Can we resolve ambiguity by email?

Comparing Computer Mediated Communication with Face to Face Communication in the Real World

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"When young children name pictures, by themselves and by others, they name them based on the intent of the artist, and do not rely on what the picture looks like." (Paul Bloom, 2001)

Abstract

In this article I want to concentrate on the language and communication aspect of email, more specifically the capacity to resolve ambiguity, using email compared to face-to-face communication. Email cannot replace the fullness of Face-to-Face communication; it is only an extra channel with limited utility. It's useful in situations we can express ourselves unequivocal, but it cannot resolve ambiguity neither uncertainty caused by ambiguity. In such a situation email rather adds to chaos. People can stand a big deal of ambiguity in face-to-face communication without causing any serious problem; by email it does cause problems. But let's put this point straight also, email isn't to be ambiguous per se. In a well-defined communication frame or/and between people that also meet Face-to-Face it can tackle uncertainty where there is a missing information link, it's very useful in preparing or rounding up face-to-face meetings, but it cannot handle ambiguous situations. There are two main reasons why: 1) Pragmatics states and proves that language is embedded in an interaction system that cannot be coded univocally 2) our language system is embedded in a system of mirror-neurons that supposes Face-to-Face communication to resolve ambiguity.

Introduction

There are 2 peculiarities concerning my research so far that I must mention before I start: I stepped outside the Internet (after some 14 yrs of using it) for more then a year and I only stepped back in the Net after my ideas were quite outlined. My idea was to take a certain distance from my research subject. Secondly I rather leafed through a diverse literature at the edge of my investigation field before diving into the CMC literature. A lot of CMC literature is biased. The Internet bubble was the consequence of a hegemonic discourse as I showed in 'Gaten in het geheugen van de Wetenschap, het Biological Computer Lab (BCL)'[1] (2003). 'Internet Linguistics' is quite new and linguists are only now starting to line out a frame of reference for it (David Crystal, 2005, Herring, 2001). And above all Pragmatics demands an interdisciplinary approach.

Poor language

A limited vocabulary…

Communication between men takes place mediated by language. Human life in its present form would be impossible and inconceivable without the use of language. Compared with other mammals we have an extended set of codes associated with sounds that give meaning to words used in sentences... A gorilla may have the ability to understand about 200 codes (the number varies depending on the experiment). Webster's Third New International Dictionary of the English Language (1961) contains more than 450,000 entries the same number we find in the 'Woordenboek der Nederlandsche Taal' (1500-1976, http://wnt.inl.nl/) Of course we do not use all these words, but we use a lot as a native speaker, without being aware we use them, they are there since we learned language from our mother, by social interaction and at school. By three years of age children are learning at least two new words a day and possess a working vocabulary of 1,000 words. The average English-speaking 17-year-old knows more than 60.000 words. Some adults have a vocabulary of over the 100.000 words. (Bloom, Paul, 2002) The 'lingua franca' of the Internet is English, but only a small number of Internet users really have an extended knowledge of the English language. When you wander through cyberspace you notice impoverishment and superficiality. People who aren't native speakers of English use an English vocabulary limited to about 1000 words (the vocabulary of a 3 year old).

results in lack of humour…

Unless people use their native language or local slang, this does not only result in a childish like communication by adults it has also some consequences one does not think off at first. During my long stay on the Net I noticed I gradually was loosing my sense of humour[2]. I've been wondering why. Galina Kalmikova enlightens the question. She states:

> "The perception of a joke is determined by many factors, not in the last place by the language competence and knowledge of characteristic features pertaining to a specific cultural environment. The perception of a joke is quite often caused by the fact that the recipient not only understands the language and external shapes of the characters in the joke, but that (s)he is also familiar with scripts and cliché-phrases. Due to these factors, jokes are not clear to children who have not yet seized scripts and clichés, characteristic for jokes. The same goes for the carriers of other cultures even if they know the language of the joke well." (Galina Kalmikova, 2003).

So when communicating with people having only a vocabulary of 1000 words, there isn't much to laugh about. To trigger laughter with their colleagues, employees send jokes around. They get these jokes on specialised sites, like jokes.com. They seem to lack the creativity to make jokes themselves. These jokes are mostly some kind of picture, small film, thus not verbal at all. Before employees met at the coffee table. They made jokes on work situations, on bosses.

[1] http://home.versateladsl.be/vt6204613/daniel/SCI/bcl/index.html

[2] Thanks God, I had a rather intensive social live outside my job.

Jokes are often a binding factor in small groups. They foster solidarity. An entire joke culture would be disappearing if we limit our communication to email.

Humour is often based on paradoxes. Problems we have to solve contain paradoxes and contradictions[3]. Contradictions and paradoxes can be easier solved when we meet Face to Face. Paradoxes often trigger laughter, but problems are solved, contradictions have to be worked out, have to be eliminated. Using email, paradoxes lead to misunderstanding and the typical ping-pong of email exchange that solve nothing at all, contradictions often lead to conflict.

cannot convey feelings…

A limited vocabulary is also annoying and obstructive when expressing emotions. Language isn't limited to conceptualisation, expressing factual information, inquiries or requests. A person's speech, supplemented by facial expression and gesture when speaker and hearer are mutually in sight, indicates and is intended to indicate a great deal more next to humour: emotions and feelings, tastes, tempers, all kind of mental states. These vary rather analogous than discrete, they aren't monotonous and apt to digitalize. Though Jaak Panksepp wants us to believe that we share our emotional circuits with mammals, and that all of our emotions can be reduced to seven: anger, care, fear, raw game, lust, exploration drive and panic or separation grief, the communication tools we have to express them are excessive. Let's take the exploration drive as an example: starting by curious, enquiring, inquisitive, questioning, probing, nosy, prying, snooping, suspicious, suspect, doubtful, dubious, queer looking, distrusting… we notice that we have a lot of words for explorative behaviour. But at the end of the line we notice relevant changes.

Imagine the following conversation:
'What are you looking at?'
'Oh, I'm just curious.' either 'I don't trust that guy.'

It's a world from differences using the same mammal circuit, or did we end up in the fear circuit? Emotions are mixed, they can be contradictory and one emotion incites another but not always the same. Men react on a threat by a 'fight or flight' response, while women mostly react by mediating behaviour, a care response. Sometimes lust and fear are close, lust and pain also. But to Panksepp it's all the same mammal circuits. How many synonyms do we use for mad, lovely, beautiful, in love? Well they are all about lust. But a guy, whose speech is limited to the word 'horny', will have some problems finding a lady, I'm afraid. We can offer him a small language course. In the different regions of the UK different words are used for one and the same thing, we give here the top 10.

1. Dosh ,
2. Dough
3. Readies
4. Brass
5. Bread
6. Wad
7. Lolly
8. Wedge
9. Wonga
10. Moolah

Well he can now at least say to the whores he has cash in his pockets.

[3] Paradoxes and contradictions are not the same, therefore I copy the entries in Merriam-Websters:

con.tra.dic.tion n (14c) 1: act or an instance of contradicting 2 a: a proposition, statement, or phrase that asserts or implies both the truth and falsity of something b: a statement or phrase whose parts contradict each other <a round square is a ~ in terms> 3 a: logical incongruity b: a situation in which inherent factors, actions, or propositions are inconsistent or contrary to one another

par.a.dox n [L paradoxum, fr. Gk paradoxon, fr. neut. of paradoxos contrary to expectation, fr. para- + dokein to think, seem--more at decent] (1540) 1: a tenet contrary to received opinion 2 a: a statement that is seemingly contradictory or opposed to common sense and yet is perhaps true b: a self-contradictory statement that at first seems true c: an argument that apparently derives self-contradictory conclusions by valid deduction from acceptable premises 3: something or someone with seemingly contradictory qualities or phases

It will not suffice to have left only 7 words to express our feelings, unless we want to retreat into the mammal world. The learning of a human language is a thorough learning process. But also most emotions that lead to complex actions incite a learning process. Most sexologists claim that making love has to be learned? In all this activities a lot of communication is involved. When will our human core businesses: communications get the attention it deserves? When there are no words left over to talk about it? Well on the Net it is seems to be happening sometimes.

The (subtle) differences in emotions, feelings, sentiments, tempers and mental states can be expressed by a great number of words. The fact that these differences are expressed by parts of a language usually mastered later by foreign learners gives rise to misinterpretation and often makes foreign speakers appear rude or insensitive when they are, in fact, simply deploying fewer resources in the language. So we can also expect that if a limited vocabulary is used on the Net, it will induce rudeness, cause misinterpretation and misunderstanding.

doesn't show you at all

Within the range of the structural and lexical possibilities of a language, speakers are able to convey their emotional attitudes and feelings toward the person or persons they are addressing and toward the subject matter of what they are saying. But deceit is also conveyed by language. People are also able to conceal their feelings as one form of linguistic deception, though this is usually a harder task when they are talking Face to Face. A person's speech is supplemented by facial expression and gesture when speaker and hearer are mutually in sight. Wiener did a lot of research on the feedback mechanisms in communication and today there is a lot of literature available on the subject. Although I'm afraid a lot of modish cyber freaks do not know what Wiener had to say about feedback in cybernetics. On the Net (unless you have some shivering images due to the typical delay of digital communication when using a Web cam) body language cannot be exchanged. If we have a Web cam we should at least be connected on a free 5Mb channel otherwise synchronisation is inexistent, and still text will travel faster then images. In email, intonation, gestures, posture that support the interpretation of our words are absent… so we are missing a lot of our tools for interpretation. It's a tough job. As early users we were perfectly aware of this. A new code, the code of emotes was created to replace these tools, it's a start.

I've been countering poor language use and one might ask, what if we are using complicated language on the Net? The impoverishment of language on the Net is a worst-case scenario. It isn't bound to happen. People can adapt to new constraints, and probably they will. But, can we resolve ambiguity by email under the circumstances a sophisticated language is used. If face-to-face communication is nothing more or less then a code system, there is no reason why speech wouldn't be transposed in writing, thus replacing face-to-face communication with ease. But there are two ways to conceive of how thoughts can be communicated from one person to another. The first way is through the use of strict coding and decoding, which makes explicit use of symbols, rules, and language. The second way is by making interpretive inferences, which communicate to the hearer information that is left implicit.

The bootstrapping problem

The code model has the advantage of simplicity but if it has to cover all forms of human communication it suffers from some important inconsistency: How does a child learn to speak, learn the code, having no basic code available to start with? In engineering we call such a problem, the bootstrapping problem. The inference model doesn't need a code to start with. As to Sperber inference takes place spontaneously all the time:

> "Humans spontaneously interpret one another's behavior, not as simple body movements, but as the belief-guided fulfilment of intentions." (Dan Sperber, Gloria Orriggi, 2006)

How does a 1 to 2 year old baby infer the meaning of his mother's intentions? Can a baby read his mother's mental states; represent its mother's intentions mentally? The intentions of

mother and child are quite straightforward and maybe what's more important, they have no alternative: the mother and the baby will both be as clear as possible to show their intentions. The capacity of mind reading by two year old children has been demonstrated. Infants have a grasp of the mechanics of communication even before language begins.

A child is able to grasp the intentions of another person before it acquires spoken language as was shown by an experiment of Terje Falck-Ytter and Claes von Hofsten. At Uppsala University in Sweden they recruited three groups of subjects: adults, 12-month-olds, and 6-month-old infants. The researchers showed each group a video of an actor's hand moving toys into a bucket nine times. With each repeated viewing, the team measured the amount of time it took the volunteers to look at the bucket. After the first viewing, adults and 12-month olds started gazing at the bucket even before the hand arrived at it, indicating that they knew the intention of the actor. But 6-month olds never looked at the bucket until the actor had placed the toys inside. It just so happens that the motor skills needed to move an object into a nearby container develop at the age of 7 to 9 months. (Falck-Ytter, Terje, von Hofsten, Cleas, 2006) Infants only a few hours or days old have been shown to imitate a wide range of facial expressions (eg, tongue protrusion, mouth opening, widened/pursed lips, eye blinking or happy/sad/surprised expressions), manual gestures (eg, hand opening/closing) and vocalizations. The fact that the activation of the inference system precedes the acquisition of language is an indication for it's predominant role in language acquisition as found in developmental research (Papafragou, Anna, 2002, Happé, Francesca, Loth, 2002). In his often quoted summary 'How Children learn the Meaning of Words' Bloom pointed to the 'Theory of Mind' (mindreading) as important mechanism for word learning:

> "This is that children learn words through their sensitivity to the referential intentions of other people, through use of "theory of mind". Because of this, the best way to teach a child an object name is to make it as clear as possible that you are intending to refer to the referent of that name; and the best way to do this is to point and say the word. In this way, the child can infer that the speaker means to pick out the dog when using this new word, "dog", and the meaning will be quickly and accurately learned." (Bloom, Paul, 2000)

Apes don't point (see Kita, Sotaro, 2003), they don't seem to be able to read pointing neither while human infants invariably seem to point before they speak. Though little children may be called little apes sometimes, they have a lot more brains then apes. Experimental studies show that infant pointing at 12 months already is a communicative act which involves the intentional transmission of information to share interest with, or provide information for other persons. (Liszkowki, Ulf, 2005)

Because we can deduce the intention of our face-to-face speaker, even a very cryptic message suffices to understand what she/he means, even if communication is speechless. Children understand the language of speechless communication often better then grown-ups. In an education context the intentions of parents towards children from 3 yrs until 12 yrs old is quite clear. In that period children tend to accept the authority of their parents without much arguments. Most of the time a severe look is enough to indicate a child is breaking some rule that has been made explicit to it by one of the parents before. Maybe a father doesn't think about punishment on the moment he gives his child that severe look, the child interprets it that way.

Does a baby learn language by copying or imitating what its' mother/fathers, other persons say: a widespread opinion?

> "As Chomsky pointed out long ago, members of the same linguistic community do not learn to speak by copying the sentences they have heard. Most sentences of a language are uttered, if at all, only once, and, therefore, the overlap between the sets of sentences heard by two learners of the same language is quite small. If they learned their language by copying, language learners would end up speaking not just languages quite different from one another, but also languages quite different from those humans speak." (Dan Sperber and Gloria Origgi, 2000a, p.6)

We are not monkeys. Language learners do not copy, they work on what they hear, they sift, sort and analyse all linguistic input. This way they acquire the grammar and meaning of words, not by imitation but by working intensively with the language material they are been offered.

The code model versus the inference model

Do we communicate mere by a code system? Pragmatic linguistics (Ducrot, Grice, Levinson, Sperber & Wilson) and also Chomsky before them have refuted this limitation more than once. They object that the same sentence can be used to communicate an indefinite number of different messages that cannot be retrieved by simple decoding.

> "But another very important aspect of pragmatics is concerned with inferences that are invited – or implicated – rather than required or triggered by the semantics: often, synonymous expressions will have different implicatures." (Levinson, 1998; p. 8)

Take, for example, the sentence: "It's going too fast" This very ordinary sentence does not present any particular linguistic difficulty. Yet, it can be used to convey an indefinite number of meanings, for example: I cannot keep up, life is going to fast; The chemical reaction is too fast this thing is going to explode; You are driving too fast, you are going to take a ticket. If the laboratory assistant doesn't grab the intention of the professor's words, e.g. that he has to add some solvent to slow down the chemical process they both might be blasted away. If the hearer doesn't succeed in tracking down the intention of the speaker the communication will fail. This could be dramatic in the case an explosion is imminent.

In this example we might suppose some procedures will be agreed upon beforehand, yet the sentence: 'It's going too fast', doesn't necessarily mean things are going to explode. To grip that intention, the laboratory assistant must have some access to the mental states of the professor. Using some naïve psychology, that is the ability to represent the mental states of the professor (a slight panic in his eyes), he finally understands that he has to take action according to the procedure they agreed upon. The professor on his side had the intention to let the laboratory assistant take action. In inferential communication the communicator seeks to fulfil his intention, to reach his goal by making it manifest to the hearer. Summarising: the hearer understands the speaker whose intention it was to influence the mental states of the hearer, by gripping his intention using some naïve psychology. This might be a fairly complex process. It was the philosopher Paul Grice (1957) who first developed this point of view.

An important characteristic of the inference model is that it supposes overt communication that contains some risk. The hearer might become suspicious when she/he detects a communicator wanting to influence her/his mental state, but if the hearer is willing to understand the communicator:

"overt communication makes it possible to transmit at very little cost contents as rich and precise as one wants.' (Dan Sperber, Gloria Orriggi, 2006)

Information spinning, image building, advertising and as we know now also banking… are activities based on the art of deceit. I'm talking about well respected citizens in a well respected world, whose authority is based on hiding their real intentions. On the other hand, children do not tend to hide their intentions, what's of cause an advantage in communication. When refugee children are entering our country, often speaking languages having no link with our language at all, they learn to speak our language in a few months. Of course children have a greater capacity to learn new things then adults, but these children initially do not learn the new language in dictionaries or text books, they learn it first through experience, through mirroring other children during observation, social interaction and play, and then they take the books at hand. I think also there is another reason why children learn easily from other children, and that is completely compatible with what Sperber states: children do not hide their intentions and if they do it it's part of the game, they hide and they show themselves again, but they are mostly transparent. Using inference we do not need to share exactly the same code, inference seems to work also when we do not share a code at all.

Another example from Dan Sperber to show the capacity of face-to-face communication using inference: When Paul sights to Mary when they are together on a party: I'm beat,' the chance that Mary will answer: 'Well let's go home then,' does not surprise us. Why? Is it relevant that Paul is uttering he is only bored, a little tired or very tired. In this situation it doesn't. Mary immediately understood what Paul was up to.

As to Sperber, inference gives us the possibility to resolve ambiguity.

> "Quite commonly, a fragmentary, ambiguous and loose coding is sufficient, in the context, for indicating a complete and unequivocal meaning." (Dan Sperber, Gloria Orriggi, 2006)

> "The central claim of relevance theory is that the expectations of relevance raised by an utterance are precise enough, and predictable enough, to guide the hearer towards the speaker's meaning. The aim is to explain in cognitively realistic terms what these expectations of relevance amount to, and how they might contribute to an empirically plausible account of comprehension." (Dan Sperber and Deirdre Wilson, 2004)

Interpretation depends on implications and presuppositions for example, "Has he stopped bothering you?" presupposes the proposition that you and I know that he has been bothering you, and asks whether this has stopped. Discourse analysis is not only about 'what is said' but also about 'what is talked about'. Text, as a set of textual features, is used to carry discourse. But, text only becomes discourse when it is put in relation to context.

'It's a long time we visited your mother'

When this sentence is uttered in a zoo by a man addressing his wife in front of the elephants' cage, we understand immediately the irony in this sentence. Indeed, the discourse of the man – or what the man talks about - is not at all about visiting his wife's mother, but instead revolves around a comparison between an elephant and his mother-in-law. Clearly, as well, the discourse is not just about elephants or the zoo, which were the environmental circumstances used to comprehend the utterance.

The pragmatic meaning of a text, that is, its discourse, is always achieved in relation to an extra-linguistic reality that is called context. Indeed, discourse is usually intended to address something outside itself, an extra-linguistic reality, and context is what makes the connection between this reality and the text. It is a central and essential claim in Pragmatics, which actually delimits its area of inquiry, that language is always uttered in context, that is, as a response or an address to an extra-linguistic reality. (Widdowson, H.G.,2004, p. 8) Relevance Theory[4] can be sketched as:

> "Intuitively, an input (a sight, a sound, an utterance, a memory) is relevant to an individual when it connects with background information he has available to yield conclusions that matter to him: say, by answering a question he had in mind, improving his knowledge on a certain topic, settling a doubt, confirming a suspicion, or correcting a mistaken impression. In relevance-theoretic terms, an input is relevant to an individual when it's processing in a context of available assumptions yields a positive cognitive effect." (Dan Sperber, Deirdre Wilson, 2004)

> "In this respect, inferential comprehension is not different from any other cognitive process of non-demonstrative inference that draws relatively reliable conclusions from fragmentary evidence open to multiple interpretations by relying upon both empirical regularities and context." (Dan Sperber, Gloria Orriggi, 2006)

Human communication can be defined as a circular and overt attempt to modify a partner's mental states. This requires each party involved to possess the ability to represent and understand the other's mental states, a capability which is commonly referred to as mind reading, or theory of mind (ToM).

[4] See for a complete delineation: http://www.dan.sperber.com/relevance_theory.htm

(Mutual) understanding can be defined as the inference of the intention of a speaker from a multitude of cues: text decoding and disambiguation, foregrounding presuppositions that are in the background, interpreting interpersonal, visual and temporal context, body language, haptic information, intonation, rhythm, attitude, facial clues and emotional expressions, local habit, environmental cues, prejudices, relationships, appointments and engagements, shared experience, shared values, situation and settings, cultural factors, enacted roles and social-economic context resulting in a shared reference. This list is not limitative and the layering will differ from case to case.

Concluding our view on the code model:

> "Relevance theory takes a different approach. It characterises communication as a different type of social process than does the code model. From the point of view of the code model, communication can be described as social because it is a form of interaction, but the abilities it presupposes in communicators are signal-oriented rather than other-oriented. All an encoder has to do is produce a signal; all a decoder has to attend to is a signal. This can happen without either communicator having any notion that there are other beings like itself, with mental states and capacities, or even that it is itself such a being. Thus, bees are social animals and code-communicators, but there is no reason to credit them with any form of subjectivity, let alone intersubjectivity." (Dan Sperber, 1997)

Communication can be successful without resulting in an exact duplication of codes in communicator and audience. We see communication as a matter of enlarging mutual cognitive environments, not of duplicating codes.

Mirroring Neurons

The predominance of the inference model in face-to-face communication is also confirmed by neurological research. Mirror Neurons were discovered in 1994 in the macaque brain by Galese and Rizzolatti. What do Mirror Neurons do? They mirror observed actions:

> "The observation of an object-related hand action leads to the activation of the same neural network active during its actual execution. Action observation causes in the observer the automatic activation of the same neural mechanism triggered by action execution." (Galese, 2005).

In the years that follow, Galese and others (also called the Parma Group because they all work at the university of Parma in Italy) explore the Mirror Neuron system. The Mirror Neuron system is also demonstrated in the human brain.

What is special about this is that the neural system for action execution is triggered but the execution of the action is inhibited. It's not mere a system that is mirroring action it also performs simulations. When a given action is planned, its expected motor consequences are forecast. This means that when we are going to execute a given action we can also predict its consequences. The action model enables this prediction. Since the Mirror Neurons uses the same neuronal circuits this mechanism allows us also to predict actions of others.

> "The same functional logic that presides over self-modelling is employed also to model the behaviour of others: to perceive an action is equivalent to internally simulating it. This enables the observer to use her/his own resources to experientially penetrate the world of the other by means of a direct, automatic, and unconscious process of simulation." (Galese, 2005)

This 'process of simulation' of the action of others takes place regardless of the fact we are in direct communication with them. In a way our brain is communicating with the persons we observe before we even exchanged a word.

Recently Iacobini compared the action of Mirror Neurons when observing intentional and not intentional behaviour. He concluded that the reaction pattern of the Mirror Neurons is different when the actions observed were intentional. Mirror Neurons are only activated when the action is meaningful to the observer, the system cannot be deceived:

"—areas active during the execution and the observation of an action—previously thought to be involved only in action recognition are actually also involved in understanding the intentions of others. To ascribe an intention is to infer a forthcoming new goal, and this is an operation that the motor system does automatically." (Iocobioni, 2005)

The system of Mirror Neurons also works also with emotions as to Galese:

"We recently published an fMRI study showing that experiencing disgust and witnessing the same emotion expressed by the facial mimicry of someone else, both activate the same neural structure – the anterior insula – at the same overlapping location (Wicker et al. 2003). This suggests, at least for the emotion of disgust, that the first- and third-person experiences of a given emotion are underpinned by the activity of a shared neural substrate." (Galese, 2004)

I think it isn't too speculative to add that observation of others also can cause the release of neuro-transmitters like oxytocine, a neurotransmitter that generates trust into humans (Kosfeld, 2005). This might explain also why some lonely people seek crowded places like bars and markets. Though they do not succeed to talk to anyone, it makes them feel better when they can observe other people. Their Mirror Neurons were stimulated all the time by observing and simulating the actions of the others.

There is some discussion (Gergeley Csibra, 2006, Jacob Pierre, Jeannerod Marc, 2006, see also the discussion at interdisciplines.org[5]) about the exact interpretation of the simulation process of Mirror Neurons, some see it as imitation, and others see it as constitutive action for prediction and anticipation. The question is: does imitation reduce to copying? Or does imitation allow creative interpretation?

"…a plausible counter-hypothesis for the role of MNs would be that they are involved in the prediction or anticipation of subsequent — rather than in the simulation of concurrent — actions of the observed individual" (Gergeley Csibra, 2006)

This interpretation is closer to the 'constructive processing of linguistic input' as it is understood by Sperber and Orriggi. Concurrent imitation doesn't seem very useful to me because the results of it are only available once the perceived action is completed. Anyway there is a consensus about the capacity of action understanding of Mirror Neurons. The Mirror Neuron system also works when we hear somebody describe an action or when we hear an action is going on. This might be the basis for language learning without the use of language. The hypothesis is that the Broca's area (language area) evolved atop the mirror system for grasping with its capacity to generate and recognize a set of actions. (Arbib et alii, 2005a, Arbib, Michael, 2005b)

As to Arbib's hypothesis human language evolved in 4 steps out of the primate system for grasping:

"S4 A complex imitation system for grasping.

S5: Protosign, a manual-based communication system, breaking through the fixed repertoire of primate vocalizations to yield an open repertoire.

S6: Proto-speech, resulting from the ability of control mechanisms evolved for protosign coming to control the vocal apparatus with increasing flexibility.

The final stage is claimed to involve little if any biological evolution, but instead to result from cultural evolution (historical change) in Homo sapiens:

S7: Language: the change from action-object frames to verb-argument structures to syntax and semantics; the co-evolution of cognitive and linguistic complexity"
(Arbib, Michael, 2005b)

[5] http://www.interdisciplines.org/mirror/papers/1/15/printable/discussions/view/1415

Cortical regions on the surface of the human brain that are involved in the production of speech, such as Broca's area are closely allied to those parts of the primary motor cortex that control the hands and the face. A frontal section through the primary motor cortex reveals not only the proximity of the hand region to the face region, but also the relatively large areas of cortex dedicated to their control. The functional association between these regions is revealed by lesions in the vicinity of Broca's area that produce deficits in the expression of both spoken language and sign language. Hand gestures routinely accompany speech in the course of countless exchanges between people every day around the world. The author argues that the behavioral and physiological connections between the hand and the vocal apparatus betray the evolutionary origins of human language.

The position that language has evolved out of gestures and not out of the vocalizations of the alarm calls of monkeys or the hooting of apes, has been debated. The strongest argument against this scenario is that human language and primate vocalizations are fundamentally very different phenomena. As Chomsky observed in his 1966 book Cartesian Linguistics, human speech is unbounded in its capacity to express thought and in its freedom from stimulus control, whereas animal communication systems either consist of a fixed number of signals or a fixed number of "linguistic dimensions," each associated with a nonlinguistic dimension. Primate vocalizations are containing a message in themselves, whereas human vocalizations can be combined in novel ways to create a message. In my view, it seems more likely that the call-like vocalizations of our ancestors have persisted in the emotional cries of modern human beings—such as crying, laughing and screaming—rather than in speech.

Michel et alii found neurological evidence suggesting that self-reflection may be used to infer the mental states of others when they are sufficiently similar to self." (Michel et alii, 2005).

These results provide a neurological basis for the Relevance theory of Sperber, saying that we understand each other in grasping the intentions of our collocutor. This is not to say that Mirror Neurons are the only mechanism through which we understand the intentions of others, analysis of the perceived action and connecting it to the context and some theory we have in mind play a role as well.

> "In humans, however, social cognition encompasses the ability to mindread."
> (…)
> "Thanks to their mindreading ability, healthy human adults readily explain and predict human actions by representing and attributing to human agents a whole battery of internal unobservable mental states such as goals, intentions, emotions, perceptions, desires, beliefs, many of which are far removed from any observable behavior (Gopnik and Wellman, 1994). It is also intuitively clear that there is a gap between full-blown human mindreading and the psychological understanding of perceived actions afforded by MNs." (Jacob, Pierre, 2005).

While Mirror Neurons work unconsciously, it is suggested that mindreading is at least a partly conscious process. It is possible that both take place at the same time. Some hint in that direction might be found in the results of Jacob Jolij during experiments with blindsight. He found that there are two processing routes for affective information: a fast, but crude subcortical route, and a slower, but more accurate cortical route. As to Jolij the conscious process can suppress access to unconscious information. while they still influence our emotions. (Jolij, Jacob, 2005)

Both paths are also mentioned by Rizzolatti and Craigheiro from the Parma group they first point to the conscious recognition of actions:

> "How are actions recognized? The traditional view is that action recognition is based exclusively on the visual system. The understanding of an action done by nother individual depends on the activity of the higher order visual areas and, in particular, of those of the superior temporal sulcus, where there are neurons selectively activated by biological motions (Perrett et al. 1989; Carey et al. 1997; Allison et al. 2000; Puce and Perrett 2003)." (Rizzolatti and Craigheiro, 2005, p. 108)

Then they point to the unconscious recognition by mirror neurons:

> "Another hypothesis is that an action is recognized when the observed action activates, in the observer's brain, an analogous motor representation. The observer does not execute that action, because control mechanisms prevent its overt occurrence, but the evoked motor representation ("motor knowledge") allows him to understand the meaning of what he saw (Rizzolatti et al. 2001).
>
> It is important to note that the two hypotheses are not in contraposition. Rather, they describe two different ways in which an action may be understood. The "visual" hypothesis describes a "third person" relation between the observer and the observed action. The action, albeit recognized in its general meaning, is not understood in all its implications, because it does not enter into the semantic motor network of the observing individual as well as in his/her private knowledge of what doing that action means. "Visual" understanding is similar to that a robot, Mirror neuron: a neurological approach to empathy 109 able to differentiate an action from another, may have, or humans have when they see a bird flying or a dog barking (see below). In contrast, the "motor" hypothesis describes the "first person" understanding of what the individual is seeing. The observed action enters into the observer's motor representation and recalls his/ her similar experiences when doing that action. It is an empathic recognition that makes the observer share the experience of the action agent." (Rizzolatti and Craigheiro, 2005, p. 108-109)

In the same paper they explain also the two routes for emotional understanding, one recognizing emotion in a rational way and one understanding emotions by feeling them. They wonder if the last is the basis for altruism.

> "Can we deduce from this that the mirror mechanism is the mechanism from which altruistic behavior evolved? This is obviously a very hard question to answer. Yet, it is very plausible that the mirror mechanism played a fundamental role in the evolution of altruism. The mirror mechanism transforms what others do and feel in the observer's own experience. The disappearance of unhappiness in others means the disappearance of unhappiness in us and, conversely, the observation of happiness in others provides a similar feeling in ourselves. Thus, acting to render others happy – an altruistic behavior – is transformed into an egoistic behavior – we are happy." (Rizzolatti and Craigheiro, 2005, p. 116-120)

Our brains appear to have developed a basic functional mechanism, called 'embodied simulation' by Galese, which gives us an experiential insight of other minds. This let's us also tune up with others, this is what we call empathy. The theory (well let's not forget it is based on a mass of empirical research) of Mirror Neurons states that we are continually in a process of mirroring the behaviour of the people we live with and deduct from these neuronal mirror actions the intentions of the others. **The system of Mirror Neurons thus has a double functionality: It let's us grasp the intentions of our collocutor and it creates empathy for him.**

How does language evolve with inference and without inference?

As to Dawkins, Grice, Chomsky, Sperber, Milikan, Arbib and many other scientists: humans are born with a language function/faculty/device. (Hauser, Chomsky, Fitch. 2002, Dan Sperber and Gloria Origgi, 2000a): the biological emergence of a faculty that let's us learn language without the use of language. Sperber and Origgi put it this way:

> "A language faculty is an adaptation because it permits the acquisition of linguistic competence, which permits verbal communication, which can be used in a great variety of ways, some with beneficial effects." (Dan Sperber and Gloria Origgi, 2000a, p. 2)

So we had an evolutionary advantage in this adaptation. Then the question remains: how did the human species develop that language function? Is it code based or inference based? Lets have a look at Sperber's and Origgi's proposals (Dan Sperber and Gloria Origgi, 2000a, Dan

Sperber and Gloria Origgi, 2000b, Dan Sperber and Gloria Origgi, 2006). Contrary to many linguists, philosophers and logicians they counter the problem keeping firm to a naturalistic and pragmatic approach (Dan Sperber,1999 and Dan Sperber 2000c) without Darwinizing culture the way Dawkins does (Dan Sperber, 2000d).

I'm an engineer, so the 'how to' comes always first, and incidentally it turned out to be the focal point of the whole matter. How does that language device work?

> "The contextual evidence on the basis of which a meaning can be attributed to a new word tends to be different in every case, and, moreover, quite often, a word is used with a contextual meaning different from its "literal meaning". Still, language learners converge on the same meanings for the same words, not by copying - and what exactly is there to copy on the semantic side? - but by deriving converging conclusions from quite different and sometimes divergent pieces of evidence.
> (…)
> To sum up this point, the stabilisation of linguistic devices is explained not by some kind of imitation of linguistic behavioural inputs, but by the constructive processing of these inputs by a biologically evolved language faculty." (Dan Sperber and Gloria Origgi, 2000a, p. 6)

Differences between the communicator's code and that of the code of the hearer are a source of possible error in the communication process. When evolutionary changes took place the code model wouldn't have worked:

> "Under these conditions, a mutation affecting an individual's language faculty places her at the risk of internalising a code that is different from that of her conspecifics on the basis of the same linguistic data. This mismatch of codes would be detrimental to the individual's ability to communicate. It would be counter-adaptive. More generally, since a code must be shared by a population in order to be advantageous, evolution cannot easily "experiment" with modifications whose anyhow low chance of being advantageous could not be verified until the modification was sufficiently widespread." (Dan Sperber, Gloria Orriggi, 2006)

Animal communication codes, functioning according to the code model, are usually small. They do not involve much learning and vary little. Human language, on the contrary has been and still is changing a big deal. This change can only be intercepted using the inference model, since:

> "The success of inferential communication does not require that the communicator and the audience have the same semantic representation of the utterance. It suffices that the utterance, however they may represent it, be seen as evidence for the same conclusion." (Sperber, 2006)

This doesn't only go for semantic evolution but also for grammatical evolution as is shown by Sperber and Orriggi in "A Pragmatic Perspective on the Evolution of Langage and Languages" (Dan Sperber, Gloria Orriggi, 2006)

The role of inference when adding new words and expressions to our conversation is absent in Internet communication. Though it is a hype to be enthusiast about Internet Language researchers who do a lot of field research have been concerned:

> "I believe that we are making ourselves into less sophisticated users of language because of computer mediated communication in general and, perhaps, e-mail in particular. Computer mediated communication, especially e-mail and instant messaging, drives us to produce writing and send it off without reflecting." (Baron, Naomi, 2000)

Internet communication induces a less sophisticated use of language while it should use a more sophisticated language as we showed above, but this seems to be impossible and seems inhibited because we lack inference. Naomi Baron sums up also a range of other reasons why this is the case. Internet use adds to a previous existing tendency of using more informal language. We're losing a distinction between a spoken and written register, trapped by the ease of the medium. E-mails are usually composed at lightning speeds, without any concern about editing, clarity or word choice. Writing is becoming an encoding of informal, spoken language. Snippet reading is also affecting our reading habits as a culture. A lot of email

messages only contain half of a sentence. Reading on a screen changes the nature of reading. One of the things that troubles her, says Naomi Baron, is that authors don't feel ownership, they also don't feel responsibility. (Baron, Naomi, 2002, Baron, Naomi, 2003)

Without inference communication looses its main functionality: to grasp the intentions of our collocutor. On the other hand it is possible to understand one another without decoding words, using gestures, with a glance. Words can be detached from communication, inference cannot.

> "Travellers to foreign lands report successful transactions conducted without language. Captain Cook's unintended sojourn in Cape York is a case in point, or Huxley's journeys on HMS Rattlesnake. The best documentary evidence is probably the film, First contact, incorporating footage made by the gold prospectors the Leahy brothers contacting tribes in Highland New Guinea for the first time in the 1930s: it is as if the basis for transactional interactions existed independently of culture and language, and the slots can in necessity be filled by mime and iconic gesture." (Levinson, 2004, p. 3)

That way language can change and evolve. New words applying to new situations can be added to the language thesaurus.

> "Needless to say, conversation is the primary form of human verbal interaction, the context in which all primary language-learning is accomplished and many details of linguistic structure are intimately tied to it." (Levinson, 2004, p. 13)

Introducing conflict, ambiguity and paradoxes

Semantic ambiguity

Face to face communication is the richest in social context cues and any form of mediated communication lessens the cues available. One of the main functions of inference is disambiguation of codes, deriving the implications of an utterance, for instance "the cat is behind the tree" implies that the tree is between the speaker and the cat.

> "Relevance theory treats the identification of explicit content as equally inferential, and equally guided by the Communicative Principle of Relevance, as the recovery of implicatures. (Sperber, Dan, Wilson, Deirdre, 2002)

Ambiguity occurs when there is a breach in our codification system, when the interpretation of the exchanged message does not coincide. Ambiguity and conflict often arise when benevolence is used up. Without inference we cannot solve that problem.

The inference model was depicted as an essential part of this capacity while inference is often reduced to recognising body-language and alike, the exploration of Mirror Neurons makes inference an integral part of communication theory not some weird attachment we couldn't ignore but that we didn't want to give a lot of weight. The way we treat codification is part of the inference system and not the other way around. Email communication is bereft of this interpretation mechanism that is omnipresent in face-to-face communication. We assume that in daily conversation, and this is also congruent to our experience, ambiguity is resolved by the mechanism of simultaneous feedback and inference, which makes our conversation successful. We lack both in email. What are the possibilities when we cannot recur to those mechanisms?

One is semantic negotiation. Though it will take some time, it might enrich our exchange but it supposes some benevolence. But even if they would be so kind to start a negotiation there is no guarantee they will come to the same result. In preparing this article I did a small lexical inquiry into the word 'ambiguity' itself and was astonished to find slightly different accounts in Merriam-Websters Collegiate Dictionary and Oxford Advanced Learners dictionary. I give them here:

am.bi.gu.i.ty n, pl -ties (15c) 1 a: the quality or state of being ambiguous esp. in meaning b: an ambiguous word or expression 2: uncertainty
© Merriam-Webster's Colligiate Dictionnary

am.big.u.ous adj [L ambiguus, fr. ambigere to be undecided, fr. ambi- + agere to drive--more at agent] (1528) 1 a: doubtful or uncertain esp. from obscurity or indistinctness <eyes of an ~ color> b: inexplicable 2: capable of being understood in two or more possible senses or ways syn see obscure -- am.big.u.ous.ly adv -- am.big.u.ous.ness n
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am•bi•gu•ity /mbjuti/ noun (pl. -ies)
1 [U] the state of having more than one possible meaning: Write clear definitions in order to avoid ambiguity. A lot of humour depends on ambiguity.
2 [C] a word or statement that can be understood in more than one way: There were several inconsistencies and ambiguities in her speech.
3 [C, U] the state of being difficult to understand or explain because of involving many different aspects: You must understand the ambiguity of my position.
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MWCD adds also uncertainty as a possible meaning of ambiguity. There you are. We might use dictionaries to resolve our differences and end up in a quarrel all right if we do not use the same dictionaries.

And what about the context? Sperber and Wilson (Sperber and Wilson,1995) argue that people try to maximise the relevance of the information they process. To do that, they assume that any information given to them is relevant. Then, they search for a context in which this information is, in effect, relevant. Context is an extra-linguistic reality. Linguistic encoded meaning which is the same on every occasion of its use, isn't decisive in understanding. In email the extra-linguistic reality is virtual.

The language we use in email isn't a formal language, where the meaning of words is univocal and strictly delimited, it's closer to the natural language we use in conversation and speech then to formal writing (Naomi Baron, 2001, Sally Abalrous, 2002) With e-mail correspondence, one has the illusion of ephemerality, messages appearing and disappearing from your screen (Sproull and Kiesler, 1991, p. 39). People sending email tend to behave more informal. They loosen up, feel more uninhibited, and express themselves more openly, not caring about univocal expression. This kind of behaviour is close to face-to-face communication only IT ISN'T face-to-face communication. It's not a conversation but a series of intermittent, one-directional comments, though it uses more or less the same language. As to Newmeyer: "Virtually any sentence imaginable is loaded with potential ambiguity." (Newmeyer, 2006)

Pragmatic view on ambiguity

Paul Grice pointed out that natural language is not a consistent logical system as to Levinson both systems are distinct and even not linked[6]. Conversation contains many 'indeterminacies', paradoxes and ambiguities not only because of the inherent biases of human thinking but because some language features ask additional inference: they are context dependant. The pragmatic view of Grice persists that people in a conversation have a common goal (target, objective). This is an injunctive to cope and overcome the shortcomings of language People in a conversation are thus motivated by what he called a 'Cooperative Principle':

> "Make your contribution such as it is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged."

He proposed that the intended meanings (referring to the background) should be invoked using a set of maxims of conversation:

[6] Claiming that they are not linked seems a little pushy when not offering proof

"Maxim of Quality: Truth
Do not say what you believe to be false.
Do not say that for which you lack adequate evidence.

Maxim of Quantity: Information
Make your contribution as informative as is required for the current purposes of the exchange.
Do not make your contribution more informative than is required.

Maxim of Relation: Relevance
Be relevant.

Maxim of Manner: Clarity
Avoid obscurity of expression.
Avoid ambiguity.
Be brief (avoid unnecessary prolixity).
Be orderly."

Though I share one of Grice's central themes: that an essential feature of most human communication, both verbal and non-verbal, is the expression and recognition of intentions, I have my doubts about the need of his maxims. So I prefer to follow the approach of the Relevance Theory of Sperber and Wilson:

> "Relevance theorists share Grice's intuition that utterances raise expectations of relevance, but question several other aspects of his account, including the need for a Co-operative Principle and maxims, the focus on pragmatic processes which contribute to implicatures rather than to explicit, truth-conditional content, the role of deliberate maxim violation in utterance interpretation, and the treatment of figurative utterances as deviations from a maxim or convention of truthfulness." (Dan Sperber and Deirdre Wilson, 2004)

As speakers, we expect what we say to be accepted as true. As hearers, we expect what is said to us to be true. If it were not for these expectations, if they were not often enough satisfied, there would be little point in communicating at all. If we wish that our social world should be organized based on the maxim of truthfulness there is no reason to reject it, but this is a wish not a reality. I expect a communication theory to be a tool in analyzing the real world. Deceit is a reality but it becomes a problem when I cannot expose it. The main reason why we cannot expose deceit is that the speaker inhibits inference of what he says because his intentions are not expressed or he is hiding them. The problem is that his informative and communicative intention is not manifest. I think this is a decisive criterion to decide about the articulation and truthfulness of a speaker.

> "The truth in Grice's model is that we have the ability to interrupt and prevent the automatic running on of our talking and our doing-and-believing-what-we-are-told equipment, and assume others have this ability too. We interrupt, for example, when we have happened to look under the hood and discovered evidence that the conditions for normally effective talking … are not met." (Carston, Robyn, 2005, p. 32)

Not being able to answer or question some utterance can be very frustrating. This is shown in next situation: Somebody has volunteered in a social-cultural centre and was waiting for instructions for his first job (doing the bar) when the director arrived finally just before the public came stumbling in. The director said: "This time for an exception you will doing a paid volunteer job." The volunteer hadn't the time to repair from my astonishment as the director disappeared again. The whole evening he was cursing to himself asking what was meant... Volunteer work is not paid and he didn't want to be paid because that way it was illegal.

When feedback is made impossible, inference is inhibited. We cannot point to contradictions between message and context either between statements of the utterance. When something isn't clear or seems to be spurious, e.g. when we observe contradictions in the utterances of a speaker in a conversation, we can interrupt and ask clarification. A speaker who isn't hiding his intentions will not have problems with our demand, he will be happy to show that his utterance is not forged e.g.. Maybe he wasn't aware at all of his inconsistency, maybe he was aware but

he doesn't want to be considered as a counterfeiter. If he has nothing to hide he will search to solve this problem. Being overt makes the intentions of the speaker manifest.

> "The fuller characterisation [of ostensive-inferential communication] involves the notions of manifestness and mutual manifestness. In particular, we argue that for communication to be truly overt, the communicator's informative intention must become not merely manifest to the audience (i.e. capable of being recognised and accepted as true, or probably true), but mutually manifest to communicator and audience." (Dan Sperber and Deirdre Wilson, 2004)

The problem with Grices maxim of truthfulness is that apparent violations not necessarily inhibit the inference of a message, as is the case with the frequent occurrence and acceptability of loose and figurative uses of language. (Dan Sperber and Deirdre Wilson, 2002)

This said I want to concentrate on some problems with ambiguity finding their origin in the structure of language. One special feature of language that is known to introduce paradoxes is 'deixis' or 'indexicality'. Indexality is the phenomenon whereby some linguistic expressions are systematically dependent on the context for their interpretation. Take for example the utterance "Put this book over there" – which book is being referred to, and which place it is to be put, are determined by features of the context outside the utterance itself, here typically gestures: this and there act as place-holders for contextually-specified parameters. This seems a very simple problem at first sight but…

> "…the phenomena turn out to be very puzzling both philosophically and psychologically, for deixis introduces context-dependency into almost every utterance (in English for example, nearly all sentences are tensed, and tense is deictic, as in "It is Tuesday" where is locates the reference time as today). One of the central philosophical puzzles is that deixis makes possible self-reference in utterances, thus introducing, e.g., many paradoxes of the 'Cretan-liar' type: "This sentence is false" is true if and only if it is false." (Levinson, 1998, p. 2-3).

Philosophers have long disagreed about just how close the ordinary language words "if", "or" and "and" are to their logical counterparts. Grice argued that the divergence between ordinary language and logic was largely due to the implicatures of language usage. For example, if I say "Glenn was an astronaut or he was a senator", I suggest that he was not both, but this does not mean that natural language or is not equivalent to logical (inclusive) disjunction. That is because if I knew he was both, I should (following the maxim of Quantity) have said so; since I didn't, I implicate that I believe he was one or the other but not both.

> "One central attraction of the Gricean approach is that it promises to simplify the kinds of meanings we attribute to expressions. For example, as mentioned, English or seems normally to have an exclusive use (as in "The book is either in the bedroom or the sitting room"), but obviously this is not always so (consider "I lent you my pen or my pencil, or both"). Grice's tactic is to avoid positing an ambiguity (between inclusive and exclusive or), by assuming that or has a wide, general meaning (e.g. the inclusive meaning), which is then specialized in context where appropriate by an extra pragmatic inference – namely the Quantity implicature 'not both'." (Levinson, 1998, p. 10)

Keeping this in mind we can be positive about the fact that in a dialogic situation, ambiguity can be neutralised by further dialogue and 'mutual adjustment', feedback, context, **inference and shared reference**. In email it creates ambiguity. The better both corresponds know each other, it is to say they can refer to a shared experience in the real world the more likely they will be able to resolve ambiguity. But when the writer and receiver do not know each other nor their reciprocal context they can only use new sentences, which are again virtually loaded with ambiguity.

Paradoxical Communication

When message content and context cues contradict each other, inference is difficult. One situation where this is apparent is the case of paradoxical communication as Bateson and Watzlawick described it.

When we communicate with somebody on a regular basis there is always a relation involved, we cannot escape from, but in occasional encounters in the public area we can perfectly communicate while there is still a lot of ambiguity about our relationship. How would we build new relationships if we could not tolerate some ambiguity at the beginning[7]?

When two people meet face-to-face they negotiate about their relationship some way or another, and maybe they will renegotiate it afterwards. In the real world we have a lot of tools that support this process, in the virtual world we are operating blind, we are bereft of the interaction part of communication: the construction of a relationship is very difficult, we lack immediate feedback, we have no mirror neurons active, conflicts arise easily, conflict resolution is a big problem.

A message never stands alone: the relation between the 2 or more persons that communicate is adding/giving meaning to it. It is one of the contextual cues. A simple example will clarify. When an employee is in the office of the managing director, and the director drops his pencil, there is 90 % chance that the employee will stoop and take the pencil from the floor without one word being exchanged. The relation between the employee and the director is clear, the employee is obedient (he shouldn't) and maybe the malignant director dropped his pencil on purpose to test his employee. In this relation most messages of the director will be understood as instructions by the employee, but not the other way around. The director does not take instructions from his employee. It's worse; managers are not allowed to admit their mistakes. That in such a relationship communication is poor speaks for it.

> "Double bind interactions are defined as conflicting messages conveyed more or less simultaneously, as in the situation, well known from Bateson et al.'s paper were a mother tells her son that she loves him while at the same time turning her head away with a look of disgust. In this example, the mother conveys two messages to the son: one of love, conveyed verbally, and one of disgust, conveyed non-verbally." (Koopmans, 1997)

and:

> "Bateson made a distinction between two levels of communicative behavior: a purely substantive level, which refers to the use of communication to exchange information for its own sake, and the metacommunicative level, which refers to the self-regulatory function of communication in social systems. Effects of communicative expressions on the relational context need to be understood on the metacommunicative level. An example where this self-regulatory aspect is fairly explicit is the following exchange between a mother and her daughter:
>
> "Mother: One of the things that bothers me very much is way in which you curse. I don't like that at all.
> Daughter: I get mad. Kids do it in school, so I get it from them.
> M: I don't care whether they do it in school or not. I don't want you to do it at home.
> D: And you do it too, so why -
> M: So what! I am not 14 years old.
> D: Well, you still do it.
> ...
> M: Well, If I'm just going to be something that can be cursed at and so what etc. etc., the message I'm getting is that you could care less whether I'm there or not. And I have been vehemently screaming about the fact that I feel that you're trying to take my place in this family. (Minuchin & Fishman, 1981, p. 135)" (Koopmans, 1997)

It's a 'Catch-22", but most authors ask to carefully analyse the situation before concluding it can lead to schizophrenia. At least 9 conditions must be fulfilled:

(1) There must be a relational context.
(2) The relationship is of a vital importance.
(3) Both persons have an intense involvement.

[7] Research has been done to occasional encounters of people meeting each other at the cash register of a shop. Strangers meet strangers, have a short chat, and thereafter maybe will never meet again. I do not see how one can define a relation in such a short time in public spaces. There simply is no need to. Nevertheless the researchers find that these encounters have a positive effect on the mental health of people living alone.

(4) In this relation one person is making conflicting injuctions on different levels.
(5) The other person cannot discriminate these levels.
(6) The other person doesn't have the ability to comment on this situation.
(7) The other person cannot escape from the field of the relationship.
(8) The relation is asymmetric
(9) There must be a prolonged exposure

As to Bateson and Watzlawick we cannot escape from some definition of the relationship when we communicate. Haley is still more radical, he stated that a person trying to avoid, to escape this definition shows a schizophrenic reaction.

> "A person can avoid defining his relationship by negating any or all of these four elements. He can (a) deny that *he* communicated something, (b) deny that something was communicated, (c) deny that it was communicated *to* the other person, or (d) deny the context in which it was communicated." (Haley, 1990)

I do not know if not being able to define a relation makes people sick, it seems a little far-fetched. In clinical situations, or in situations where people (mostly children) cannot escape from a relationship (child/parent), where people have no means and no logic to analyse and understand what is happening to them, yes. This kind condition (closure, chain) is part of Bateson's original description of Double Bind said to be at origin of schizophrenia. But in all day life, between free adults, in Face to Face communication, I think this lack of a definition can be overcome by other means: we still have a lot of tools at hand, we evaluate, we analyse, we replay our conversations, our mirror neurons are active and we communicate with the same persons in different settings.

Paradoxical communication is apparent in cynical utterances like: 'Be spontaneous!' If one follows this lead he is not spontaneous, if he doesn't he doesn't want to take advice. Often people put you in a Catch-22 situation. Not language is to blame here but the cynical mind.

The communication theory of Bateson and Watzlawick was still much depending on the code model for communication though it adds several levels of code, it adds meta-communication to the whole system. It's a different approach. What is clear to me is that **when message content and relational clues contradict each other, the inference process is inhibited**. This might have psychopathological consequences.

> "However, functional or structural disruption of the neural mechanisms underlying ToM may give rise to various types of psychopathology, including schizophrenia (Frith 1992; Brüne 2001)." (Martin Brüne, 2005)

> "Dissecting the cognitive architecture in terms of how human beings interact with their social environment and the pathologies that may arise from failures to do so properly has boosted our understanding of many of the cognitive and behavioral symptoms found in a group of disorders we call schizophrenia (e.g., Gallagher and Frith 2003). However, a variety of intriguing questions remain open to scientific exploration." (Martin Brüne, 2005)

Children acquire ToM between 1 yr and 10 yr. One hypothesis could be that this acquisition was disturbed. Again we must look critical to the empirical findings. We do not know whether the implicit assumption that ToM development in schizophrenia patients prior to the clinical manifestation of the disorder has been normal—as opposed to autistic—is correct. Thus, there is a need for longitudinal studies of ToM in children at risk of developing schizophrenia.

How must we interpret neurologically contradictions between message content and relational clues? One interpretation is suggested by Jacob Jolij's findings on blind-sight (Jolij, Jacob, 2005). We could define it as a contradiction between emotive information on subcortical and cortical level. Another suggestion is offered by Rizzolatti and Craigheiro who point to two routes for emotional understanding, one recognizing emotion in a rational way and one understanding emotions by feeling them through mirroring neurons. (Rizzolatti and Craigheiro, 2005, p. 108-109). This is an issue for further research but it shows that inhibition of the inference process can have far reaching neurological consequences.

> "There is good empirical evidence that ToM is specifically impaired in schizophrenia and that many psychotic symptoms—for instance, delusions of alien control and persecution, the presence of thought and language disorganization, and other behavioral symptoms—may best be understood in light of a disturbed capacity in patients to relate their own intentions to executing behavior, and to monitor others' intentions. However, it is still under debate how an impaired ToM in schizophrenia is associated with other aspects of cognition, how the impairment fluctuates with acuity or chronicity of the schizophrenic disorder, and how this affects the patients' use of language and social behavior. In addition to these potential research areas, future studies may also address whether patients could benefit from cognitive training in this domain." (Martin Brüne,2005)

Flame wars

What happens when all (or most) cues for inferences are absent? One often plea for CMC points to metalinguistic cues: informal codes, which they call "emotext". They include intentional spelling, lexical surrogates, grammatical markers, strategic capitalization, and visual arrangements of text characters into "emoticons." An example:

Al,
hahahahahahahhahahahahahahahahahahahaa
sniff waaaaaaaaaaaaaaaaaaaaaaaaahhhhhh
I laughed, i cried. . . . that post was GREAT! :-)
Amusedly,
-Mirth-

Does this make you laugh? I don't think so. Though when you are in a group, laughter is contagious. When you have to picture it from a terminal, it mostly isn't. It rather does make you feel silly.

Among the most commonly used emoticons are:

:-) happiness, humor	**:-o** shocked, amazed
:-(sadness, displeasure	**:.(** crying
;-) winking	**:-]** sarcastic

But these 'emoticons' haven't really solved the problem; it is just another code, shorthand for sentences like, I'm happy, I'm shocked and so on. For decades, email was notorious for its general rudeness and the apparent ease with which senders resorted to profanity. (Kiesler et alii, 1984, Smilowitz, Compton and Flint,1988, Smolensky et alii, 1990, Collins, Mauri, 1992, Baron, Naomi, 2002, Curall, Friedman, 2003)

> "As a consequence, many CMC users have argued that the written CMC medium is inadequate for expressing nuances of meaning (e.g., sarcasm, bemusement, tentativeness, irritation) that facial expressions and/or vocal features typically convey in face-to-face spoken conversation. Two linguistic features of CMC have emerged from these assumptions about the conversational nature of CMC and the inadequacy of writing to express conversational intent. The first feature is emoticons (also sometimes known as smileys). The second is the phenomenon known as flaming."(Baron, Naomi, 2002, p 20)

In one of her early papers "Computer Mediated Communication as a Force in Language Change" Naomi Baron writes about an "increased tendency for aggression to be displayed when talking from terminal to terminal". In her study she showed that in computer-mediated communication there is a higher frequency of arguments and flaming, i.e. using insults and profanity. Also David Chrystal in his book "Language and the Internet" devotes several pages to the topic of aggressiveness in CMC.

In a series of experiments designed to explore the impact of computer mediated communication (CMC) on group interaction and decision making, Kiesler et al. used groups of three students who were asked to reach consensus on a choice-dilemma problem in three different contexts: once face to face, once using the computer anonymously, (i.e. not knowing

which one of their group was talking/typing) and once using the computer where each member knew when the other was 'talking'. Their data showed, "in all three experiments, that CMC had marked effects on . . . interpersonal behavior..." (Kiesler et alii, 1984, p. 1128), in that 'people in CMC groups were more uninhibited than they were in face-to-face groups, as measured by uninhibited verbal behavior, defined as frequency of remarks containing swearing, insults, name calling and hostile comments" (Kiesler et alii, 1984, p. 1129).

Kiesler et al. postulated the following three reasons for their results: "a) difficulties of coordination from lack of informational feedback, b) absence of social influence cues for controlling discussion, and c) depersonalization from lack of nonverbal involvement and absence of norms" (Kiesler et alii, 1984, p. 1130).

Asch's social influence experiment was used as the basis for a study by Smilowitz, Compton and Flint (1988), investigating the effect of the exclusion of contextual cues provided by face to face interaction on individual judgement in CMC contexts. They determined that: "It is easier for a deviant to persist in the CMC environment." (Smilowitz, Compton and Flint,1988)

Sproul and Kiesler reported that respondents who saw flaming in e-mail messages an average of 33 times month, only saw the same kinds of verbal behaviour in face-to-face conversations an average of 4 times a month. (Sproul and Kiesler, 1986)

> "Even extreme acts of aggression, such as narrative enactments of sexual violence against women, find ideological justification in dominant male discourses -- for example, through invoking principles of "freedom of expression" (Herring, 2001, p. 12)

Smolensky, Carmody, and Halcomb (1990) examined the extent to which tasks, and the degree to which users are acquainted with one another, will mediate the occupancy of uninhibited verbal behaviour. They determined that the amount of uninhibited verbal behaviour was highest among triads who did know one another prior to the experiment, and those persons who were highly extroverted were likely to exhibit the highest levels of uninhibited verbal behaviour. (Smolensky et alii, 1990)

We will treat this in more detail now.

Missing grounding and social context cues in email

Clark and Brennan pointed to the lack of grounding in email communication (H. Clark, S Brennan, 1991, p. 128) when confronted with ambiguity and conflict. Friedman and Curall refer to it when analysing email disputes that seem to escalate more often than disputes in face-to-face communication .(Friedman, R. A. & Currall, S. C. 2003.) Our framework sketched above: 'the most important type of cognitive effect achieved by processing an input in a context is a contextual implication', is confirmed by their observations, so let's look at these grounding factors.

(1) Poor language

See also above under Poor Language: 'A limited vocabulary results in lack of humour, cannot convey feelings, doesn't show you at all.'

It seems to me that the so-called new language that originates from Internet communication (Internet lingo) is not adding new content and refinement but rather tends to downsize the wealth significances of the used language on the Net. Although Internet gave birth to an extended new vocabulary of technical terms, this doesn't mean it adds new words outside the technical realm. As an informatics teacher I have often enough been confronted with the problems of computer illiteracy. When you did not belong to a peer group reading and talking about it, you stayed outside the Net. Of course we still can benefit from semantic explications for new words and expressions (and there were a lot of magazines and lists on the Net) but even then you are still missing the contextual and emotional capacities of face-to-face communication.

Examples of this downsizing the wealth of expression can be found in the computer metaphors used to name concepts concerning the human mind. People talk about 'downloading something to their hard disk' when referring to 'keep something in mind', 'remember', 'memorise', 'bear in mind', 'consider' etc. Oh, and we have even those wonderful alternatives for hard disk: database, chip… but all of course as dead as anything. A computer stores masses of data accurately and unchanged in its memory, but this misses the whole wondrous side of our memories, which proceed by a rich and shifting network of associations we are hardly even beginning to understand. It's practically never said in so many words, but a metaphor is always based on an implied comparison. The Industrial Revolution did a lot more than just transform our physical world; it revolutionized our whole way of talking about ourselves. It's hard to imagine how we managed to explain our feelings before we knew the mind is a steam engine: blowing off steam or having a head of steam, being under pressure or all fired up, serving as a safety valve ... Continuing to look farther back quickly convinces us that there is hardly any product of human inventiveness that has not been used to talk about ourselves. a broken record, an emotional roller coaster, being an open book, having a screw loose, being a dim bulb, being out of focus, going down the drain, engraved/etched on the mind, having a short fuse, burning the candle at both ends ...

Put in the form of propositions, the mind is a computer, a steam engine and so on sound a bit preposterous, since we know that all these expressions are 'only metaphors'. But consider: aren't we regularly seduced into using a metaphor as if it described all that needs to be observed about the human mind? Take the common expression he's blowing off steam, which is a colourful way of talking about expressing emotions. But humans are a lot more complicated than steam engines: releasing steam does automatically relieve the pressure in an engine, but does shouting your resentment about something necessarily make you feel relieved? It might, but it might also build up the anger (=steam) even more by reminding you how mad you really are.

> "According to the inferential model, a communicator provides evidence of her intention to convey a certain meaning, which is inferred by the audience on the basis of the evidence provided. An utterance is, of course, a linguistically coded piece of evidence, so that verbal comprehension involves an element of decoding." ."(Wilson, Deirdre, Sperber, Dan, 2004)

Some metaphors can be misleading when they are not completed with other evidence. This is less a problem in face-to-face communication than it is in written communication.

> "However, the linguistic meaning recovered by decoding is just one of the inputs to a non-demonstrative inference process which yields an interpretation of the speaker's meaning."(Wilson, Deirdre, Sperber, Dan, 2004)

Defenders of the claim that computers have added to the richness of language forget that the computer world has borrowed and included a mass of words from ordinary language, e.g.: gopher, desk top, clip board, drag and drop, copy and paste, shut down, to surf, to hit, navigator, piracy, traffic, etc.

A remarkable impoverishment of language on the Net can be detected in the editing style of webs displaying chunks of texts comparable with advertising and billboards.

> "A troubling model of what writing in the future might look like appears in Steve Krug's *Don't Make Me Think*! (2000), a book on how to write good Web sites. Krug writes: "Web users tend to act like sharks: They have to keep moving, or they'll die. We just don't have time to read any more than necessary"(p. 22). Or: "most Web users don't have time for small talk; they want to get right to the beef….The main thing you need to know about instructions is that no one is going to read them – at least not until after repeated attempts at 'muddling through' have failed"(p. 46.) While this is an accurate description of how most users "read" on the Web (and therefore good advice for Web page design), the larger question will become, what effects are the design of "readable" Web pages likely to have on written language not intended just for rapid browsing." (Baron, Naomi, 2002)

The National Endowment for the Arts (USA) has done a number of studies over the last couple of years, the results of which are scary. Between 1999 and 2003, the average literacy of the college-educated American declined significantly. Statistically significantly. Only 25 percent of college graduates were deemed proficient from a literacy standpoint, defined as using printed or written information to function in society to achieve one's goals and develop one's knowledge and potential. The number of seventeen-year-olds who reported never or hardly ever reading for fun rose from 9 percent in 1984 to 19 percent in 2004. (Baer et alii, 2006)

Is this only an American tendency or is it spreading? One positive evolution is that youngsters today see instant messaging (IM) only as a background communication, they use the expression 'under the radar', while multitasking:

> "But as nearly all of us can attest, the most common use we make of Internet-based technology in controlling the ways we linguistically interact with one another is through multitasking. Who among us has never, at some point, read or composed an email while simultaneously talking on the phone? These days, multitasking while using a computer is being raised to a high art by teenagers and young adults." (Baron, Naomi, 2005, p. 14)
>
> "The results (Baron, Clem & Rabinovitz In Prep.) suggest that multitasking while doing IM is extremely common. With respect to computer-based multitasking:
>
> 70.3% were engaged in other Web activities (e.g., surfing the Internet)
> 47.5% were using a computer-based media player
> 38.6% were doing word processing
>
> As for additional off-line activities,
>
> 41.1% were holding face-to-face conversations
> 36.7% were eating or drinking
> 28.5% were watching television
> 21.5% were talking on the telephone"
> (Baron, Naomi, 2005, p 14)

(2) Depersonalisation

The pragmatic linguist Levinson complaints about the impersonal view on linguistics:

"Students of linguistic systems tend to treat language as a disembodied representational system which is essentially independent of current circumstances, that is, a system for describing states of affairs in which we individually may have no involvement, like the first three minutes of the universe." (Levinson, 2004, p. 2)

The code model for communication has been dehumanising communication study for years. All that 'intello' talk about redundancy and entropy wasn't very fruitful. It might have been useful for engineers wanting to measure signal noise, but in analysing human communication it is misleading. We have sketched face-to-face communication as being very powerful in understanding the meaning of messages. Neither Captain Cook nor the Leahy brothers, contacting tribes in Highland New Guinea for the first time needed words for their transactions with the aboriginals. Inference is the basis for transactional interactions that are independent of culture and language, and the slots can in necessity be filled by mime and iconic gesture. Children learn language without language by inference the spoken words and gestures of their caretakers.

The code model, originating in first order cybernetics is at the origin of a depersonalising view on human interaction. Humans are considered as computers, as machines and in the end also treated that way. In sociology this is called re-entrance. Social theories are not only created by people who claim to understand what they are saying; they are above all about people and may become understood by the very people of which these theories speak. When this

happens, social theories can be said to re-enter the very practices they claim to describe and change their truths right in front of the theorists' eyes. And of course when pleading for a culture where the other is absent they incite manipulative behaviour causing depersonalisation and conflicts.

(3) Absence of embodied simulation

Copresence allows each party to observe one another. They can see what the other is doing and looking at, so their Miror Neurons can try to fetch the intentions of the other party. Often a frowning eyebrow indicates some problem but we do not see it, we cannot react to it. The problem remains. Emotions cannot be fetched. Negative emotions not only remain present they tend to amplify in the silence one spends beyond it's computer.

> "Interaction is characterized by expectation of close timing – an action produced in an interactive context (say a hand wave) sets up an expectation for an immediate response. Face-to-face interaction is characterized by multi-modal signal streams – visual, auditory, haptic at the receiving end, and kinesic, vocal and motor /tactile at the producing end. These streams present a 'binding problem' – requiring linking of elements which belong to one another across time and modality (e.g. a gesture may illustrate words that come later, a hand grasp may go with the following greeting)." (Levinson, 2004)

Audibility allows each party to hear timing of speech and intonation. When one utters sarcasm or irony[8], he does this by stressing certain parts of the sentence. Whereas speech conveys not only what is said but also how it is said, e-mail is limited to the former. As such, e-mail is an inherently more impoverished communication medium than voice or face-to-face communication. This limitation is likely to be fertile ground for miscommunication and, in particular, a lack of awareness of that miscommunication. Kruger et alii experimented with this limitation and they found that email users constantly overestimated (1) their capacity to convey sarcasm by email either (2) to detect sarcasm in email (Krüger et alii, 2005). When an ironic remark is interpreted literal, one can feel accused and abused. Things might end up badly.

Pauses in a conversation say often more than the content of an utterance:

> "Workers in Conversation Analysis have established that after a question, a request, offer or the like, where a response is immediately relevant, the response options are not equal but ranked. Responses which are in the expected direction are immediate and brief, responses which are in the opposite direction are typically delayed, marked with hesitations and particles like well, and accompanied by explanations. Thus the absence of an immediate response after the following indirect request apparently indicates quite clearly to the requester that his request will be declined." (Levinson, 2004)

It is important here to discriminate between conscious recognition of the actions and emotions of the others and the chaining actions of mirror neurons that make us really grasp the intention of actions by simulation and make us really feel the emotions of others thus creating empathy for them.

(4) Sequentiality and reciprocity get mixed up

In a conversation everybody speaks at his turn. In conversation people time their interferences. They acknowledge by a nod or some consenting remark either they can interrupt to show disagreement. All of that is lost in e-mail communication. Often email conversation

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[8] **cynic** /snk/ noun

1 a person who believes that people only do things to help themselves, rather than for good or sincere reasons: Don't be such a cynic!

2 a person who does not believe that sth good will happen or that sth is important: Cynics will say that there is not the slightest chance of success.

cyni•cism /snszm/ noun [U]: In a world full of cynicism she was the one person I felt I could trust.

sar•casm

/skzm; NAmE srk/ noun [U] a way of using words that are the opposite of what you mean in order to be unpleasant to sb or to make fun of them: 'That will be useful,' she snapped with heavy sarcasm (= she really thought it would not be useful at all). a hint / touch / trace of sarcasm in his voice

gets out of sequence. Contextual clues get mixed up this way. There are fast mailers and slow mailers. In a mailing list the thread you wished to pursue has been lost when you are too slow.

Email is a diachronic form of communication. Contextual clues often depend on the time frame of communication. When using email time frames of sender and receiver can vary greatly. We send an email in the morning when we are fit and well cancelling an invitation of a friend because we notice there are some inconsistencies in our agenda. It's just an every day routine to us, but we do not wonder when our friend will be reading it. Let's say he is returning from his job where he was confronted with plenty of problems, he is tired and feels unhappy and lonely. So he checks his email, hoping to find some better news. Our cancellation will only add to his unhappiness, if not be interpreted as a blow in his face. One advice, do not cancel appointments by email, it is a little cowardly isn't it? Simultaneous communications allows immediate feedback when something is misunderstood or falls badly. Email doesn't allow this.

> "Human interaction is characterized by a conversational mode of exchange, in which the erstwhile speaker becomes a listener, and the erstwhile listener becomes a speaker, the valued commodity apparently being speaking while others hold their tongues. This alternation of roles seems to be universally built into the deictic system of languages ("I" refers to the current speaker, "you" to the current addressee, and my "I" becomes your "you"). Many human societies have asymmetrical assignments of roles and elaborate divisions of labour, but in all of them informal interaction seems to be built on the alternation of conversational roles. Given that human language processing is obligate and automatic (hearing you speak English, I automatically comprehend even if I'd rather not), the alternation of listening roles implies an obligatory inhabiting of other's mental worlds. So it seems that cooperative sharing of the communicational resource guarantees our mutual sharing of the Schelling mirror-world." (Levinson, 2004)

(5) Email is one-way communication with low feedback

This might sound controversial, though it isn't. Email occurs in a very different context than direct communications. It lacks social cues. Emails are typically received and written while sitting in isolation, staring at a computer screen. Email interactions are thus distant from the social rituals common to face-to-face or telephone conversation. You are just talking to a machine when writing email. One could wonder if the new language of the Internet is spoken by a great number of rather insular types who like to keep interpersonal contact to a bare minimum.

People get a lot of SPAM, unsolicited mail. How come? The response-rate of email (0.25%-0.5%) is lower than the response-rate of postal mail (2%-3%). Henceforth the aggressiveness of direct mailers though there are methods to prevent the need of this practice: when you collect your email addresses on your website from people stating they want to receive mail. It is as simple as that… but some people think that they can get away with SPAM, and of course they need to send huge volumes.

(6) Absence of social context cues and shared reference

Mauri Collins has tried to find the origin of flaming. As to her it's the consequence of the absence of 'social context cures'.

> "The term 'social context cues' refers to the various geographic, organizational, and situation variables that influence the content of conversation among persons. Persons are usually sensitive to these social context cues and they can inhibit or facilitate what is said, how, and by who to whom. When defined as a person's physical position in time and place, geographic location can have a profound effect on communication. Discourse that is suitable for a bedroom is rarely suitable for the podium at a national convention, from a pulpit unsuitable for a bar on a Friday night. A business phone call made to someone's home number may originate quite properly at ten o'cloc in the morning, yet be most unwelcome arriving in another time zone at 5 am." (Collins, Mauri, 1992)

Though she points in the right direction, the explanation of the social field is rather limited. That shouldn't surprise us because sociology hasn't implemented yet a relevant definition of

communication. Most sociologists rely on the code model thought they complain it doesn't help a lot to explain the phenomena they are confronted with.

> "A coding-decoding mechanism, left to operate unhindered and in a vacuum, would create a copy of the communicator's meaning in the recipient's mind. The sociologically crucial fact that contents get transformed, distorted, lost or suppressed in most social communication cannot be explained in terms of such a basic mechanism. Unless some other mechanism is envisaged, those effects of communication that go beyond, or against, mere decoding must be explained entirely in terms of who is communicating what to whom, and why." (Sperber, Dan, 1997)

Social context influences as well the content as the attitudes in communication. This does not only concern situational context or setting (strangers on a platform waiting for a train, at home, in office, in a bar, at a conference), but also prejudices and beliefs, acceptance, legitimate speech and power relations.

The inference model is intrinsically social, not just because it describes a form of interaction, but also, less trivially, because it exploits and enlarges the scope of basic forms of social cognition, connecting social players, action context and discourse context.

Some cultures like the culture of gipsies, called 'gitanos' in Spain, 'Roma' in the Balkan and calling themselves 'Olah' are often quite overt and explicit when expressing their emotions with gestures but seem to be also more capable to read emotions in others. They are often excluded from our so-called high-cultivated society, which gives them an extra stimulus to analyse body language, posture and gestures. We must admit and regret that they suffer a lot of racism. When an average petit-bourgeois small shopkeeper sees approach e.g. Roma women he acts and reacts based on the prejudice that is widely spread: 'Fuck, they are going to rob me!' He is a professional, he's used to have a poker face in any circumstance, but to those two gipsy women he is not able to hide his anxiety. They notice his nervousness immediately, they think another bastard who's thinking we are going to rob him… and of course they will be slightly upset, they will not give a friendly smile to that shopkeeper but rather a tough look. The shopkeeper, being suspicious, less trained in reading body language will interpret their looks as being aggressive, while in fact he started the whole process of mental aggression. But now he states that his prejudices were confirmed and he can go on fooling himself and his clients all the time. This is an example of miscommunication based on prejudice. It shows that when two groups do not know and understand the living conditions of each other they miss context cues to understand each other, even when they meet face-to-face speechless. One could remark this is because they do not talk to each other. This is of course true but the inference based on prejudice is too strong to make dialogue fruitful when benevolence is absent. Feelings take over from reason.

I found the most substantial description of social context cues in Bourdieu:

> "La linguistique le plus avancée rejoint actuellement la sociologie sur ce point que l'objet premier de la recherche sur le langage est l'explication des présupposés de la communication. L'essentiel de ce qui se passe dans la communication, n'est pas dans la communication: par exemple, l'essentiel de ce qui se passe dans une communication comme la communication pédagogique est dans les conditions sociales de possibilité de la communication. [...] [L]a communication en situation d'autorité pédagogique supposes des émetteurs légitimes, des récepteurs légitimes, un situation légitime, un langage légitime." (Bourdieu 1984,p. 103-104)

Applied on our example of the shopkeeper and the 'Olah' women: minorities are often excluded from public discourse, they have no possibilities to communicate, to give evidence on their living conditions, to gain empathy. The shopkeeper lacks benevolence, an open-mind.

> Il faut un émetteur légitime, c'est-à-dire quelqu'un qui reconnaît les lois implicites du système et qui est, à ce titre, reconnu et coopté. Il faut des destinataires reconnus par l'émetteur comme dignes de recevoir, ce qui suppose que l'émetteur ait pouvoir d'élimination, qu'il puisse exclure 'ceux qui ne devraient pas être là'; mais ce n'est pas tous: il faut des élèves qui soient prêts à reconnaître le professeur comme professeur, et des parents qui donnent une espèce de crédit, de chèque en blanc, au professeur." (Bourdieu 1984,p. 103-104)

The "Olah' women are not considered as legitimate speakers, the shopkeeper is. The shopkeeper does not acknowledge the 'Olah' women as legitimate listeners. When he wants to slander and smear the 'Olah' to his other clients he will take care the women cannot hear him. Email is at first private communication but e.g. this is often denied in corporations where managers demand to have access to the mailboxes of their employees, giving them excessive power to manipulate. Some features like CC and BCC turn email in semi-public communication adding possible manipulative features.

> Il faut aussi qu'idéalement les récepteurs sois relativement homogènes linguistiquement (c'est-à-dire socialement), homogènes en connaissance de la langue et en reconnaissance de la langue, et que la structure du groupe ne fonctionne pas comme un système de censure capable d'interdire le langage qui doit être utilisé. [...] Un langage légitime est un langage aux formes phonologiques en syntaxiques légitimes, c'est-à-dire un langage répondant aux critères habituels de grammaticalités, et un langage qui dit constamment, en plus de ce qu'il dit, qu'il le dit bien. Et par là, laisse croire que ce qu'il dit est vrai: ce qui est une des façons fondamentales de fair passer le faux à la place du vrai. Parmi les effets politiques du langage dominant il y a celui-ci: 'Il le dit bien, donc cela a des chances d'être vrai.' » (Bourdieu 1984,p. 103-104)

When people speak different languages they are often short of reciprocal acceptance. Minorities have no access to the 'dominant discourse'. A 'dominant discourse' often turns into hegemonic discourse. A hegemonic discourse is one, which has become so embedded in a culture that it appears silly to ask "Why?" about its assumptions. It is capable not only of determining answers, but also the questions, which can be asked. Censorship, taboo, suppression, manufactured consent, repression and control are all different but they work in the same direction.

Bourdieu thus describes the presuppositions of communications in the social field. Presuppositions are a typical pragmatic topic.

> "Presupposition is a second major topic in pragmatics, and concerns the way in which propositions already presumed in a discourse context are usually not stated or questioned, but encoded in a more 'background' way." (Levinson, 1998, p. 5)

We see no problem in inserting Bourdieu's proposal into 'relevance theory' on condition we also insert 'shared reference' into the inference process. We have to add to his proposal what is specific - or is there no difference - for the Internet.

> "Computer networks do not guarantee democratic, equal-opportunity interaction, any more than any previous communication technology has had that effect. Pre-existing social arrangements carry over into cyberspace to create an uneven playing field, and computer mediated communication can be a tool of either oppression or resistance." (Herring, 2001, p. 13)

While utopian theorists might be disappointed by this outcome, it is a reality. Collisions between the social reality and virtual reality are inherent. Though computer networks do not guarantee equal-opportunity interaction, this is not perceived that way when immediate feedback is missing.

> "Since the effect of the majority opinion is diminished, individuals with deviant opinions are more likely to hold out that to succumb." (Smilowitz, Compton and Flint,1988, p 320)

Smilowitz et alii attribute this to the absence of physical cues focussing attention exclusively on the text, the lack of a sense of others' presence to enforce social norms and the lack of non-verbal informational cues to encourage or discourage particular choices. (Smilowitz, Compton and Flint,1988)

I do not agree with those who pointed to the 'lack of authority' on the Net to explain the chaotic perceived. A person doesn't dismantle mentally when on the Net. He will behave on the Net like he is behaving or wanting to behave in the real world, but this remains hidden behind the terminal. Authorities in the real world like our shopkeeper add to communication pollution

as well. Net etiquette isn't working when not all players do accept it. My experience is that it works fairly well in groups having strong common goals and meeting each other in the real world regularly. But of course you need only one person wanting to sap discourse and impose his viewpoint and you have problems. I think this too is rather to happen when somebody is inflicting authoritarian compulsions. Authority is mostly at the origin of communication pollution.

A great number of paradoxes restraining inference can be found in the political field. We call it hypocrisy. We live in a society claiming to defend free speech, free flow of information and democracy but that society is not offering channels to its citizens. What's more: American authorities sabotages reporting of its wars, by shooting at journalists and initiating media wars and media control. In Italy Burlusconi owned and controlled 95% of the media. While the capacity of telecommunication has never been higher before, the media have never been in the hands of fewer persons. The big mass is reduced to silence. The US claim to defend privacy, democracy and free market all over the world, but it is spying its citizens and is tapping international phone lines with modern technology, spying on international bank traffic in order to steel contracts of European industry. 'Bush' who claims to bring democracy with force. Etc.

> "CMD also inherits power asymmetries from the larger historical and economic context of the Internet. These include the traditional dominance of the United States as the leading source of computer network technology (Yates, 1996b), the fact that the cost of the equipment required to set up and access computer networks creates "haves" and "have nots", both within the U.S. and globally (Petrazzini & Kibati, 1999), and the continuing overrepresentation of white, middle class, English-speaking males in positions of control as Internet mode and site administrators (Shade, 1998). These circumstances advantage certain groups of Internet users over others, and call for critical CMD analysis that is sensitive to issues of power and control." (Herring, 2001, p. 12)

Some social groups do not get a hearing in society because their habitual forms of discourse are not privileged, not recognised as legitimate or even "sensible" by those who control the media and exercise power. Thus a major task of the women's movement in the 'seventies and later was to break through a credibility barrier (even among other women) so that their voice and their arguments, could be heard.

Conclusion

The situation is not hopeless. First we must mention that some features of email also can be advantageous in preventing ambiguity and conflicts. Once you know email is quite different from face-to-face communication you can avoid ambiguity and conflicts bearing this in mind. Therefore one must become conscious about how face-to-face communication works and try to replace the contextual evidence by written evidence. This isn't mere a transposition of spoken language into written language, we must rethink and recompose the whole conversational discourse in a written discourse.

But even then ambiguity lurks after every corner. When a conflict arises by email we collapse in a scattered Diaspora, become roamers behind a desk, we lack embodiment. The situation can be compared with a scene in a hotel bar. Two drunkards telling their life stories, unable to catch up with reality, unable to share their separated worlds… they will leave both thinking nobody in the whole world is able to understand them.

Absolutely the simplest and best way to avoid misunderstaning online is to avoid emails altogether. This may sound silly, but it's true. A large number of problems with bad email wars come out of the simple fact that the problem is way too hot to easily deal with "face-to-face," so people hide behind their electronic shield. Overtness anticipates conflicts. **The mind is like a parachute it only works when it's open** (Frank Zappa).

In fact we didn't have to amend much our worst-case scenario we started with, we only had to shift from poor language to poor communication resulting in poor language. Email communication is impoverished communication lacking the possibility of inference, grasping the intentions of our collocutor, typical activities that let us resolve ambiguity. When ambiguity arises in email it can lead to a conflict that easily escalates. It's far better to prevent ambiguity in email and when it occurs to role back to face-to-face communication.

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