

# PRELUDE TO A SOCIO-LOGIC OF IMPERATIVES

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## ABSTRACT

This short essay attempts to challenge some of widely held philosophical assumptions on the nature of the relationship between logic, language and reality. In Section 1 the hegemony of theoretical logic is being questioned; Section 2 proposes a hypothesis on socially mediated semantics; Section 3 addresses the problem of ontology of logical sentential moods.

**Keywords:** imperative logic, speech act, sentential mood ontology

*"[...] it is one of the enduring virtues of logic that it sits at an academic crossroads between the sciences and humanities, allowing us to see new developments in many fields, their analogies, and deep structure."*

Johan van Benthem (2011, 344)

Elizabeth Anscombe (1957, 57ff) wrote that practical logic is the least recognized token of Aristotle's best discoveries. One could paraphrase and say that practical logic is the least explored of the branches at the ground level of logic. It can be argued, as it will be done here, that imperative logic lies at the heart of practical logic.

The investigations in imperative logic strongly suggest that zero-agent and single-agent logical notions do not suffice; social context ought to be taken into account too.<sup>1</sup> The imperative sentence typically mentions the identity of communicative subject to whom the sentence is addressed and thus a social component is built into its very semantics. This fact contributes to theoretical enrichment of logic with notions of communication or rational interaction: new socio-logical concepts arise to display societal dimension of logic and logical dimension of society.

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<sup>1</sup>The terms 'zero-agent notion' (e.g. truth) and 'single-agent notion' (e.g. proof) have been borrowed from van Benthem (2006).

## 1. Intelligence, language understanding, and socio-logical concepts

In the course of philosophical investigations it becomes clear that practical logic is not equal to applied theoretical logic. The autonomy of practical logic manifests itself in an impossibility of importing the basic notions from theoretical logic. Although it is not the case that the logical vocabulary must be rebuilt anew, thought-provoking questions arise. For instance, is consequence relation necessarily unaffected by premise addition? Is consistency of sequence of sentences independent from utterers' identities? It takes some theory to see the answer.<sup>2</sup>

Let us take an imaginative standpoint of formal intelligence given in the groundbreaking work by Alan Mathison Turing (1936). Assume that (a part of) language understanding ability is a Turing machine  $m$  that responds to input string-sentence  $\varphi$  of an imaginary rudimentary language  $\mathcal{L}$  firstly, by decomposing the input string  $\varphi$  according to syntax recognition rules of  $m$ , and secondly, by building interpretation according to semantic rules of  $m$ , thus obtaining a finite sequence  $\sigma$  of symbols as the result written down on the tape. In addition, the machine  $m$  is context sensitive. It memorizes the results of its previous computations and takes them into consideration for understanding new input. This competence enables machine  $m$  to communicate with different sources of input strings. In the beginning there is no prior computation and therefore no output context has been recorded.

Can tautologies be defined as those input strings to which machine  $m$ 's response in any configuration  $\sigma$  is that very configuration? Obviously, there will be no such string  $\varphi$  for if the tape is empty (the context denoted by  $\emptyset$ ) Turing machine  $m$  will respond with some finite inscription  $\sigma$  on the tape as the result of syntactical decomposition and interpretation of  $\varphi$ .

The notion of consequence can be re-conceptualized in terms of properties of  $m$ : sentence  $\psi$  is one of general consequences of sentences  $\varphi_1, \dots, \varphi_n$  if machine  $m$ , in any of its configurations  $\sigma$  generated by processing  $\mathcal{L}$ -sentences, will after receiving input sequence  $\varphi_1, \dots, \varphi_n$  compute an output context  $\sigma'$  which will not be changed by  $\psi$ , i.e.,  $m(\psi, \sigma') = \sigma'$ . If we equate (the notion of)  $m$ -type of language understanding with (the notion of) information adoption, then general consequence will explicate the common conception (1) of information containment.

- (1) Conclusion adds no information to *any* context that includes all the information contained in premises.

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<sup>2</sup>E.g. apophantic or picture theory of language will give an affirmative answer to the first and, being a zero-agent theory, will dismiss the second question. Speech-act theory, on the other hand, will prompt us to see a multitude of language uses beyond descriptive and to be tolerant to logical pluralism.

But there is a specific and less common notion (2) of informational containment in the context carefully chosen not to contain any further information besides the one given by premises.

- (2) Conclusion adds no information to the context that includes *only* the information contained in premises.

The second notion can be explicated using the concept of consequence introduced by Veltman (1996, 224), later termed as ‘ignorant-update-to-test consequence’. According to our metaphor:  $\psi$  is one of specific consequences of sentences  $\varphi_1, \dots, \varphi_n$  iff machine  $m$  starting in configuration 0 (i.e., with an empty tape) after sequentially processing  $\varphi_1, \dots, \varphi_n$  will output context  $\sigma = m(\varphi_n, m(\dots, m(\varphi_1, 0) \dots))$  which is a fixed point for  $\psi$ , i.e.,  $m(\psi, \sigma) = \sigma$ .

Many philosophers had argued that consequence relation in practical logic does not have the properties of the classical relation investigated by Tarski (1956). The non-Tarskian properties pointed out by Geach (1972) are (i) locality and (ii) existence of the limit: conclusion holds in virtue of given premises although it can be defeated by additional premises provided the premises given are not complete. In a similar manner, Davidson writes that in practical inference one cannot “detach conclusions about what is desirable (or better) or obligatory from the principles that lend those conclusions colour” (Davidson 2001b, 37). He uses the old legal term ‘prima facie’ for this kind of consequence relation. It has been shown how ignorant-update-to-test consequence can provide the explication for prima facie consequence relation and its traits described by Geach (Žarnić 1999; 2011). Shedding a new light on the issue, Ju & Liu (this volume, see Definition 3.14 ff.) demonstrate the suitability of ignorant-update-to-test consequence for the theories of practical logic within complex setting of multiple normative sources.

The notion of consistency plays a crucial role in the theory of dynamics of mental and social phenomena since it is employed in the determination of the equilibrium point which the revision process tends to. On the other side, the consistency itself is an open concept since, as Quine (1961, 43) taught us, “no statement is immune to revision,” axioms and rules of logic included. There are as many notions of consistency as there are logical theories. Then again, it is an open question whether consistency is a concept independent from social reality.

Let us assume that language understanding machine  $m$  receives input  $\varphi$  from source  $i$ , processes it, outputs context  $\sigma$ , and then source  $j$  gives input  $\psi$ . It happens that  $\varphi$  and  $\psi$  are incompatible (in a pre-theoretical sense). Will  $m$  meet a failure or a revision demand while computing the outcome of  $\psi$  in context  $\sigma$ ? If the incompatible inputs are given by the same source  $i = j$ , then machine  $m$  confronts a disequilibrium. On the other hand, if sources are different ( $i \neq j$ ), then some fact that regards the relationship of  $i$  and  $j$  might be relevant. Thinking

sociologically, it might be that  $i$  and  $j$  are unequal in power. The information on their position in social hierarchy may be crucial to properly respond to directive inputs ( $\varphi$  given by  $i$  and  $\psi$  given by  $j$ ).<sup>3</sup> Therefore,  $m$  must be equipped with a certain social knowledge in order to understand  $\varphi$  and next  $\psi$ . So, the proper input for  $m$  is not a mere sentence but a speaker's socially positioned identity coupled with a sentence. If meaning is that what sentences *do*, like informational expansion and contraction, then the logical structure of  $m$ 's understanding is a complex that merges pre-social understanding of sentence meaning with social knowledge. Therefore, language understanding in communicative setting is a socio-logical ability.<sup>4</sup> To  $m$ , the identity of speaker is part of sentence syntax while his/her social position is part of semantics.

## 2. Society in logic

Let us change the setting and make a question whether social context can constitute sentence meaning. One may be inclined to think that a directive speech act performed by  $i$  uttering imperative  $![j \text{ stit} : \varphi]$  to  $j$  will succeed in creating an obligation for  $j$  to see to it that  $\varphi$  only if  $i$  stands in appropriate power relation to  $j$ , i.e., if  $i$  has a position higher than  $j$  in a social hierarchy  $<$ . From this inclination a curious lemma follows:

- (1) If social relation is a relation of equivalence, then there will be no thetic obligations.

Jadacki (this volume) has shown the importance of making the distinction between axiological and thetic obligations: only the latter can be generated by the performance of a speech-act.

Is it admissible to postulate the possibility of directive use of imperative in a Habermasian ideal speech situation (of imagined equality) where “the speakers must act *as if* [...] there is an equal distribution of chances” to order and resist orders (Benhabib 1985, 87)? The answer is not immediately clear but there are grounds for the affirmative answer.

Let us assume that there is a social system  $\mathcal{H} = \langle \{i, j\}, < \rangle$  with two actors  $i$  and  $j$  and with a single type of subordination relation  $<$ . The proposition (2), restated in (3), seems to be valid in a system of this kind.

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<sup>3</sup>The legal tradition has recognized the principles for resolution of normative inconsistency by taking into account (logical, temporal, legal-hierarchical) relations between sources (“*lex specialis derogat legi generali*”, “*lex posterior derogat legi priori*”, “*lex superior derogat legi inferiori*”).

<sup>4</sup>The advanced logic for complex understanding of directives coming from different positions in social hierarchy has been developed by Ju & Liu (this volume) with precise determination of the logical form of conservation of consistency by contractions which follow the paths of social subordination.

- (2) If  $i$  is an authority to  $j$  in  $\mathcal{H}$ , then  $j$  becomes obligated to see to it that  $\varphi$  after  $i$  utters  $![j \text{ stit} : \varphi]$  to  $j$ .
- (3)  $j < i \rightarrow [i : "![j \text{ stit} : \varphi]"]\mathbf{O}_j[j \text{ stit} : \varphi]$

In a system with more than two actors, the proposition (2) may fail to hold. For instance,  $i$ 's directive could be overridden by an opposite directive coming from another source  $x$  having authority at least as high as that of  $i$ . The possibility of opposing authorities restricts the principle (2) to its weakened form: "commands *usually* generate obligations" (Yamada 2008). Another way to save the principle (2) is hinted by Brożek (this volume). She introduces the notion of absolute deontic authority  $i$  with respect to receiver  $j$  within social group  $A$ : for any other authority  $x \neq i$  higher than  $j$  in social system  $\mathcal{X} = \langle A, < \rangle$  it holds that  $x < i$ . In such a context an imperative uttered by  $i$  and addressed to  $j$  necessarily generates an obligation for  $j$ .

- (4) If  $i$  is an absolute deontic authority with respect to  $j$ , then  $j$  becomes obligated to see to it that  $\varphi$  after  $i$  utters  $![j \text{ stit} : \varphi]$  to  $j$ .

Let us put aside the problem of resolving conflicts of normative sources and the possibility of existence of absolute deontic authority. It appears that there is a common and tacit presupposition that imperatives generate obligations only in the presence of hierarchical social relations. If the potential for generating obligations is essential for imperatives and if it can be actualized only in presence of hierarchical social relations, then imperatives are meaningless in a community of equals. *Prima facie* something is wrong here. It would be hasty to conclude that power inequality is a condition of possibility of imperatives. Yamada (this volume) has uncovered the logical anatomy of request, hereby given in a simplified form (5) and restated in (6). Requests seem to offer a socially neutral form of using imperatives.<sup>5</sup>

- (5) After  $i$  utters  $![j \text{ stit} : \varphi]$  to  $j$ ,  $j$  is obligated either to see to it that  $\varphi$  or to see to it that  $i$  knows that  $j$  will not see to it that  $\varphi$ .
- (6)  $[i : "![j \text{ stit} : \varphi]"]\mathbf{O}_j([j \text{ stit} : \varphi] \vee [j \text{ stit} : \mathbf{K}_i \neg[j \text{ stit} : \varphi]])$

The semantics of imperatives is multi-layered and logical theories can isolate one or more layers. If a theory focuses on the expression of speaker's will or on changes in recipient's motivational state, then the bouletic layer will become visible.<sup>6</sup> On the other hand, if a theory pays attention to social relations, the deontic layer will be displayed. Imperatives are used in performing different types of

<sup>5</sup>The notion of epistemic obligation developed by Åqvist (1975) has made it theoretically possible to capture a fuller range of deontic effects of imperatives.

<sup>6</sup>Segerberg's (1990) imperative logic is a paradigmatic example of bouletic approach where the will of the authority issuing command is represented.

speech act such as commands or requests, having different deontic effects although achieved using the same grammatical form. Pragmatic difference regardless of syntactic sameness can be explained through the hypothesis that it is a social context that determines the type of speech-act: in the context of social hierarchy, an imperative uttered along the descending line will become (*ceteris paribus*) a command, while in the egalitarian social context it will become a request.<sup>7</sup>

- (7) After  $i$  utters  $![j \text{ stit} : \varphi]$  to  $j$  in social context  $\mathcal{H}$ , then  $j$  is obligated to see to it that  $\varphi$  provided that  $j < i$ . Otherwise,  $j$  is obligated either to see to it that  $\varphi$  or to see to it that  $i$  knows that  $j$  will not see to it that  $\varphi$ .

Syntax, semantics and pragmatics are different sides of the same semiotic phenomenon. The closer we get, the more blurred the distinction becomes and the harder it gets to come to terms with the separation of an utterance meaning from its communicative effects. If communicative effects are established within a social context, as the present hypothesis proposes, then social relations are inherent in logic of speech acts: a social context determines whether by imperative utterance a command will be given or a request made. Similarly to Section 1, it occurs that speakers' social positions, as well as their relations to the hearer, are tacit elements of syntax that are needed for proper understanding and interpretation of language.

### 3. Imperatives and the ontology of social reality

There are two distinguishable types of mental states: the one having *mind-to-(fit the)-world* direction of fit and the other with *world-to-(fit the)-mind* direction of fit. In order to express mental states having different directions of fit, language needs sentences with different directions of fit: *word-to-(fit the)-world* direction of fit characterizes indicative mood and is typically used for expressing belief, and *world-to-(fit the)-word* direction of fit characterizes imperative mood and is typically used for expressing will. Nevertheless, it appears that some sentences have both directions of fit, sentences that “make something the case by representing it as being the case” (Searle 2010, 86). These sentences do not express a *sui generis* mental state such as wishful thinking or believing what one wants to be the case. Rather, they transcend the Chomskian conception of language as “a system for

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<sup>7</sup>The hypothesis presented here stands in opposition to Searle & Vanderveken: “‘Request’ is the paradigmatic directive verb, but since it is special in having a rather polite mode of achievement of its illocutionary point, it cannot be taken as the primitive directive” (Searle and Vanderveken 1985, 199). Our hypothesis differs by treating “mode of achievement” as an influence of a social context on the effects of imperative utterance, which along the descending line of hierarchy typically generates the hearer’s duties, whereas in egalitarian context or along the ascending line of hierarchy it offers the hearer a choice between making imperative content true and making the speaker aware of the hearer’s refusal.

expressing thought” (Chomsky et al. 2002, 72). They show that language can create social reality, i.e., “the phenomena [which] are what they are in virtue of being represented as what they are” (Searle 2010, 85).

- (1)  $\varphi$  is the case after  $i$  utters  $\cdot\varphi$  only if  $\varphi$  describes a social phenomenon.
- (2) For some  $\varphi$ ,  $[i : “\cdot\varphi”]\varphi$ .

Some sentences create social reality, they generate normative structures by assigning and alternating deontic status of acts for norm-subjects or actors. The sentences having double direction of fit are similar to imperatives which in an appropriate social and communicative context  $C$  (i.e., if delivered along the descending hierarchical line and in absence of another defeating imperative) create mutual obligations for interlocutors.

- (3) In context  $C$  after  $i$  utters  $![j \text{ stit} : \varphi]$  to  $j$ ,  $j$  becomes obligated to see to it that  $\varphi$  and it becomes forbidden for  $i$  to see to it that  $\neg\varphi$ .
- (4)  $C \rightarrow [i : “![j \text{ stit} : \varphi]”](\mathbf{O}_j[j \text{ stit} : \varphi] \wedge \mathbf{O}_i\neg[i \text{ stit} : \neg\varphi])$

Regarding deontic status of permissibility, imperatives seem incapable of giving permissions other than those implied by obligations imposed.<sup>8</sup> On the other hand, some permissions given to an actor can be understood as a removal of antecedently existing restrictions on his/her actions and formally explicated as imperative downdate (Mastop 2005, Žarnić 2012). Mastop (this volume) advances a new development along these lines by treating permission in a “positive”, non-derivative way: not as a removal of what was previously forbidden but as an introduction of new possibilities of doing. This approach brings us closer to Kanger’s theory of rights (Kanger and Kanger 1966) where simple rights are explicated using deontic and praxeological operators either as the bearer’s permissives (passive rights) or the counter-party obligatives (active rights), and where atomic types of rights (26 in number) are defined as conjunctions of simple rights and their negations. Example (5) below describes the Kangerian effects of norm performative promulgated by a legislator granting a right to a norm subject.<sup>9</sup> The term ‘right’ is ambiguous, so it is indexed by its “atomic number” from (Kanger and Kanger 1966) and for an illustrative purpose it can be read as ‘freedom of publication’ with  $\varphi$  standing for ‘ $j$ ’s piece is published’. Sentences (6) and (7) show that there is an imperative that can substitute the indicative norm performative as regards prohibition of  $k$ ’s interfering with  $\varphi$ , but similar imperative replacement is not available for  $j$ ’s permissions in (5)(i) and (5)(iii) unless the absence of restrictions of  $j$ ’s doing  $\varphi$  or  $\neg\varphi$  is presupposed.

<sup>8</sup>The derivative generation of permission is encoded by D-axiom:  $\mathbf{O}\varphi \rightarrow \mathbf{P}\varphi$

<sup>9</sup>See Mastop (this volume) for explication of the term ‘norm performative’.

- (5) After legislator  $i$  proclaims that “ $j$  has versus  $k$  a right<sub>5</sub> to the effect that  $\varphi$ ”, then (i)  $j$  is permitted to see to it that  $\varphi$ , (ii)  $k$  is forbidden to see to it that  $\neg\varphi$ , (iii)  $j$  is permitted to see to it that  $\neg\varphi$ , and (iv)  $k$  is forbidden to see to it that  $\varphi$ .
- (6)  $[i : “ \cdot j$  has a right<sub>5</sub>( $k, \varphi$ )”]( $\mathbf{O}_k \neg[k \text{ stit} : \neg\varphi] \wedge \mathbf{O}_k \neg[k \text{ stit} : \varphi]$ )
- (7)  $[i : “! \neg[k \text{ stit} : \neg\varphi]; ! \neg[k \text{ stit} : \varphi]”](\mathbf{O}_k \neg[k \text{ stit} : \neg\varphi] \wedge \mathbf{O}_k \neg[k \text{ stit} : \varphi])$

Different answers could be obtained within different theoretical frameworks for the question whether norm performatives belong to a sui generis logical mood category that has twofold direction of fit or are just a succinct way of delivering a sequence of imperatives. Regardless of what answer is given, it is obvious that imperatives shape normative relations between actors, thus creating a social reality in addition to expressing thought, representing world and influencing other minds.

The power of shaping normative social reality is not the only ontological difference between imperatives and indicatives; their contents differ too. Nowadays it is commonly agreed that Belnap’s imperative content thesis holds:

Regardless of its force on an occasion of use, the content of every imperative is agentive. (Belnap et al. 2001, 10)

The term ‘agentive content’ denotes an act description. As it is commonly known, Davidson (2001a) has claimed that there is no logical aspect of agency ascribing sentences that cannot be captured by first order language as ‘entity  $i$  is causatively involved in  $F$ -type event  $e$  that was intended by  $i$  under description  $F$ ’ provided that events and open sentences are added as entities in the ontology, i.e., in the domain of interpretation. If Davidson is in the right, then the imperative content thesis entails that imperatives presuppose a combined natural-linguistic ontology of substances, events and syntactic objects. This presupposition is not of necessity required by indicatives. On the other hand, Von Wright’s (1966) approach to the logical form of agentives was based on a constructive ontology: an act is definable as a structure composed of the actor’s and Nature’s histories, a history is definable as a sequence of totalities of states of affairs or Tractarian worlds, a state of affairs is definable as a relation of objects. The Tractarian world is generalized in Von Wright’s theory as a point lying on a history line that can be related to other points of the same or different history. In Von Wright’s semantic perspective, an act is not an event-entity but a bundle of concurrent histories.

It would not be right, I think, to call acts a kind or species of events. An act is not a change in the world. But many acts may quite appropriately be described as the bringing about or effecting (‘at will’) of a change. To act is, in a sense, to interfere with ‘the course of nature’. (von Wright 1966, 36)

The temporal structure of action turns out to be more complex than the temporal structure of changes in Nature. First, there is a multitude of parallel time lines: there is a natural history, a time ordering of Tractarian worlds with actor  $i$  present merely as a natural body, as an organism but not as an actor; and there is an agent history, a time ordering of Tractarian worlds with actor  $i$  present as an actor, as an intentional system. Second, worlds belonging to different histories are comparable as well, e.g. as being simultaneous or not. Therefore, the two notions of time orderings are comprehended by the concept of action: the time as an ordering of worlds along the same history line, and the time as ordering of worlds lying on different history lines. The difference between the two notions of time is that, in one, the time orders atemporal worlds and in the other, the time orders temporal structures (i.e., histories), thus building a second-order temporality. Let us call this complex consisting of two time orderings—branching time structure. If determinism means that only one future is possible, then branching time is an indeterministic structure.

Let us agree on the thesis that semantics ought to be justified within an ontological theory and call it ‘interpretational commitment thesis’. Imperative semantics calls action semantics, and the latter calls indeterministic, branching time structure. So, by interpretational commitment thesis, imperative semantics implies indeterminism. Therefore, for a speaker using imperatives, the doctrines of determinism and indeterminism cease to be open theoretical options: imperatives commit us to indeterminism. Therefore, imperative semantics is not neutral with respect to ontological theory, but presupposes it.

*Example 3.1.* The imperative (8) entails indicative (9).

(8) Open the door!

(9) It is possible that the door will be open and it is possible that the door will not be open.

A Stoic cannot assent to (9) since it implies an open future. It is a non-conventional norm of language use that the speaker is committed to defend the entailments of his utterance. Therefore, by using imperative (8) a Stoic would violate a norm of language use.

**Acknowledgements** The short essay presented here and the editorial work on this special issue are supported by the projects “Theory of Imperatives and Its Applications” (Foundation for Polish Science) and “Logical Structures and Intentionality” (Ministry of Science, Education and Sport of the Republic of Croatia). A part of the paper was presented at the IUC course “Mind, World and Action” (Dubrovnik, 2011). I wish to thank Jacek Jadacki for helpful criticism and Siniša Ninčević for language advice.

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Received: February 24, 2012

Accepted: March 4, 2012

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