On resolving communicative incoherence

–collective MIND, social WORLD, communicative ACTION–

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Overview

Abstract

This paper defines the relation between social forms of communication (e.g. those defined by the relation of authority or its absence) and the ways of reaching understanding. The working hypothesis is a Habermasian one in the process of revising collective intentionality so to remove disagreement the shift from one social form of communication to another is required. According to this hypothesis the disagreement in attitudes plays the same functional role in social learning as does the error in individual learning, while the shift to a non-authoritative communication form is a condition of possibility of revising collective intentionality. The proposed topic will be investigated using the methods of formal pragmatics and it is, consequently, closely connected to theories in philosophy of language and logic, among which the following stand out as relevant: the illocutionary logic of J. Searle and D. Vanderveken, the normative pragmatics of R. Brandom, and the dynamic epistemic logic of J. van Benthem et al.

Logical pragmatics

- Logical notions, such as 'consequence', have been defined so far using semantic notions, such as 'interpretation', and syntactic notions, such as 'proof'. These notions are coextensive and, therefore, interchangeable if there is a harmony between logic syntax and semantics, i.e., a logic under consideration is sound and complete.
- The third dimension of logical semiotics has been missing from the picture and will necessarily miss from it if zero-agent and single-agent perspective prevails. Pragmatics, as current research shows, can offer the third way for understanding logical phenomena. Taking the pragmatic standpoint is not just another way of describing and investigating otherwise well-studied phenomena. Rather, the pragmatic standpoint opens up a perspective in which previously unrecognised logical phenomena become visible.
- Since from the pragmatic standpoint at least two actors (agents) are required in the theoretical model, it seems proper to use the term *socio-logic* in order to emphasize the fact that the research focus lies on the logical phenomena occurring in social interaction.

Logical phenomena in communication

- There are logical phenomena which cannot be properly understood in "zero-agent logic" or "single-agent logic". These phenomena can be found in communication; communication being the type of rational interaction by a sequence of acts of language use (i.e., *discourse*).
  - I will argue that the phenomenon of "resolution of communicative incoherence" becomes visible and solvable only from the viewpoint of socio-logic.

Collective intentionality

- The social phenomenon of common belief in a communicative group, say a group of philosophers and scientists or actors characterized by a high degree of rationality, is a very complex logical phenomenon. Common belief is not only a general belief, a belief shared by everybody in a communication group, it is also socially reflexive belief where everybody in the group believes of everybody in the group that she shares the same belief and believes of everybody to believe that up to any level of iteration. A remarkable logical phenomenon, extremely complex and yet taken to be self-evident in our everyday thinking.

	i's beliefs:	*j*'s beliefs:
0	$B_i\varphi$	$B_j\varphi$
1	$B_iB_i\varphi$; $B_iB_j\varphi$	$B_jB_i\varphi$; $B_jB_j\varphi$
2	$B_iB_iB_i\varphi$; $B_iB_iB_j\varphi$; $B_iB_jB_i\varphi$; $B_iB_jB_j\varphi$	$B_jB_iB_i\varphi$; $B_jB_iB_j\varphi$; $B_jB_jB_i\varphi$; $B_jB_jB_j\varphi$
…	…	…

Social reflection and collective intentionality

- The property of social reflexivity ($B_j\varphi \rightarrow B_iB_j\varphi$) is an essential property of collective intentionality.
- Collective intentionality (Searle) and normativity (Habermas) are necessary ingredients in the ontology of the social world.
- In this talk the logical phenomenon of revision of collective attitudes will be analysed from the standpoint of the *socio-logic* and it will be argued that the condition of possibility of the revision lies in the transformation of social relations in the communicative group.

The foundations of socio-logic

Expressive conception of language

Illocutionary logic. Searle and Vanderveken have revealed the structure of communicative action (speech-act) as an expression of individual psychological states.

Normative conception of language

Normative pragmatics. Brandom has shown how use of language reshapes the distribution of normative values over communicative acts (linguistic commitments).

Logico-structural conception of language

Dynamic logic. Van Benthem has given the syntax and semantics for the formal language appropriate for the analysis of how language creates social world.

Locutions as modal operators

- The dynamic logic describes effects of a communicative act using the formula

[act] effect.

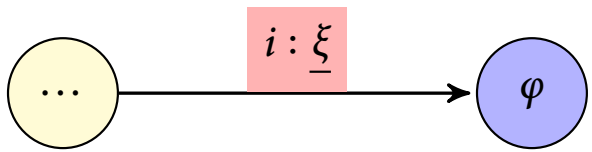
Example (Translation)

After actor i asserts that φ ($i : \cdot\underline{\varphi}$) it is forbidden for i to deny that φ ($\mathbf{F}_i\ i : \cdot\underline{\neg\varphi}$) translates to

$$[i : \cdot\underline{\varphi}]\mathbf{F}_i\ i : \cdot\underline{\neg\varphi} \qquad \text{(NC)}$$

Formula (NC) can be understood as a way of stating the principle of non-contradiction within formal pragmatics; it states the basic principle of non-contradiction from classical logic ($\neg(p \wedge \neg p)$).

- Arrow diagram where φ may stand for a psychological (individual mental state) or social (collective intentionality, normative reality) effect.



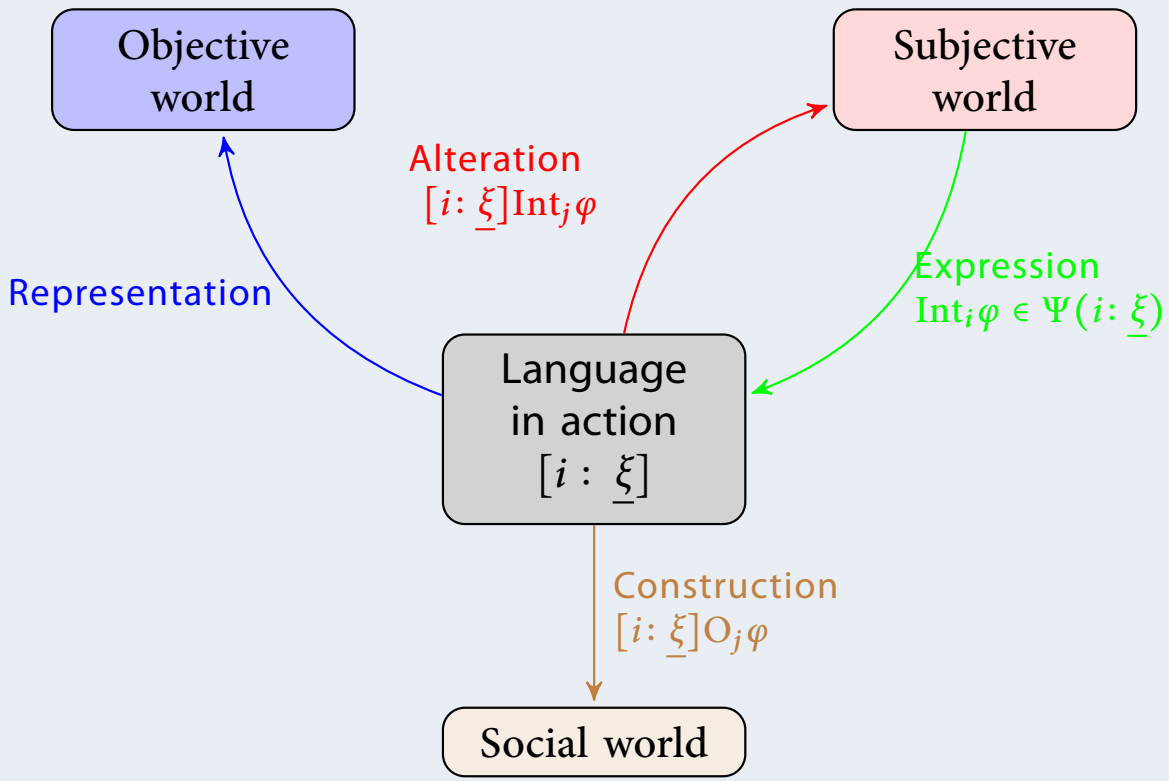
(1)

Symbols in the presentation

- sender = speaker/writer; receiver = hearer/reader.
- O_i, F_i, P_i = deontic operators, the deontic value is restricted to actor i.
- Int_i = some intentional state of i: $\mathrm{B}_i \ldots$, $\neg\mathrm{B}_i \ldots$,$\mathrm{D}_i \ldots$, $\neg\mathrm{D}_i \ldots$.
- $i : \underline{\xi}$ = locution of i, i says/writes:"ξ", communicative act.
- $\Psi(i : \underline{\xi})$ = the set of intentional states of i expressed by locution $i : \underline{\xi}$. Similar to "sincerity conditions" of Searle and Vanderveken. The actor need not have intentional states expressed by her locution.
  Example (disputable). $\Psi(i : \underline{\text{I am curious about } \varphi}) =$
  $\{\mathrm{B}_i\neg\mathrm{B}_i\varphi, \mathrm{B}_i\neg\mathrm{B}_i\neg\varphi, \mathrm{D}_i(\varphi \to \mathrm{B}_i\varphi), \mathrm{D}_i(\neg\varphi \to \mathrm{B}_i\neg\varphi)\}$
- $i : \underline{\xi_1} \ldots j : \underline{\xi_n}$ = discourse, sequence of locutions, $n \geq 1$.

Locution as expression and action

Habermas ontology and formal pragmatics



The three theories (illocutionary logic, normative pragmatics, dynamic logic) can be connected within the framework of Habermas' ontology.

- The connection with Searle's and Vanderveken's illocutionary logic is the thesis that *locutions express intentional states*. The connection with Brandom's normative pragmatics is the thesis on *parallelism between the logical structure of language and the structure of linguistic commitments*. The connection with van Benthem's dynamic epistemic logic is the thesis that *language in use shapes collective intentional states* and the methodological approach.
- The aims are to connect the theses and to determine the normative contexts that enable the formation of collective intentional states in communication (=language mediated social interaction).

Principal– or α–norm of communication

A norm of language-use that enables sharing of attitudes (formation of collective intentionality).

> *Linguistically expressed attitudes of one actor ought to be shared by every actor in the communication group.*

Definition

Let G be a communication group.

If $\mathrm{Int}_i\varphi \in \Psi(i\colon \underline{\xi})$, then $[i\colon \underline{\xi}]\mathrm{O}_j\mathrm{Int}_j\varphi$ for any $i, j \in G$. (α-norm)

Example

Suppose that the sender's belief that she went to pictures yesterday is expressed by the act of her saying that she went to pictures yesterday: $\mathrm{B}_s\ \varphi \in \Psi(s : \underline{\cdot\varphi})$. After the communicative act $s : \underline{\cdot\varphi}$ the receiver is obliged by α-norm to share the attitude, i.e., to believe that the sender went to pictures yesterday: $\mathrm{O}_r\ \mathrm{B}_s\ \varphi$.

Two special cases

α-norm applied to the sender: $i = j$

α norm applied to the sender herself yields the *norm of sincerity*:

> *The sender ought to have the attitudes that have been linguistically expressed by her.*

If $\mathrm{Int}_i\varphi \in \Psi(i\colon \underline{\xi})$, then $[i\colon \underline{\xi}]\mathrm{O}_i\mathrm{Int}_i\varphi$ for any $i \in G$. (Norm of sincerity)

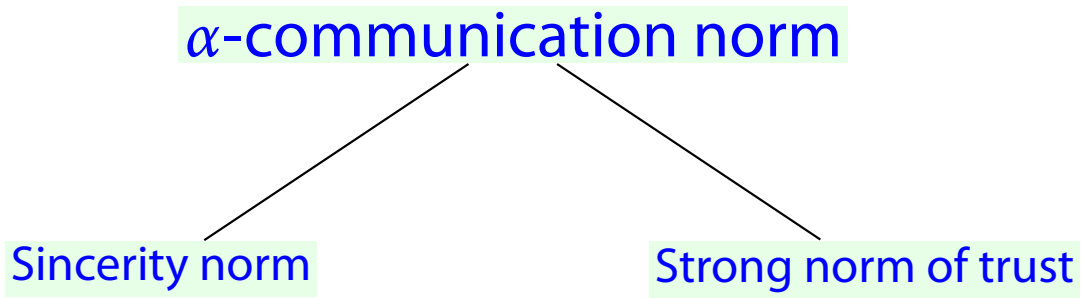
α-norm applied to a sender-receiver pair: $i \neq j$

α-norm applied to a sender-receiver pair yields the *strong norm of trust*:

> *The receiver ought to have the attitudes that have been linguistically expressed by the sender.*

If $\mathrm{Int}_i\varphi \in \Psi(i\colon \underline{\xi})$ and $j \neq i$, then $[i\colon \underline{\xi}]\mathrm{O}_j\mathrm{Int}_j\varphi$. (Strong norm of trust)

An overview



Beliefs about the norm

Definition (α-norm observance belief)

An actor i has α-norm observance belief iff

- actor i has veridical beliefs about all instances of α-norm

$$\text{If } [i\colon \underline{\xi}]\mathrm{O}_j\varphi, \text{ then } \mathrm{B}_i[i\colon \underline{\xi}]\mathrm{O}_j\varphi \qquad \text{(Norm belief)}$$

- actor i believes that α-norm is always observed by everyone in the group

$$\mathrm{B}_i([i\colon \underline{\xi}]\mathrm{O}_j\varphi \to [i\colon \underline{\xi}]\varphi) \qquad \text{(Norm observance belief)}$$

Definition (α-communication)

Communication in a group G belongs to α-type if α norm holds for G and it is a general belief in G that the α-norm is observed.

Getting rid of deontic operator

If everybody in the communication group correctly recognizes the α-norm and believes that it is observed by everyone in the group (in other words, if α-norm observance belief is a general belief), then everybody in the group believes that language in use alters intentional states of all group members.

Proposition

Communication group has general alteration belief.

Proof.

Let B_G denote "for all $i \in G$, B_i". General alteration belief is a consequence of language norm and norm observance belief. Let $[i\colon \underline{\xi}]\mathrm{O}_j\varphi$. Then everybody in G believes that this norm holds: $\mathrm{B}_G[i\colon \underline{\xi}]\mathrm{O}_j\varphi$ since general α-norm observance belief is correct with respect to norms of language use. Also everybody believes that the norms of language use are being observed by every group member: $\mathrm{B}_G([i\colon \underline{\xi}]\mathrm{O}_j\varphi \to [i\colon \underline{\xi}]\varphi)$ for all $i, j \in G$. Therefore, everybody in the group believes that the language in use brings about alterations:$\mathrm{B}_G[i\colon \underline{\xi}]\varphi$. □

Provisional semantics

- Denote by M, w a point w in a relational structure M.
- Associate with each locution operator $[i : \underline{\xi}]$ an operation that transforms structure M into structure $M|i: \underline{\xi}$. In this way the effects of language use are modelled as changes of relational structures.

Provisional definitions

- $M, w \vDash [i: \underline{\xi}]\varphi$ iff $M|i: \underline{\xi}, w \vDash \varphi$.
- $M, w \vDash \mathrm{B}_i\varphi$ iff $M, v \vDash \varphi$ for all v such that $R_{\mathrm{B}_i} wv$.

Axiom (Logical axiom on operators switch)

$\mathrm{B}_i[i: \underline{\xi}]\varphi \leftrightarrow [i: \underline{\xi}]\mathrm{B}_i\varphi$

Operator switch axiom

Proposition

Logical axiom

$$\mathrm{B}_j[i\colon \underline{\xi}]\varphi \leftrightarrow [i\colon \underline{\xi}]\mathrm{B}_j\varphi \qquad \text{(Operator switch)}$$

is sound with respect to the provisional semantics.

Proof.

- $M, w \vDash \mathrm{B}_j[i\colon \underline{\xi}]\varphi$ iff
- $M, v \vDash [i\colon \underline{\xi}]\varphi$ for all v such that $R_{\mathrm{B}_j} wv$ iff
- $M|i\colon \underline{\xi}, v \vDash \varphi$ for all v such that $R_{\mathrm{B}_j} wv$.

- $M, w \vDash [i\colon \underline{\xi}]\mathrm{B}_j\varphi$ iff
- $M|i\colon \underline{\xi}, w \vDash \mathrm{B}_j\varphi$ iff
- $M|i\colon \underline{\xi}, v \vDash \varphi$ for all v such that $R_{\mathrm{B}_j} wv$.

□

The phenomenon of social ontology: making it the case by believing it to be the case

Proposition (True by belief)

If everyone in a communication group is rational and believes that the α-norm is being observed, then the α norm is being observed.

$$\textit{If}\ \ \mathrm{B}_G([i\colon \underline{\xi}]\mathrm{O}_j\mathrm{Int}_j\varphi \to [i\colon \underline{\xi}]\mathrm{Int}_j\varphi)\ \textit{, then}\ \ [i\colon \underline{\xi}]\mathrm{Int}_j\varphi\ . \tag{2}$$

Proof.

Reductio. Let $[i\colon \underline{\xi}]\mathrm{O}_j\mathrm{Int}_j\varphi$. Suppose that j is rational but violates the norm. After the locution $i\colon \underline{\xi}$ has been performed the actor j does not have the required intentional state, $\neg\mathrm{Int}_j\varphi$. Assuming the introspective accessibility of intentional states, the actor j is aware of her own intentional state that violates the norm, $\mathrm{B}_j\neg\mathrm{Int}_j\varphi$. On the other hand, the actor has α-norm observance belief and, therefore, j believes that she has the required state, $\mathrm{B}_j\mathrm{Int}_j\varphi$. Since j is rational she does not have inconsistent beliefs. Therefore, *the α communication norm generally believed to be observed is in fact observed.* □

Collective intentionality as social reflection

Proposition (Social reflection)

In the presence of the α-norm observance belief, the social reflexive belief of the first order is produced by language use.

Proof.

1. Let $\mathrm{Int}_i\varphi \in \Psi(i\colon \underline{\xi})$.
2. $\mathrm{B}_G[i\colon \underline{\xi}]\mathrm{Int}_j\varphi$ for any $j \in G$, by the general alteration belief.
3. $[i\colon \underline{\xi}]\mathrm{B}_G\mathrm{Int}_j\varphi$ for any $j \in G$, by the operator switch axiom.

□

Weak trust

Definition (Weak norm of trust)

If $\mathrm{Int}_i\varphi \in \Psi(i\colon \underline{\xi})$ and $j \neq i$, then $[i\colon \underline{\xi}]\mathrm{O}_j\mathrm{B}_j\mathrm{Int}_i\varphi$. (Norm)

Corollary 1

The general communication norm observance belief satisfies (realizes, makes true) the weak norm of trust.

If $\mathrm{Int}_i\varphi \in \Psi(i\colon \underline{\xi})$ and $j \neq i$, then $[i\colon \underline{\xi}]\mathrm{B}_j\mathrm{Int}_i\varphi$. (Norm observance)

Proof.

Use Proposition on “social reflection”. □

Moore's paradox

Translations:

- φ stands for 's went to pictures yesterday';
- $s : \underline{\cdot\varphi}$ stands for 's says: "I went to pictures yesterday"'
- $s : \underline{\cdot\neg \mathrm{B}_s \varphi}$ stands for 's says: "I don't believe that I went to pictures yesterday"'.

Conventions:

- $\mathrm{B}_s\varphi \in \Psi(s : \underline{\cdot\varphi})$;
- $\neg\mathrm{B}_s\varphi \in \Psi(s : \underline{\cdot\neg\mathrm{B}_s\varphi})$.

Suppositions:

- α-norm holds and there is the α-norm observance belief.
- The discourse $s : \underline{\cdot\varphi}\ \ s : \underline{\cdot\neg\mathrm{B}_s\varphi}$ is cumulative, i.e., no act is a withdrawal.

Proposition

In α communication Moore-type discourse destroys rationality.

Proof.

1. $[s : \underline{\cdot\varphi}]\mathrm{B}_r\mathrm{B}_s\varphi$, by Proposition on social reflection.
2. $[s : \underline{\cdot\neg\mathrm{B}_s\varphi}]\mathrm{O}_r\mathrm{B}_r\neg\mathrm{B}_s\varphi$, by Trust norm. Using Proposition on "true by belief" we get: $[s : \underline{\cdot\neg\mathrm{B}_s\varphi}]\mathrm{B}_r\neg\mathrm{B}_s\varphi$.

Since the discourse is cumulative, r ends in an irrational state: $[s : \underline{\cdot\varphi}][s : \underline{\cdot\neg\mathrm{B}_s\varphi}]\mathrm{B}_r\,\bot$ □

Communicative incoherence

Much easier example for the destruction of rationality with respect to α-normative context is given by linguistically expressed disagreement.

Example

- Let $\mathrm{B}_i\varphi \in \Psi(i : \underline{\cdot\varphi})$.
- Senders s and s' express disagreement: $s : \underline{\cdot\varphi}$ and $s' : \underline{\cdot\neg\varphi}$.
- By Trust: $[s : \underline{\cdot\varphi}]\mathrm{O}_r\mathrm{B}_r\varphi$ and $[s' : \underline{\cdot\neg\varphi}]\mathrm{O}_r\mathrm{B}_r\neg\varphi$.
- By Proposition "true by belief": $[s : \underline{\cdot\varphi}]\mathrm{B}_r\varphi$ and $[s' : \underline{\cdot\neg\varphi}]\mathrm{B}_r\neg\varphi$. Therefore, $[s : \underline{\cdot\varphi}][s' : \underline{\cdot\neg\varphi}]\mathrm{B}_r\bot$.

Limitations of α communication

- α communication cannot deal with the communicative incoherence or Moore-type discourse.
- In such cases the rationality of communication group members is destroyed and the formation of collective intentionality fails.
- The change of communication type, i.e., the replacement of α norms with some other, is needed in order to preserve rationality and enable formation of collective intentionality.

β-norm of communication

β-norm is a norm contrary to α-norm.

> *Linguistically expressed attitudes of one actor need not be shared by any other actor in the communication group.*

Definition

Let G be a communication group.

If $\mathrm{Int}_i\varphi \in \Psi(i\colon \underline{\xi})$, then $[i\colon \underline{\xi}]\mathrm{P}_j\neg\mathrm{Int}_j\varphi$ for any $i, j \in G$. (β-norm)

Remark: logical norms of communication

The complete absence of obligations to have some intentional state after "receiving a message" in the normative context β does not imply the absence of any communicative obligation. There are obligations resulting from the language use. If a certain one-actor discourse creates absurdity, then it is forbidden to perform it:

$$\text{If } [s : \underline{\xi_1, \ldots, \xi_n}]\bot, \text{ then } [s : \underline{\xi_1, \ldots, \xi_{n-1}}]\mathrm{F}_s\, s : \underline{\xi_n} \tag{3}$$

For example, Moore's type discourse gives rise to the following logical norm of communication: $[s : \underline{\cdot\varphi}]\mathrm{F}_s\, s : \underline{\cdot\neg \mathrm{B}_s\varphi}$. In its generalized form this norm has been termed the norm of "undeniability of sincerity conditions" and seems to be one the first logical norm of communication to be discovered. Logical norms of communication reflect the fact that communicative acts are performed by using the language, which has the logical structure. In other words, logical norms of communication determine the deontic world created by the sender's own use of language. With each message the sender reshapes the distribution of deontic values over her locutions, making some of them forbidden (like it is forbidden to deny having the intentional states expressed in a discourse), some become obligatory (like it is obligatory accept the implications of one's discourse), etc.

γ norm of communication

γ-norm "lies between" α-norm and β-norm.

> *Linguistically expressed attitudes of some actors need not be shared by some actor in the communication group and linguistically expressed attitudes of some actors ought to be shared by some actor in the communication group.*

Definition

Let G be a communication group.

If $\mathrm{Int}_i\varphi \in \Psi(i\colon \underline{\xi})$, then $\exists i \exists j[i\colon \underline{\xi}]\mathrm{P}_j\neg\mathrm{Int}_j\varphi \wedge \exists i\exists j[i\colon \underline{\xi}]\mathrm{O}_j\mathrm{Int}_j\varphi$ where $i, j \in G$.

(γ-norm)

Communicative authority

Definition

$$\mathrm{EA}(s,r) \text{ iff } \mathrm{B}_s\varphi \in \Psi(s:\underline{\xi}) \text{ implies } [i\colon \underline{\xi}]\mathbf{O}_r\mathrm{B}_r\varphi$$

(Epistemic authority relation)

Definition

$$\mathrm{BA}(i,j) \text{ iff } \mathrm{D}_s\varphi \in \Psi(s:\underline{\xi}) \text{ implies } [i\colon \underline{\xi}]\mathbf{O}_r\mathrm{D}_r\varphi$$

(Bouletic authority relation)

Definition

Actor i is a (strong) communicative authority for actor j iff actor i's locution produces the obligation of actor j to have the intentional state expressed by the locution.

$$\mathrm{CA}(i,j) \text{ iff } \mathrm{Int}_i\varphi \in \Psi(i\colon \underline{\xi}) \text{ implies } [i\colon \underline{\xi}]\mathbf{O}_j\mathrm{Int}_j\varphi$$

(Authority relation generalized)

- The configuration of communicative authority relation can be understood as a consequence of the normative context of communication. If α-norm holds the *CA* relation is universal. If β-norm holds the *CA* relation is empty. All other configurations of *CA* show that normative context belongs to γ type; since γ norm is a type, its more specific tokens are needed to determine the *CA* distribution.

Theory of theory change

- The phenomenon of theory revision is well studied. The AGM theory (Alchourrón, Gärdenfors, Makinson) of theory revision has reached the "textbook level" and thus constitutes a standard part of logical education at the postgraduate level. Nevertheless, the AGM theory (of theory revision) is restricted to the assertive type of sentences, to sets of sentences in the indicative mood or descriptive theories conceived as "abstract objects", and thus it is a theory of the "zero-agent logic".
- Revision of collective intentionality is a much more complex phenomenon and, as will be argued here, it cannot be reduced to exclusively logical changes but includes social transformations as its proper part.

Communicative incoherence

- A logical phenomenon similar to attitude inconsistency at individual level can also be found at the collective level. Let it be called *communicative incoherence*: the term 'incoherence' points to the fact that there is a disagreement within the group, the adjective 'communicative' shows that the disagreement can be discovered only in communication. Unlike individual states which are introspectively accessible, collective intentionality is transparent only for those intentional states that are produced by language in use.

Definition

Discourse $i : \underline{\xi_1} \quad \ldots \quad j : \underline{\xi_n}$ is *communicatively incoherent* in a normative context iff it creates absurdity (destroys rationality) in the context.

Contradiction and destruction

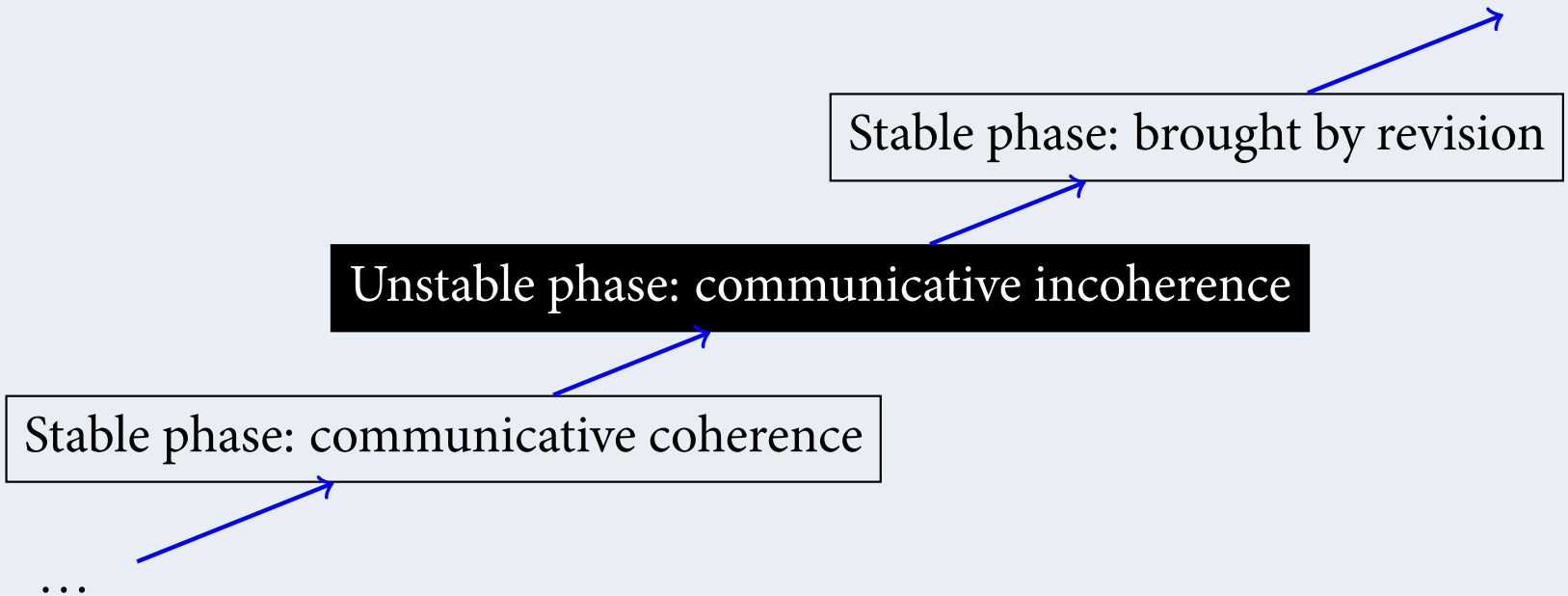
- Contradiction creates destruction according to the principle *ex contradictione quodlibet*. In classical logic the presence of contradictory sentences in the premises destroys the proof by making every sentence provable, their presence in the theory destroys its descriptive power by making no interpretation possible, their presence in the discourse destroys communication by making it impossible to reach understanding.contradictory
- According to Tarski's (1930) theory of consequence relation ($Cn : \wp\mathcal{L} \to \wp\mathcal{L}$) there must exist a sentence whose consequence is the whole of the language ($\mathcal{L}$). Tarski's Axiom 5 states this property: *there is a sentence x such that $Cn(\{x\}) = \mathcal{L}$.*
- Is it rational to abandon the whole theory once a contradiction has been discovered? Is it rational to end communication when the disagreement of attitudes has been revealed? No, and no.

Reason for revision

- The discovery of contradiction is not a reason for destruction of a theory or a communicative exchange (=language-mediated rational interaction), but a reason for reconstruction.
- A good example of how a contradiction gives a reason for reconstruction (and not for the destruction) is given in AGM concept of revision. Revision is complex and underdetermined theoretical change occurring when a new sentence x cannot be consistently added to a theory A. Revision takes two steps: 1. contraction, which is an under-determined change of A to a contracted theory A^* to which x can be consistently added, and 2. expansion of A^* with x.
- So, the fact that the theory growth leads to contradiction, i.e., $\{p, \neg p\} \subseteq Cn(A \cup \{x\})$ for some p, is not a reason to destroy it, but to revise it. Classical logic was not intended to provide a model of theoretical or normative dynamics: contradiction leads to destruction. Translated to the communicative field: the discovery of a disagreement is not a reason to destroy collective intentionality but to engage in an attempt to reconstruct it.

Instability phase

The state of a communication process enters an unstable phase if communicative coherence (social contradiction, disagreement of attitudes) becomes revealed. Classical logic admits no unstable phase since a contradiction would destroy the process. It is a well-known empirical fact and requirement of rationality that contradiction will not "explode" but it will give reason for a change (a revision or reconstruction of collective intentionality).



Phases of communication process. Note that α-norm of communication need not hold neither in stable nor in unstable phase.

Diversity of normative contexts for language generated collective intentionality

- The α-norm together with the general belief in its observance is just a special case of normative context for construction of collective intentionality. There are other normative contexts as well. It may well be the case, as it is argued here, that a change in normative context is a condition of possibility of creating collective intentionality. If so, the dynamics of social relations a necessary part of the dynamics of collective intentionality.
- This fact gives a example of socio-logic phenomena: a societal change is a precondition for the logical phenomenon of revision.

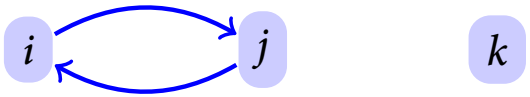
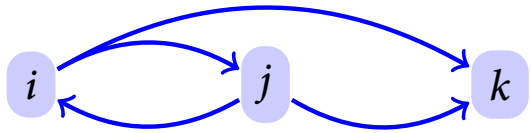
Communicative equality and non-equality

There are two equality types of communicative authority distribution: (α-type) where communicative authority relation is universal within a group G, $CA = G \times G$ (i.e., general communication norm is generally obeyed); and (β-type) where communicative authority relation is reduced to identity relation, $CA = \varnothing$. The third type (γ-type) is the non-equality type and comprises all transitive relations that are neither universal nor empty. A communicative authority relation R belongs to γ-type iff R is transitive, $R \neq G \times G$, $R \neq \varnothing$.

Equality with authority (α-type) $\forall i \forall j CA(i,j)$
Equality without authority (β-type) $\forall i \forall j \ \neg CA(i,j)$
Non-equality (γ-type) $\exists i \exists j \ \neg CA(i,j) \wedge \exists i \exists j \ CA(i,j)$

Communicative hierarchy

- Communicative inequality (γ-type) comes in a variety of subtypes.

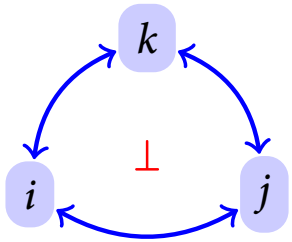
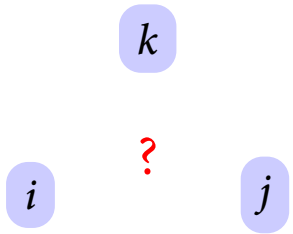
Some γ-subtypes	
Not connected subtype $\exists i \exists j(\neg CA(i,j) \wedge \neg CA(j,i))$	Not symmetric subtype $\exists i \exists j(CA(i,j) \wedge \neg EA(j,i))$
Examples	
Not connected but symmetric	Connected but not symmetric
	

- Let us call "hierarchical" those γ-subtypes that are connected but not symmetrical.

Resolving communicative incoherence

- The communicative incoherence is an unstable communication phase, a state of disequilibrium and it gives the reason for an informational process aimed to resolve the imbalance. For example, scientific knowledge is subordinated to the requirement of *intersubjective testability* (H. Feigl) and the discovery of the communicative incoherence shows that the requirement has not been met and, therefore, corrective actions must be taken.
- The resolution of communicative incoherence can have one of the two forms:
  1. the *conservative form* retains the existing communicative authority relations and assigns the obligation to revise their own intentional states to individual actors,
  2. the *non-conservative form* transforms communicative authority relations while the revision process occurs at the collective level.

Non-conservative form

Communicative action(J.H.) α-type  Communicative incoherence	⇒ ⇒	Argumentation practice (J.H.) β-type  Subdetermined process of reaching understanding

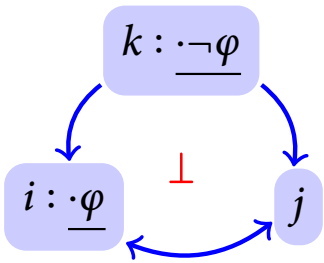
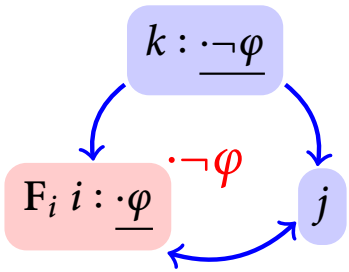
Transition from α- to β-type of communicative authority distribution

As soon as [validity claims][1] are problematized and made the object of a justified controversy, interlocutors switch (in however rudimentary a fashion) from communicative action to another form of communication, namely, a practice of argumentation, willing to convince one another of their views as well as to learn from one another.

Jürgen Habermas (2003).
Truth and Justification, str. 77, MIT Press.

[1] Truth, normative rightness, sincerity.

Conservative form of revision

γ-type N	$\Rightarrow$	γ-type N
		
Communicative incoherence	$\Rightarrow$	Determined resolution

- An actor's refusal to revise her intentional states (or at least to perform only those locutions expressing the revised intentional states) might end in excommunication.

Non-compliance with conservative type of resolution of communicative incoherence

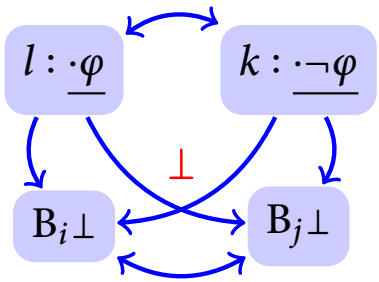
Samuel Hirszenberg (1907) *Excommunicated Spinoza*.

~~Note.~~[2]

[2] The group of persons in the background shows consternation with Spinoza's refusal of γ-type of reconstructing collective intentionality. The book in Spinoza's hand symbolizes β-type of reconstruction where the referent group is an imagined group of philosophers/scientists.

Obstacles to conservative resolution

- The appeal to higher authority cannot provide the solution for certain subtypes of γ-configurations.

Conservatively unresolvable communicative incoherence Conflicting authorities k and l


Conclusions

- The non-conservative resolution of communicative incoherence includes the change in communicative authority relations. Thus, social dynamics is a condition of possibility of logical dynamics in reconstruction of collective intentionality.
- The transition from α-type to β-type configuration is a rational socio-logical revision form. The failure of communication as "informational exchange" is replaced with argumentation, which if successful, restores the collective intentionality and enables the restoration of α-type.
- On the other hand, the conservative resolution of communicative incoherence has many obstacles and cannot be considered adequate for the construction of collective intentionality in the community of scientists and philosophers.
- The communicative authority configuration of the community of scientists and philosophers ought not be of stable γ-type, but, rather, should have a transformative structure of α–β–α–... transitions.[3]

[3] Max Planck's famous dictum *Science advances one funeral at a time* shows that γ-type or conservative form of revision prevails, the ironic tone shows that this is a sordid fact.

Appendix: a consequence for the philosophy of science

- The project of finding distinguishing properties of scientific discourse within the syntax and semantics of its language (like the one conducted within the theoretical framework of logical empiricism) is nowadays generally regarded to be unsuccessful.
- According to the analysis presented here it is within the semiotic dimension of pragmatics where the "demarcation line" between science/philosophy/ and non-science/philosophy/ ought to be sought for.
- It is the type of reconstruction that defines the scientific/philosophical/ discourse as the one where the knowledge is built within a non-conservative transformative structure of α–β–α–... types of equality distributions of communicative authority..

Prototype $\mathcal{L}_{\text{effect}}$ dynamic modal language for communication theory

Definition (The prototype language $\mathcal{L}_{\text{effect}}$)

$$\mathcal{L}_{\text{world}} \quad p \text{ is a sentence of propositional logic}$$

$$\mathcal{L}_{\text{reality}} \quad \varphi ::= p \mid \neg\varphi \mid (\varphi \wedge \varphi) \mid \Diamond\varphi \mid \mathrm{D}_{\mathsf{i}}\varphi \mid \mathrm{B}_{\mathsf{i}}\varphi \mid \mathsf{i} \text{ stit } \varphi \mid \mathrm{O}_{\mathsf{i}}\varphi \mid \chi$$

$$\mathcal{L}_{\text{utterance}} \quad \xi ::= !\mathsf{i} \text{ stit } \varphi \mid \cdot\varphi \mid \cdot\varphi \rightarrow !\mathsf{i} \text{ stit } \varphi$$

$$\mathcal{L}_{\text{locution}} \quad \chi ::= \mathsf{i} : \underline{\xi}$$

$$\mathcal{L}_{\text{effect}} \quad \epsilon ::= \varphi \mid [\chi]\epsilon \mid \neg\epsilon \mid (\epsilon \wedge \epsilon) \mid \circledast_{\mathsf{i}}\epsilon \mid \ulcorner \circledast_{\mathsf{i}}\varphi \urcorner \in \Psi(\mathsf{i} : \underline{\xi})$$

Cf.

Žarnić, B. (2013)
Logical roots of linguistic commitment.
In *Theory of Imperatives from Different Points of View, vol. II*. Eds. A. Brożek, J. Jadacki, and B. Žarnić. Warsaw: Wydawnictwo Naukowe Semper.