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A mentalist framework for linguistic and extralinguistic communication

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Abstract. We outline some components of a mentalist theory of human communicative competence. Communication in our species is an intentional and overt type of social interaction, based on each agent's capability of entertaining shared mental states and of acting so as to make certain mental states shared with the other. Communicative meaning is a matter of ascription: it is not an intrinsic property of a communicative act, but is instead created here and now as the shared construction of the interlocutors. We then discuss how communicative actions are superficially realized by our species, focusing in particular on the difference between linguistic and extralinguistic (that is, gestural) means of expression. Linguistic communication is the communicative use of a symbol system, whereas extralinguistic communication is the communicative use of a set of symbols. The difference turns out to be a matter of processing rather than of intrinsic structure.

Keywords. Human communication, communicative competence, mental states, shared belief, communicative meaning, linguistic actions, extralinguistic actions.

Introduction

In this paper we outline some components of a mentalist theory of human communication. We start with a distinction between communication proper and social interactions at large. Any situation where an agent's mental states are affected by a behavior or state of being of another agent is an instance of social interaction, but all social interactions are not communicative.

Communication is a special type of social interaction whose distinctive features are intentionality and overtness. These depend in turn on each agent's capability of entertaining shared mental states and of acting so as to make certain mental states shared with the other. Our theory of human communication is therefore cast in terms of the mental states types that an agent has to be able to entertain in order to have the capability of engaging in a communicative interaction and of the modifications that these states undergo in the course of the interaction itself.

This view of communication allows us to give a strictly mentalist definition of the concept of communicative meaning. Communicative meaning is a matter of ascription; it is not an intrinsic property of utterances and other communicative actions, but is instead created here and now as the shared construction of the agents involved.

We then draw a further distinction between communication, viewed as a cognitive faculty, and the means of superficial expression that an agent may utilize to make her communicative intentions manifest to and shared with a partner. We focus in particular on two such means of expression, namely linguistic communication and extralinguistic (that is, gestural, in a broad acceptation of the term) communication. In discussing the main features of these two modes of expression, we argue that the former is the communicative use of a symbol system and the latter is the communicative use of a set of symbols.

Finally, we discuss the relationship between our views of the nature of communicative meaning and of the nature of communicative actions. The difference between the linguistic and the extralinguistic modes of expression turns out to be a matter of processing rather than of intrinsic structure.

Varieties of social interactions

Any situation where an agent's mental states are affected by a behavior or state of being of another agent is an instance of *social interaction*. We discriminate between two varieties of social interactions, which we will call *information extraction* and *intentional communication*.

Information extraction

The first type of social interaction occurs when the affecting agent has no overt intention to alter the mental states of the affected one. E.g., if Ann sneezes Bob may infer that she has a cold; if her shirt clashes with her gown he may infer that she has no style, and so on. Bob may construe some of these events (like sneezing) as unintentional of Ann and others (like dressing) as intentional, but, unless he construes them as overtly directed toward him, he will have no reason to suppose that Ann *intended to communicate* to him that she has a cold or that she has no style.

These situations may be accounted for by an extension of Grice's (1957) notion of *natural meaning*. Natural meaning requires no intentionality other than that of the cognizer: if you think to yourself "Those black clouds mean rain", the verb *mean* implies no true meaning, intentionality, or cognition on the part of the clouds. What happens is simply that you notice a certain event or phenomenon (namely the clouds), from which you think you may legitimately draw some inference (namely that it is going to rain).

A similar account may be given for situations like the above, where Bob autonomously infers something about Ann from the observation of some action or event in which she is involved. We have an instance of *(social) information extraction* whenever agent *x*'s mental states are affected by agent *y*'s actions or state of being, with no recognition, on the part of *x*, of an overt intention of *y* to achieve that effect.

It may be worth remarking that we are taking the observer's standpoint in this analysis. What makes the difference between information extraction and true communication then is whether he construes the events in which the actress is involved as (*a*) intentional on her part, and (*b*) as overt, that is, manifestly directed toward him.

Thus, Ann might actually have had the intention of having Bob infer that she has a cold or that she has no style, as part of some private plan of hers. Even if Bob should detect Ann's hidden plans, however, our analysis would not change, because condition (*b*) would not be satisfied anyway. Analogously, in the dressing example, Bob's inference might be viewed as an undesired side effect of Ann's plan to indeed communicate something quite different to him (or to whatever agent observes her). This, again, leaves our analysis untouched, because condition (*a*) would not hold anyway. Intentionality and overtness, to repeat, are definitional of true communication.

Intentional communication

In Grice's (1957) analysis, non-natural meaning (that is, intentional communication) involves instead two cognizers, the one overtly intending that the other construe her actions as communicative. Thus, if Ann says to Bob "Take an umbrella when you go out: the TV said that it's going to rain" we have a true instance of communication if and only if she, by uttering that sentence, intends: (*i*) to induce Bob to take an umbrella, (*ii*) to let Bob recognize intention (*i*), and (*iii*) to have this recognition be (part of) Bob's reason for taking an umbrella.

As shown by Strawson (1964) and Schiffer (1972), however, this account lends itself to certain counterexamples (concerning in particular keyhole recognition) that can only be avoided if Ann also entertains an intention (*iv*) that her intention (*ii*) be recognized, an intention (*v*) that her intention (*iv*) be recognized, and so on.

Grice's account thus falls into an infinite regression since, for any *n*-th intention that the agent entertains, it is always necessary that she also entertain an (*n* + 1)-th intention that that intention be recognized. An infinite nesting of mental states, however, is obviously impossible in the real world, making this definition of communication unacceptable.

This problem can be avoided if Grice's account is so modified as to deal with communication in terms of shared mental states. Airenti, Bara and Colombetti (1993) and Colombetti (1993) have proposed that *shared belief* be defined as a primitive mental state: an agent shares that *p* with a partner if and only if she believes both that *p* and that the partner shares that *p* with her.

This allows Airenti, Bara and Colombetti (1993) to also redefine *communicative intention* as a circular primitive of the same sort: in particular, as an agent's intention to overtly make some mental states of hers shared with the partner. That is, an agent intends to communicate that *p* to a partner if and only if she intends to make it shared with him both that *p* and that she intends to communicate that *p* to him (see also Colombetti, in press).

In this account, sharedness is a state of an agent's mind (and therefore a one-sided one) rather than a state of the world. The intentionality of communication is therefore, from the standpoint of the addressee, a matter of ascription. That is, he may wrongly take the actress's behavior as communicative or vice versa, or as communicative that *q* instead of (as in the actress's intentions) communicative that *p*, thus giving rise to different types of failures, misunderstandings and exploitations. (By the way, this should also help clarify our interpretation of the examples made in the subsection on information extraction.)

Strong empirical evidence has been collected in neuropsychology and developmental psychology in favor of a sharedness-based approach to communication (e.g., Airenti, 1998; Bara, Bosco & Bucciarelli, 1999a, 1999b; Bara & Bucciarelli, 1998; Bara, Bucciarelli & Geminiani, 1999; Bara, Tirassa & Zettin, 1997).

Communication as competence

The idea that communication requires primitive, dedicated mental states and specific types of inference has led to defining it as *competence*, that is, as a mental faculty that is yielded by the functioning of a distinct, innately specified mental organ (Bosco & Tirassa, 1998; Tirassa, 1997).

The main difference, with respect to other competence-based theories that have been proposed for language (Chomsky, 1980), for visual perception (Marr, 1982), and in much evolutionary psychology (e.g., Cosmides & Tooby, 1994; Cosmides, Tooby & Barkow, 1992), is that communicative competence is here defined in terms of mental states instead than of computational submechanisms. This has both a philosophical import (Tirassa, 1999a) and some remarkable consequences on how the architecture of the human mind/brain is conceived of (Tirassa, 1999b).

In the next sections we discuss some relationships between communicative competence, viewed as a specific mental process, and the superficial means that humans may

actually employ in order to express and understand each other's communicative meanings in dialogue.

Communicative actions and communicative meaning

We have defined communication as intentional social activity overtly aimed at affecting a partner's mental states via the joint movement on a (one-sided) shared common ground that is (one-sidedly) built, updated, and maintained by the interlocutors.

Communicative meanings are then to be dealt with in terms of ascription. The meaning of a communicative action is that which each agent involved shares with the other about a certain event (like an utterance) brought about by one of them. Thus, if Ann points at the door while communicating with Bob, the communicative meaning of her action is to be found in the interpretation that they share of it: e.g., as a request to him to leave the room, if they are quarreling; as a request to him to open the door, if someone has knocked, and so on.

This position may be contrasted, on the one hand, with the idea that the common ground is objectively given to the interlocutors, something which they can or cannot access, and, on the other hand, with the idea that certain actions are intrinsically endowed with a communicative meaning that they just convey to the interlocutor. In our account, actions have no communicative meaning *per se*: their communicative meaning is instead to be found in the mental states that each party takes as shared with the other. Therefore, the literal interpretation of an utterance has no primacy in the comprehension of its communicative meaning: there exists no fixed, pre-defined repertoire of communicative meanings or actions. Communicative meanings are instead created here and now as the shared construction of each agent involved.

It is a consequence of his account that it will sometimes happen that each interlocutor ascribes a different communicative meaning to a certain action, while mistakenly taking it as shared with the other. This may give rise to failures and misunderstandings that, however clear from a "God's eye" viewpoint, will only become manifest to the agents when an actual breakdown occurs, e.g., when one acts so to make it impossible to the other to still believe (or assume) that the communicative meaning she gave to a previous utterance is indeed shared.

Types of communicative actions

While communication *per se* is better described at the level of the mental states involved, communicative actions may be superficially realized in several ways. We will distinguish here between *linguistic* and *extralinguistic* modes of expression, describing the former as the communicative use of a symbol system and the latter as the communicative use of a set of symbols.

Linguistic communication

Linguistic communication is the communicative use of a symbol system. Language is compositional, that is, it is made up of constituents rather than parts. This means that linguistic expressions may have either an atomic or a molecular structure; the constituents of a molecular expression may be either atomic or molecular in their turn. The semantic content of a molecular expression depends on its overall (syntactic) structure as well as on the semantic content of its constituents.

Thus, the meaning of a sentence like "The cat is under the table" results from the meaning of its constituents ("the cat", "is", "under the table") and subconstituents down to the atomic level ("the", "cat", "is", "under", "the", "table") and from the overall struc-

ture in which they are arranged ("the cat is under the table" rather than "the table is under the cat", or "table the under the is cat").

Compositionality allows for the following characteristics of language:

1. *Systematicity.* Language is not punctuated: the capability of dealing with (that is, generating, understanding, drawing inferences from, etc.) certain sentences is intrinsically (that is, non arbitrarily) connected to the capability of dealing with certain other sentences. Thus, an agent who is able to deal with the sentence "The dog chases the cat" should also (and, crucially, for the very same reasons) be able to deal with sentences like "The cat chases the dog" or "The policeman chases the thief" and so on — provided, of course, that the relevant lexicon is available.

2. *Productivity.* Linguistic competence allows an agent to deal with an indefinite number of meanings: an individual who can deal with abstract compositional meanings (like "*x* chases *y*", or, in general, "*x* does *f* to *y*") will also be able to deal with an indefinite number of particular instances of theirs.

3. *Possibility of displacement.* The spatial and temporal frames of reference to which language points may be different from the actual ones. This may require that predefined, special-purpose indicators (like "yesterday" or the past tense of verbs) be used, but what is important is the capability of systematically creating dislocated frames of reference, like "at place *p*" or "at time *t*", where *p* and *t* may be substituted for by whole domains of referents.

Let us be clear that we are not taking any specific stance as to the nature of linguistic competence; in particular, we do not subscribe to the views that syntax is a set of unconscious rules represented in the mind/brain or that cognition consists in the linguistic (that is, syntactic) manipulation of symbols. What we are saying is only that linguistic communication may be viewed as *the communicative use of* a symbol system that is shared among the interlocutors.

Extralinguistic communication

Extralinguistic communication in the human species comprises an array of activities like gestures, drawings, melodies, rhythms, etc.; our focus here will mainly be on gestures.

A distinction needs first be drawn between communicative and noncommunicative gestures. It follows from our discussion of the various types of social interactions that gesticulations accompanying speech, paralinguistic phenomena (prosody, intonation, and so on), facial or postural manifestations of emotions, etc. are generally noncommunicative. An agent's mental states may certainly be modified by the actress's gesticulating, frowning, or blushing, but this is an instance of communication only insofar as he construes it as intentional on her part; else, it is better viewed as an instance of information extraction. (Of course, the actress may so exploit the addressee's inferential powers as to have him infer something — once again, this is only communicative insofar as it is overt).

Let us instead remind that sign languages like American Sign Language or Lingua Italiana dei Segni have a linguistic, not a gestural, nature. They have an arbitrary lexicon and an arbitrary, compositional, and productive syntax, and their patterns of acquisition in the child and of decline after neuropsychological damage, as well as the brain areas involved, are the same of "normal" language (Petitto, 1987; Poizner, Klima & Bellugi, 1987).

Both points relate to our position that communication and the events that realize it do not have a behavioral or objective nature: the generation and the comprehension of communicative actions are better understood in terms of communicative meanings and mental processes, therefore in a mentalist framework.

Extralinguistic communication is the communicative use of an open set of symbols. That is, it is not compositional: it is made up of parts, not of constituents. This brings to crucial differences from language:

1. *Associativity.* Extralinguistic communication has no systematicity. The communicative meaning of each symbol ends in itself: there is no superordinate, molecular structure. This does not mean that symbols have to stand alone: they may partake in

complex communicative actions, whose communicative meaning is however construed by association (that is, juxtaposition) rather than composition. If Ann points at Bob and then at the window with the intention to communicate to him that she wants him to close it, her action is extralinguistic in that it is no compositional: the deictic symbols for "Bob" and "the window" are instead juxtaposed. Of course, she might have achieved a similar effect by producing a linguistic action like uttering "Would you please close the window, Bob?". An agent's choice between the expressive means available to her depends on several factors which we will not discuss here and allows further inferences on the part of the partner's.

2. *Practical constraints on productivity.* In principle, even in the absence of a compositional competence, the set of extralinguistic actions available to a community of human agents is open, that is, it has an indefinite size, as yielded by our capability of conventionalizing and learning. In practice, however, to go beyond certain limits would pose insuperable problems in terms of acquisition, memory, recognition, reasoning, etc. Thus, there often is little point in adding a new gesture which will probably be used once and never again: such accretion is more useless than impossible and, in any case, would not be *productive* in the same sense in which language is, that is, as an intrinsic competence feature and a consequence of compositionality.

3. *Irrelevance of displacement*. To point to a spatially or temporally remote frame of reference is not logically impossible in extralinguistic communication: people might, in principle, share gestures for "in the year 1962" or "in North-Western Italy". The problem is that there is no structure for the systematic generation and understanding of these expressions, such as to make it intrinsically possible to generate and understand analogous gestures for "in the year 1963, 1964, …" or "in North-Eastern, Central, Southern, … Italy", and so on. Displacement in extralinguistic communication is thus impossible, or useless, in practice, rather than in principle. This is again a consequence of its noncompositional nature.

Conclusions

Our discussion of human communicative competence and of its modes of expression is not cast at the behavioral level, because that is not the right level at which to capture these phenomena (or, for that matter, any mental phenomenon). Actions are neither intrinsically communicative nor intrinsically linguistic or extralinguistic: instead, their nature is better viewed as a matter of processing.

Communicative actions are typically made up of a complex mixture of linguistic and extralinguistic aspects. Each component of the cognitive system will process anything it can: the communicative meaning will result from the balance of these different activities.

Thus, the language module will process whatever aspect of the situation looks like language, no matter whether the input is auditory, visual (e.g., reading, reading lips, reading a sign language, etc.), tactile (e.g., Braille) etc. To say that something "looks like language" should be referred to the types of regularities that the language module can capture in the event observed. Simultaneously, other cognitive subsystems will process other aspects of the communicative situation, that will be called extralinguistic and referred to other types of regularities in the event observed.

A remarkable example of cooperation between the different subcomponent of communicative competence can be observed when we encounter a text in a foreign language we do not speak: we look for recognizable parts of the text (like words that resemble those of some language we speak) and use them to build associations and fragments of sentences, stretching our linguistic and extralinguistic knowledge to their maximum extents.

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