

Norms of Logic in Language Use

(Imperative logic and linguistic commitments)

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Russell on the purposes of language

Three actors on the stage:

- ① the speaker (expresses himself),
- ② the hearer (subject to alteration of his psychological state),
- ③ the world (inert).

It was one of the great discoveries of contemporary philosophy to notice that the world is not an inert element in the play. Russell's dictum needs an Austinian amendment:

- ④ Language serves four purposes ... (4) to *change* the social world.

3+? purposes

Language serves three purposes: (1) to *indicate* facts, (2) to *express* the state of the speaker, (3) to *alter* the state of the hearer. These three purposes are not always all present.



Bertrand Russell.

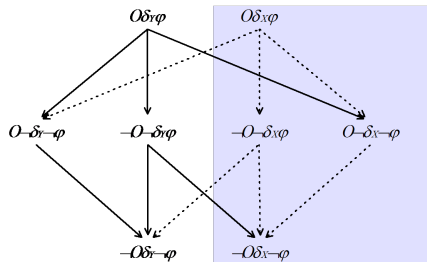
An inquiry into meaning and truth.

Routledge, London, 1995.

The William James lectures for 1940 delivered at Harvard University. First published in 1950.

Social reality as deontic pattern of actions

- Let us identify
 - the world that can be changed by words with the totality of deontic states of affairs,
 - and deontic state of affairs with deontic status of an actor's action.
- A possible way to describe a deontic state of affairs is by using Kanger-type formulas '[deontic operator][action operator][proposition]' E.g. $O\delta_Y\varphi$ states that Y 's action of seeing it that φ is (has the deontic status of being) obligatory.



Kanger's force diagram for simple rights in the group $\{X, Y\}$. An exemplar deontic state of affairs: *actor X has a claim against Y with respect to φ* : action resulting in φ is obligatory for Y , i.e., $O\delta_Y\varphi$, and therefore permitted, while it is forbidden for X prevent φ , $O\neg\delta_X\neg\varphi$.

Words that can change the world

It may seem that that deontic states of affairs can be changed only by specific speech acts, namely those having *world-to-fit-the-word* direction of fit. According to classification given by Searle and Vanderveken [1] there are five types of “illocutionary points”: assertive, commissive, directive, declarative, and expressive point. Three of these have world-to-word direction of fit:

- ① “The *commissive* point is to commit the speaker to doing something.”
- ② “The *directive* point is to try to get other people to do things. . . .”
- ③ “The *declarative* point is to change the world by saying so. . . .”

Example

- ① (directive: request) Please do not do it!
- ② (commissive: promise) I will come.
- ③ (directive: permissive) You may come.
- ④ (directive: suggestion) It might be good to go there.
- ⑤ (declarative for 1) I request that you do not do it .
- ⑥ (declarative for 2) I promise to come.

Do only \uparrow -speech acts change deontic states of affairs

Thesis

Any speech act can change some deontic state of affairs.

It is probably the type of action whose deontic status is being changed that makes us overlook this universal deontic power of speech acts. Indeed there are acts whose deontic status cannot be changed by speech acts having solely word-to-world direction of fit (assertives) or lacking any direction of fit (expressives): the deontic status of acts from non-speech category is not subjected to change by a speech act that does not have world-to-word direction of fit. On the other hand, the deontic status of any speech act can be altered by some speech act.

Sellars principle

What, then, does it mean to say of one sentence, B , that it is derivable from another, A ? Roughly, that it is permissible to assert B , given that one has asserted A , whereas it is not permissible to assert not- B , given that one has asserted A .



Wilfrid Sellars.

Inference and meaning.
Mind, 62(247):313–338,
 1953.

An example

Example

Let:

$$[i : \varphi] \odot \psi$$

stand for sentence
form:

After i utters
sentence φ , state ψ
acquires deontic
status

$$\odot \in \{O, P, F\}.$$

Letters O, P, F stand
for ‘obligatory’,
‘permitted’ and
‘forbidden’.

P i says to j : “Open the window!”

Q_1 j opens the window.

Q_2 i prevents the window from being opened by j .

(i) change in the deontic status of non-linguistic acts

$$[P](O Q_1 \wedge F Q_2)$$

R_1 i says to j : “It is impossible to open the window.”

R_2 i says to j : “You are not allowed to open the window.”

(ii) change in the deontic status of linguistic acts

$$[P]F(R_1 \vee R_2)$$

Ad (i) It is assumed that j is subordinated to i ’s authority and that no conflicting requirement is in force.

Ad (ii) It is assumed that i did not change his mind, i.e., no retractive act is performed by uttering R_1 and R_2 .

A possible objection

- An objection can be raised against the deontic power of speech acts. If the communication is not cooperative, the objection goes, then no commitments will arise either for the speaker or the hearer.
- The objection can be easily refuted. 'If something is obligatory, then it is the case' ($\nVdash O\varphi \rightarrow \varphi$) is not an axiom of deontic logic. The language use is subjected to normative requirements but it need not conform to them.

Parallelism between normative and logical structure

- There is a remarkable feature of deontic changes accompanying language use: the structure of linguistic commitments (speech act commitments) is parallel to the logic of sentences being used. Probably, this great discovery can be attributed to Sellars.
- Robert Brandom (1994) has worked out a grandiose philosophical theory which takes the dynamics of deontic dimension of language use as the basic phenomenon. He has summarized the theory as “normative pragmatics” (using language means shaping social deontic reality) and “inferential semantics” (the elements of social deontic reality are individuated by their position in the structure which is logical in its nature).



Robert B. Brandom.
Making It Explicit: Reasoning, Representing, and Discursive Commitment. 1994.



J.R. Searle and
D. Vanderveken.
Foundations of Illocutionary Logic. 1985.



Douglas N. Walton and Erik C.
Krabbe.
Commitment in Dialogue: Basic Concepts of Interpersonal Reasoning. 1995.

Psychological or social sources?

Normative structure of *communication*

Logical structure of *language*

Logical structure of *intentionality*

Searle-
Vanderveken



Brandom



Logical structuralism



Brandom's division of possible stances

I will argue that there is a third theoretical possibility where logical structure of commitments is neither a preexisting normative reality nor a manifestation of underlying psychological structure. Instead—the logical structure of language is the fundamental, irreducible structure.

The difference lies in whether the locus of authority and of commitment is viewed as internal and psychological or as constituted by public social practice.



Illocutionary logic and its psychological base

- Searle and Vanderveken (1985) have developed an elaborated system for capturing the logic of speech acts.
 - Speech act can be decomposed into two components: illocutionary force F and propositional content P . Illocutionary force is determined by seven parameters: (i) illocutionary point (assertive, commissive, directive, declarative, expressive), (ii) degree of strength of the illocutionary point, (iii) mode of achievement of the illocutionary point, (iv) propositional content conditions, (v) preparatory conditions, (vi) sincerity conditions, (vii) degree of strength of the sincerity conditions.
 - It is assumed that each illocutionary force is constructible by modification of some of its components.

Two types of commitment transmission

- There are relations of commitment transfer (preservation, inheritance) between speech acts.
- Searle and Vanderveken analyze two kinds of commitment preservations:
 - ① Illocutionary entailment or commitment preservation within the same illocutionary point Π over the same propositional content P :

$$F_1^{\Pi}(P) \triangleright F_2^{\Pi}(P).$$
 - ② Commitment transfer to another illocutionary point Π^* with the degree of strength k over possibly different propositional content Q (from speech act $F_1^{\Pi k}(P)$):

$$F_1^{\Pi k}(P) \triangleright F_2^{\Pi^* k}(Q).$$

Commitment inheritance within illocutionary point

2.3 A completeness theorem.

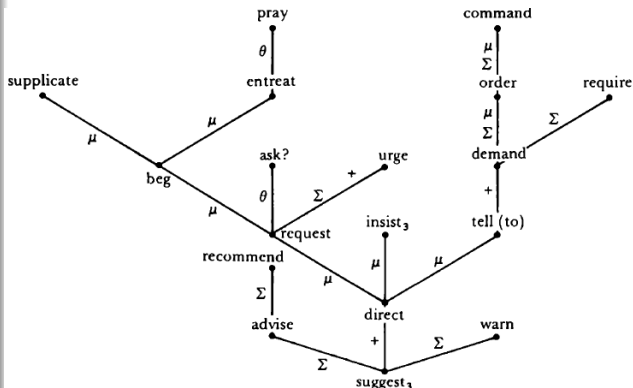
An illocutionary force F_1 illocutionarily entails an illocutionary force F_2 with the same point iff it can be obtained from F_2 by applying the operations which consist in restricting the mode of achievement, increasing the degrees of strength, and adding new propositional content, preparatory or sincerity conditions.



J.R. Searle and
D. Vanderveken.

Foundations of Illocutionary Logic. Cambridge University Press, 1985.

Commitment entailment follows the downward path. Labels over line show the type of modification by which the higher illocutionary force has been obtained from the lower one.



Commitment across illocutionary points

The definition of illocutionary commitment, i.e., commitment to illocutionary point Π' on a proposition Q with a degree of strength k in a context i , calls upon an illocutionary point already achieved in that context over some proposition, in short $i\Pi^k P$ such that

- 1 P strictly implies Q : $\vdash P \rightarrow Q$,
- 2 Q is syntactically admissible (fulfils propositional content conditions) with respect to Π' whenever so does P with respect to Π ,
- 3 psychological states expressed by $\Pi^k(P)$ strongly commit the speaker to psychological states expressed by $\Pi'^k(Q)$.

The last condition can be rephrased in modal logic terms: there is some modal logic ML of intentionality having correspondent theorem $\vdash_{ML} \varphi \rightarrow \psi$ where φ describes sincerity conditions of $\Pi^k(P)$ and ψ sincerity conditions for $\Pi'^k(Q)$. This foundation of illocutionary commitments on the logic of intentionality is termed by Searle and Vanderveken as 'strong parallelism between illocutionary commitment and propositional attitude commitment'.

Definition

A speaker is committed to an illocutionary point Π' on a proposition Q with a degree of strength k (for short: $i\hat{\Pi}'^k Q$) iff for some point Π , $i\Pi^k P$, $P \hookrightarrow Q(w) = 1$, and, first, if $P \in \bigcap \theta_{\Pi}(i)$ then $Q \in \bigcap \theta_{\Pi'}(i)$ and, secondly, $\bigcup \Psi(i, P) \triangleright \bigcup \Psi(i, Q)$.



J.R. Searle and D. Vanderveken.

Foundations of Illocutionary Logic. Cambridge University Press, 1985.

Moore's paradox and Sellars principle

- An interesting instance of the Sellars principle can be proved within Searle-Vanderveken theory:
Any speech act changes the deontic state of affairs of the expressive speech act that expresses the very sincerity conditions of the former.
- Let m be some modality of intentionality. Tautologies $m(P) \rightarrow m(P)$ are theorems in any normal modal logic. Therefore, there is “propositional attitude commitment” between members of sincerity conditions (Ψ) of the corresponding speech acts: $m(P) \in \Psi(\Pi, P)$ and $m(P) \in \Psi(\Pi_{\text{expressive}}, m(P))$. And, finally $\Pi(P)$ commits to $\Pi_{\text{expressive}}(m(P))$.

Proposition

$$m(P) \in \Psi(\Pi, P) \rightarrow (\Pi(P) \rightarrow F(\Pi_{\text{expressive}}(\neg m(P))))$$

“Moore's paradox” is a violation of this proposition

- 1 It is raining but I don't believe it.
- 2 I advise you to open the window. I don't think it is good for you.
- 3 I promise but do not intend to come.
- 4 Open the door! I don't want you to open it.
- 5 Please make me a tea. I don't want it.

Psychological basis of illocutionary logic

- The “transmission of commitments” is the logic of speech acts. The inheritance of deontic statuses from one “successfully performed illocutionary act” to other, not as yet performed speech acts, is how this logic manifests itself.

What are the logical relations between the various types of illocutions? In particular, under which conditions does the successful performance of one illocutionary act commit the speaker to another illocutionary act?

—Searle and Vanderveken. *Foundations of Illocutionary Logic*.

- The illocutionary logic is not a logic that is normative for discursive practice. Rather, normative structure of discursive practice is the logic of discursive practice.
- There is a “psychological basis” in both kinds of relations of illocutionary logic. In case of $F_1^\pi(P) \triangleright F_2^\pi(P)$ the sincerity conditions are fixed or reduced; in case of $F_1^\pi(P) \triangleright F_2^{\pi*}(Q)$ there is a commitment transmission between sincerity conditions. Therefore, Searle-Vanderveken theory of illocutionary logic is ultimately based on logic of intentionality. Thus, in the background we find an expressive conception of language: it is the logic of the intentional states that becomes visible in the speech acts’ commitment

Priority of normative pragmatics

A different perspective is given by Robert Brandom: the normative dimension of discursive practice comes first. It is irreducible phenomenon that only later can be made explicit in a logical theory.

In a series of papers Lance and Kremer (*Journal of Philosophical Logic* 1994, 1996, 2001) have tried to develop formal logical systems for Brandomian commitment based approach where “[by saying] that A entails B , we are making explicit a relation which was previously implicit in linguistic practice”.

Inferential relations among propositional contents are a matter of normative relations among deontic statuses. . .



Robert B. Brandom.

Making It Explicit: Reasoning, Representing, and Discursive Commitment. Harvard University Press, 1994.

This theory emphasizes the importance of *asserting* as a linguistic act: when a person makes an assertion, she undertakes certain commitments—to justify the assertion, and its consequences—and if these commitments are appropriately discharged, she secures *prima facie* entitlement to the assertion. This motivates consideration of an entailment-like connective “ \rightarrow ”, where “ $A \rightarrow B$ ” is to be read as “commitment to A is, in part, commitment to B ”. Given such a connective, to say (correctly) “ $A \rightarrow B$ ” is, in part, to make explicit the inferential moves to which the members of the linguistic community are committed, and thereby to shed light on the meaning or significance of the terms occurring in A and B .



Mark Lance.

The logical structure of linguistic commitment III
brandomian scorekeeping and incompatibility.

Journal of Philosophical Logic, 30:439464, 2001.

Dilemma or trilemma?

- It seems that we are faced with the following dilemma in understanding logical structure of language use that is manifested in the transformations of deontic statuses of speech acts: either to base it on the logic of expressed psychological states like Searle and Vanderveken or to base it on preexisting linguistic practice as Brandom did.
- Nevertheless, the dilemma could be avoided by introducing the third conjecture: it is the logical structure of language that is fundamental and irreducible structure.
- The theoretical perspective of dynamic logic can give us tools to develop the conjecture.

The third way

- Successful speech act produces effects on intentional states of the hearer, sometimes it also changes the normative pattern to which the hearer's actions are subjected, and it always changes the normative pattern to which the speaker's speech acts are subjected.
- Given the fact that a speech act is performed by using a “structural element”, i.e., a sentence that bears logical relations to the other sentences, the logical structure of language is partially (locally) projected to its psychological and deontic effects.
- This theoretical view is an extension of “public announcement logic” and similar approaches.

[The] language [of *Public Announcement Logic*] allows us to make typical assertions about knowledge change like

$$[!P]K_i\varphi$$

which states what an agent i will know after having received the hard information that P . This one formula of dynamified epistemic logic neatly highlights the combination of ideas from diverse fields that come together here. The study of speech acts $!P$ was initiated in linguistics and philosophy, that of knowledge assertions $K_i\varphi$ in philosophical logic and economics. And the dynamic effect modality $[\]$ combining these actions and assertions into a new formal language comes from program logics in computer science.



Johan van Benthem.

Logical Dynamics of Information and Interaction.

Behind the effects

Under the dynamic approach it is not necessary to identify the logic of locutions (utterances, addressed mood-designated sentences) with the logic of its effects. The effects could be diverse, as the case of imperative sentences shows in the table below. Rather an important theoretical question arises: *Which relation holds between the logic of locutions and the logic of effects achieved by speech acts performed by uttering them?*

UTTERANCE'S	EFFECTS	
$[i : \text{"!}[j \text{ stit} : \varphi]"]$	$B_j(\diamond\varphi \wedge \diamond\neg\varphi)$	<i>j</i> 's belief
$[i : \text{"!}[j \text{ stit} : \varphi]"]$	$D_j\varphi$	<i>j</i> 's desire
$[i : \text{"!}[j \text{ stit} : \varphi]"]$	$O_j[j \text{ stit} : \varphi]$	<i>j</i> 's obligation
$[i : \text{"!}[j \text{ stit} : \varphi]"]$	$F_i[i \text{ stit} : \neg\varphi]$	<i>i</i> 's non-linguistic obligation
$[i : \text{"!}[j \text{ stit} : \varphi]"]$	$F_i(i : \text{"} \cdot \neg\diamond\varphi")$	<i>i</i> 's linguistic obligation

Diverse effects of the same utterance.

The puzzle of imperative logic

- Prima facie it seems convincing that reduction to the logic of effects is not possible.
- In particular case of imperatives it is puzzling how can a sentence that is “about action” be identified in its meaning with its potential of changing beliefs and desires or of modifying “deontic score”?

Imperative content thesis

Regardless of its force on an occasion of use, the content of every imperative is agentive.



Nuel D. Belnap,
Michael Perloff, and
Ming Xu.

*Facing the Future:
Agents and Choices
in Our Indeterminist
World.*

Oxford University
Press, USA, 2001.

Imperative logic and other logics

Although imperative logic can be successfully studied as a logic of the will of command issuing authority (Segerberg, 1990) or as a kind of deontic logic (Chellas, 1971), its scope seems to be wider than the scope of logic of its preconditions and effects.

Thesis

There is an irreducible logic of imperatives and it is structurally similar to bouletic, doxastic and deontic logics.

Let us call the thesis on irreducible and autonomous logical structure of locutions—the thesis of logical structuralism. The thesis will be partially justified if it can be proved that imperative logic as a source logic is rich enough to embed its target projections on the structures of intentionality and on the deontic structure. This will be done if we can prove that target logics are sublogics of the source logic in the sense that their *sequitur/non sequitur* logical structure is contained within the logical structure of the source logic, i.e., imperative one. In this way, different logics need not share the same representational content and still can be connected in an essential way. It has been proved (Žarnić, 2007) that Cross' modal logic of desire (JPL, 1997) is a sublogic of imperative logic that identifies the imperative content with agentives conceived in Von Wright's sense.

Logical structuralism

- The strongest parallelism is to be expected to hold between imperative logic, on one side, and deontic logic of its projection to the structure of linguistic commitments, on the other side.
 - The parallelism is not straightforward in the “single-agent” setting. E.g., if φ entails ψ in imperative logic, it does not mean that the one who utters φ is obliged to utter ψ , rather it means that it is forbidden to him to utter a sentence that is incompatible to ψ . On the other hand, in communication, if requested, one ought to assent to entailments of his utterances or otherwise to withdraw some of these.
- The puzzling difference between representational contents of essentially connected parts of language prompts us to be receptive towards “inferentialist semantics” rooted in the proposal made by Carnap in 1930ies, e.g. *The Logical Syntax of Language*, where the “logical content” of a sentence is identified with the set of its consequences.
- The use of language is subject to norms of logic: in using a sentence we use an element of a logical structure and this structure is projected to the linguistic commitments of the speaker.
 - To use an analogy from the philosophy of mathematics: one cannot use or know the number 3 in isolation—either we use the numerical structure or fail to use numbers.

A methodological conclusion

- Imperative logic cannot be studied in isolation from the deontic logic and the logic of intentionality.
- The research in imperative logic must include the investigation of the relations between logics. It is at the same time investigation *in logic* and investigation *of logics*.
- The critical element of the research is not given only by our “intuitions” and “counterintuitions” but rather by the harmony to be established between the logic of imperatives and logic of its diverse communicative effects.

Definition

For logics $L_1 = \langle \Phi_1, \Sigma_1, \models_1 \rangle$ and $L_2 = \langle \Phi_2, \Sigma_2, \models_2 \rangle$ a parsimonious projection π^* is a projection $\pi^* : \Sigma_2 \rightarrow \Sigma_1$ such that for any $\Gamma_1 \subseteq \Phi_1$ it holds that

$$\text{Mod}(\Gamma_1, \Sigma_1) \neq \emptyset \rightarrow \exists \sigma_2 [\sigma_2 \in \Sigma_2 \wedge \pi(\sigma_2) \in \text{Mod}(\Gamma_1, \Sigma_1)]$$

Izvještaj

Theorem (B.Ž.)

Let logic $L_1 = \langle \Phi_1, \Sigma_1, \models_1 \rangle$ be a logic with strong negation. Then for any logic $L_2 = \langle \Phi_2, \Sigma_2, \models_2 \rangle$ it holds that if there are: a sentence $\kappa \in \Phi_2$, a parsimonious function $\pi^* : \text{Mod}(\{\kappa\}, \Sigma_2) \rightarrow \Sigma_1$, and a function $\tau : \Phi_1 \rightarrow \Phi_2$ such that

$$\pi^*(\sigma_2) \models_1 \varphi_1 \text{ iff } \sigma_2 \models_2 \tau(\varphi_1)$$

for any $\varphi_1 \in \Phi_1$ and $\sigma_2 \in \text{Mod}(\{\kappa\}, \Sigma_2)$, then τ is a semantic relations preserving translation, i. e.

$$\Gamma_1 \models_1 \varphi_1 \Leftrightarrow \tau(\Gamma_1) \models_2^* \tau(\varphi_1)$$

where $\models_2^* \subseteq \text{Mod}(\{\kappa\}, \Sigma_2) \times \Phi_2$ and $\tau(\Gamma_1) = \{\tau(\varphi_1) \mid \varphi_1 \in \Gamma_1\}$.