka je obvykle založena na poukázování na podstatné rozdíly mezi strukturou a sémantikou jazyků přirozených a jazyků logických formalismů. V tom však nevidím hlavní zdroj problémů.

Podle mého úsudku je daleko zásadnějším problémem, že tradiční logická analýza často vychází z problematických epistemologických předpokladů, které analytická filosofie zdělila z empiristicko-positivistické tradice. Jedná se především o pozitivistickou verzi klasického modelu racionality, jako deduktivního usuzování z nějaké báze bezprostředně ověřitelných a nepochybných poznatků. Přesvědčení, že každou rozumnou argumentaci lze redukovat na dedukci takového druhu je tím, co má ospravedlnit tradiční logickou analýzu.

Můj přínos spočívá především v prokázání toho, že nezměníme-li zásadně tato východiska, pak nám pranic nepomůže, budeme-li zkoušet argumentaci v přirozeném jazyce analyzovat pomocí nových a přesnějších logických formalismů.

Problém tedy není ani tak v samotném nástroji, jako spíše ve způsobu jeho užití. Pokud dostatečně zreflektujeme roli demonstrativního usuzování pro argumentaci jako takovou, můžeme její jisté aspekty zkoumat pomocí standardních logických formalismů mnohem plodněji.

ABSTRACT

The goal of this thesis is to defend and explain the claim that traditional logical analysis is not the best tool for studying natural language argumentation.

The most common critique directed at employment of logical formalisms as tools for analysis of the natural language is usually based on pointing out of differences between structure and semantics of natural languages and languages of logical formalisms. This is not the main issue, I believe.

According to my findings the most fundamental problem of the traditional analysis is that it is based on many problematic epistemological assumptions, which are inherited from empiricist-positivist tradition. Namely the positivist version of the classical model of rationality as deductive reasoning from some basis of immediately verifiable and therefore unquestionable knowledge. The doctrine that every reasonable argumentation is reducible on deductions of such kinds is supposed to justify the traditional analysis of argumentation.

My original contribution is mainly in showing that without abandoning those presuppositions, we cannot hope to arrive at better understanding of natural language argumentation by developing new and more precise logical formalisms.

Logical formalisms are mere tools, which we have to use for the right purpose in the first place. If we can reflect more deeply on the role of deductive reasoning for argumentation as such, we can study some aspects of it more fruitfully, with the aid of standard logical formalisms.

STRUCTURE OF THE MAIN ARGUMENT:

1. Traditional logical analysis of argumentation is inadequate.
 - 1.1. According to classical logical analysis an argument is sound if and only if it is valid and all its premises are true.
 - 1.1.1. The notion of sound argument probably originated from Aristotle's notion of demonstrative argument – that is a deduction with premises which are in some sense fundamental, necessarily true and known to be true [2].
 - 1.1.2. The intended purpose of such demonstrations was to establish certain scientific knowledge from common first principles [4].
 - 1.1.3. *With the empiristic shift in the methodology of science, demonstration became less and less important as a tool of science.*
 - 1.1.4. Logical positivists aimed to integrate empiricism with deductive methodology. Premises of arguments are no longer required to be necessarily true, but also merely contingently and empirically true [3].
 - 1.1.5. *Whether all scientific knowledge can be reconstructed in a positivistic manner is questionable.*
 - 1.1.6. *Even more questionable is, whether all rational argumentation can and should be reconstructed according to the neo-positivistic model of science.*
 - 1.2. Formal logic describes arguments which are logically valid [12].
 - 1.2.1. Logically valid is formally valid, it has some valid form.
 - 1.2.1.1. A form of an argument is relative to some set of fixed concepts [13].
 - 1.2.1.2. *Within formal languages we can easily identify logical forms of arguments and with some additional methods, we can identify valid logical forms. Such accounts of valid logical forms are known as logical systems or logical formalisms.*
 - 1.2.1.3. The multitude of logical formalisms constitutes a multitude of languages. Each different logical formalism describes all logical forms of different language [9].
 - 1.2.1.4. A (formal) language is not just any uninterpreted set of sentences. Two genuinely different languages may be constituted by the same sets of sentences with different interpretations [9].
 - 1.2.1.5. *This multitude of logical formalisms and languages is probably a result of a historic development determined by pragmatic concerns, rather than something that is caused by some internal features of formally valid arguments.*
 - 1.2.1.6. *It often does not make much sense to draw sharp line between logically and analytically valid arguments within natural languages. Rather we should study their fragments by mapping them on languages of different logical formalisms.*

1.2.3. All formally valid arguments are deductively valid. That is in each possible world where premises of a deductively valid argument are true, so is it's claim.

1.2.3.1. The definition of possible world in formal logic is usually such, as to rule out only those worlds, that would 'witness' against formally valid arguments and no other worlds [15].

1.2.3.2. There might be possibly other definitions of necessity and possible world, but none that would be considered relevant for definition of deductive validity.

1.2.4. There exists plenty of arguments, whose validity principally cannot be determined by methods of formal logic.

1.2.4.1. Valid arguments, which are not formally valid are materially valid [12]. Delimitation of formally valid arguments is not unproblematic [9], but is largely irrelevant for the purpose of argumentation analysis.

1.2.4.2. All materially valid arguments can be transformed into logically valid arguments using quite a simple trick – by adding additional premises.

1.2.4.3. Not all materially sound arguments can be transformed into logically sound arguments though. These are known as inductively cogent [5], or substantial [14] arguments. They are not deductive and hence not formal and therefore can never be captured by any logical formalism.

1.2.4.4. Substantial arguments therefore are not identic to factually valid arguments. Factually valid argument is a special case of dialectic argument, one in which all the additional premises we need to add are either logical truths, or truths or fact.

1.2.4.5. All reasonable arguments can be transformed into dialectical arguments, that is deductions with merely plausible arguments.

1.2.5. The objection against any use of logical formalisms for natural language analysis is unsubstantiated.

1.2.5.1. Formal logic studied demonstrations, not argumentation in general.

1.2.5.2. Demonstration is an important and common way of using natural language.

1.2.5.3. Using formal languages and logical formalisms as a tool for analysis of demonstrations in natural language presupposes untrivial knowledge of semantics, but so does any analysis of demonstrations in natural language.

2. A viable alternative to traditional logical analysis of argumentation exists.

2.1. The notion of plausibility can be formalized in Default Logics [10].

2.1.1. The naive approach to defaults as inference rules fails. When we are using defaults we must not merely know what claims have already been established, but also what was presumed and what particular rules have been used in the proof [1].

2.1.2. Neither credulous, nor sceptical consequence of default logics is actually a logical consequence, as it is not closed under substitution and therefore does not delimit exactly the formally valid arguments [6].

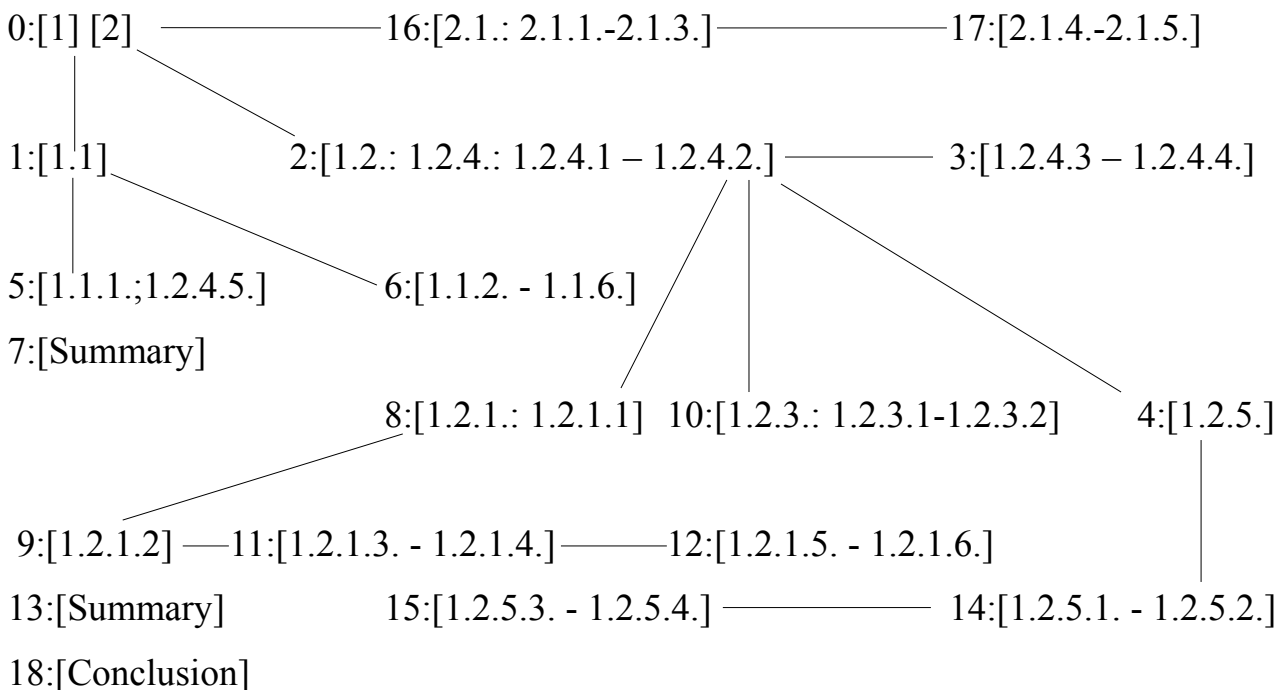
2.1.3. *There is no need to build default logics as an extension of other logic in the first place.*

2.1.4. We do not need to formulate special default rules if we use standard logical rules in a different way [7].

2.1.5. These new uses of standard logical rules for demonstration can be described most naturally in a dialectic way [8].

Legend: Points in *italic* are my ideas, open for further research. Other endpoints are often subject of continuous scholarly controversy - I usually side with one of the competing interpretations, without further criticizing it, because this lies out of the scope of my thesis. With the natural exception of endpoints all points should be substantiated by the points beneath them.

STRUCTURE AND CONTENT OF THE SECTIONS:



Legend: Numbers in brackets correspond to the number of claim, defended in the section of the dissertation, whose number is left of brackets. Sections 7 and 13 not only summarize previous sections, but also introduce some terminological usage and set up goals for new sections.

Chapter numbered '0' stands for introduction.

SELECTED BIBLIOGRAPHY:

- [1] ANTONIOU, G. *Nonmonotonic Reasoning*. Cambridge (Mass.): MIT Press. 1996. p.285. ISBN 0-262-01157-3
- [2] ARISTOTLE. *The Complete Works of Aristotle*. Vol. 1. transl.: PICKARD, W. A. ed. BARNES, J. Princeton: Princeton University Press. 1995. pp. 1-1250. 6th ed. ISBN 0-691-01650-X. Chap. 5. Topics. pp.167-277.
- [3] COFFA, J. A. *Semantic Tradition from Kant to Carnap: To the Vienna Station*. ed. WESSELS, L. New York (NY): Cambridge University Press. 1991. p. 445. ISBN 0-251-44707-0 (Pbk.)
- [4] DE JONG, W.R. - BETTI A. The Classical Model of Science: a millenia-old model of scientific rationality. *Synthese*. 2008. Vol. 174. No. 2. pp. 185-203. ISSN 0039-7857. EISSN 1573-0694.
- [5] FELDMAN, R. *Reason and Argument*. 2nd ed. Upper Saddle River (NJ): Prentice Hall. 199. p. 462. ISBN 0-13-624602-8 (Pbk.).
- [6] MAKINSON, D. *Bridges from Classical to Nonmonotonic Logic*. London: King's College Publications. 2005. p. 216. ISBN 1-904987-00-1 (Pbk.).
- [7] POOLE, D. A Logical Framework for Default Reasoning. *Artificial Intelligence*. December 1988. Vol. 36. No. 1. pp. 27-47. ISSN 004-3702.
- [8] PRAKKEN, H. - VREESWIJK, G. *Handbook of Philosophical Logic*. eds. GABBAY, D. M. - GUENTHER, F. Dodrecht: Kluwer Academic Publication. 2002. Vol. 4. p. 431. 2nd ed. ISBN 1-4020-0139-8. Chap. 3. Logics for Defeasible Argumentation. pp. 219-318.
- [9] QUINE, W. V. O. *From a Logical Point of View*. 2nd ed. 2003. Cambridge (Mass.): Harvard University Press. pp. 184. ISBN 0-674-32351-3 (Pbk.).
- [10] REITER, R. A Logic for Default Reasoning. *Artificial Intelligence*. 1980. Vol. 13. No. 1. pp. 81-132. ISSN 004-3702.
- [11] SELLARS, W. W. Inference and meaning. *Mind*. July 1953. Vol.62. No. 247. pp. 313-338. ISSN 1460-2113. EISSN 0026-4423.
- [12] SVOBODA, V. - PEREGRIN, J. *Od jazyka k logice: Filozocký úvod do moderní logiky*. Praha: Academia. 2009. p. 428. ISBN 978-80-200-1740-6.
- [13] ŠEBESTÍK, J. Bolzano's Logic [online]. *The Stanford Encyclopedia of Philosophy*. URL: <http://plato.stanford.edu/archives/win2011/entries/bolzanologic/> cit. 11.11.2011.
- [14] TOULMIN, S. *The Uses of Argument*. New York (NY): Cambridge University Press. 2005. p. 247. ISBN 0-521-53483-6 (Pbk.).
- [15] WITTGENSTEIN, L. *Tractatus Logico-Philosophicus*. intro. RUSSELL, B. 1922. London: Paul Kegan International. p. 189.