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## **SCHEMATA AND ASSOCIATIVE PROCESSES IN PRAGMATICS**

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### **Abstract:**

The notion of schema has been given a major role by Recanati within his conception of primary pragmatic processes, that is, associative processes presumed to deliver the explicit content of utterances. I propose that schemata are just a manifestation of our basic ability to create motivated associations on the basis of environmental regularities we detect. In this perspective, associative relations have enough structure to license inferential effects without any appeal to genuine inferential processes. Associative processes are then able to explain a number of pragmatic and linguistic phenomena which have been thought instead to require specialized inferential processes.

**Keywords:** schemata; associative processes; inference

### **0. Introduction**

Within the general issue of how far we can go in explaining pragmatic phenomena by way of associative processes (Recanati 2004; Mazzone 2009) an important topic is the possible role of schemata.<sup>1</sup> Recanati (2004) has devoted a couple of insightful pages to this topic, in particular, to how schemata could drive the search for coherence between activated representations. My present aim is to extend that analysis in two ways.

In the first place, I intend to show that Recanati's considerations on schemata support a strong argument in favor of associative versus inferential explanations in pragmatics. In Recanati's view, certain pragmatic phenomena can be explained in terms of associative processes, and therefore they do not require the kind of inferential reasoning that from Grice on has been considered the hallmark of pragmatic processing. On the contrary, Relevance Theory (from now on, RT; Sperber and Wilson 1986/1995; Wilson and Sperber 2004; Carston 2002) makes the assumption that pragmatic processes are inferential across the board; in practice, utterance interpretation is thought to be obtained through a non-demonstrative inference process taking a set of premises as input and yielding a set of conclusions as output. However, the main argument offered by RT against associative approaches fails to take in the due consideration the way in which schemata may

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<sup>1</sup> In general terms, associative processes are processes based on associations between representations – an idea which has been central in the philosophy of British Empiricism and has gained new impetus from psychology, neuroscience and artificial intelligence in the last half century (for a brief overview, see Fuster 2003, 6-10). In particular, Recanati (2004) makes specific reference to processes based on the spreading of activation through networks of associatively related representations.

As for schemata, the notion in its modern sense has been introduced by Bartlett (1932), and made famous by Neisser (1967). Together with partial synonyms such as “frame” and “script”, the term “schema” refers to structured patterns of information stored in memory. As we will see, Recanati (2004) makes use of the notion in order to explain how associative processes might be constrained by a search for coherence in interpretation.

constrain and drive these processes. In point of fact, relevance theorists acknowledge a role both to associative processes and to schemata. But this role cannot but be peripheral, to the extent that RT conceives of associative relationships as unmotivated and based on mere statistical co-occurrence; as a consequence, RT assigns the power to reach a motivated interpretation exclusively to inferential processing. Recanati has shown, instead, that associative processes can be constrained by schemata so as to deliver motivated interpretations. More radically, as I will argue by generalizing the notion of schema, it can be doubted that associative relationships are unmotivated at all. On the contrary, they have enough structure in themselves to license – without any appeal to an inferential mode of processing – the inferential effects which are made explicit in traditional pragmatic reconstructions. This is probably what Recanati intends when he incidentally claims that associative processes may well mimic inferential processes (see below). Not only do these considerations show that RT's argument against associative explanations is flawed, insofar as associative accounts have the resources to explain certain pragmatic phenomena; they also pose a problem for inferential accounts, since it is not clear why one should make appeal to genuine inferences in comprehension once it is realized that associative processes – that is, the best established cognitive mechanism in psycholinguistics in particular and cognitive science in general – do account for inferential effects.

There is a second sense in which I propose to extend Recanati's analysis of the role of schemata in associative processing. Schemata, I will claim, may also play a key role with reference to other phenomena than the ones Recanati refers to; in particular, schemata may contribute to the explanation of both other pragmatic phenomena – such as the consideration of the speaker's beliefs – and other levels of linguistic processing besides pragmatics. This claim is closely related to our previous considerations: since the dynamics of associative activation is but the other side of the general cognitive ability to detect and store regularities of any kind, we may expect that our considerations about schemata generalizes to any domain of experience. However, by this claim I part company with Recanati (2004). In his view, associative processes apply only to specific pragmatic phenomena at the lexical level, while the most traditional Gricean phenomena – including consideration of the speaker's beliefs – would require proper inferential processing.<sup>2</sup> On the contrary, I see no reason why consideration of the speaker's beliefs and other pragmatic phenomena should ask for genuine inferential explanations, once we take into account the full power of associative processes.

In sum, my position has commonalities with, and differences from, both RT and Recanati's view. I share with RT the idea of one single automatic mechanism for the explanation of any pragmatic fact. On the other hand, relevance theorists assume that such an automatic mechanism is nonetheless properly inferential; my suggestion – in line with Recanati's view of lexical pragmatics – is, instead, that it is associative, and that its inferential effects are a side effect of the dynamics of associative activation.

This is not to say that an explanation at a purely subpersonal level is all we need in pragmatics. A widespread intuition is that pragmatic interpretations are something that is adopted by a *subject*, at a personal level. I think that this intuition is correct; my view is that subpersonal automatic processing cooperate with personal, controlled processing in almost every episode of utterance understanding. However, the cooperation between personal and subpersonal processing is largely beyond the scope of this paper (see Mazzone in preparation). My point here is just that inferential effects can be granted at a subpersonal level, by way of purely associative processes.

In practice, I will start (section 1) by introducing Recanati's (2004) appeal to schemata in the service of his conception of primary pragmatic processes, conceived as a type of associative processes. Then, in section 2, it will be argued that an appeal to associative processes in pragmatics has very strong grounds, and that to some extent also RT has to grant this. Section 3 will analyze RT's main argument against associative accounts, and will find it inconclusive insofar as it does not take into consideration the role played by schemata in constraining associative processes. Thanks to this contribution of schemata, associative processes may be thought to have the capacity to mimic inferential processes. This conclusion will be generalized in section 4: it is argued that associative

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<sup>2</sup> In Recanati (2007), it must be said, a partial revision of this position is suggested. I will discuss this below.

relations in general, far from being purely based on statistical co-occurrence, have a motivated structure, and that schemata are but especially evident instances of motivated associative relations. Section 5 will be devoted to show how the same associative mechanisms described here can substantiate an overall theoretical framework in linguistics, and section 6 to assess whether those associative mechanisms may account for a consideration of the speaker's beliefs.

### **1. Primary pragmatic processes and schemata**

Grice (1989) has famously distinguished between two layers of meaning: “what is said” by an utterance, and “what is implicated” by the speaker in uttering that utterance in a specific situation. In Grice's own account, determining what is implicated requires an inferential step: the hearer has to draw some implicatures, that is, a specific type of implications based on a certain number of general assumptions about the speaker's rational attitude towards communication. In contrast, the mere comprehension of what is said is conceived by Grice as a process that involves neither assumptions about speakers nor inferences. To put it in terms that have become established in current debates, while determining what is implicated is supposed to require a genuine pragmatic process, determining what is said would rather ask for a semantic process based on linguistic meaning, and appealing to context only to the very limited extent that this is mandated by linguistic form.

More recently, however, some scholars have argued against this picture by claiming that the distinction between what is said and what is implicated, for clear and important that it can be, cannot be framed in terms of a distinction between semantics and pragmatics. Understanding what is said would require a substantial appeal to contextual factors as well, well beyond what is mandated by linguistic form: hence, also the determination of what is said would be a pragmatic affair, in the end. In this respect, Recanati and relevance theorists find themselves on the same side of the divide: they share a so-called contextualist position with regard to the determination of what is said. Where they part company is when it comes to the role of inferential processes based on assumptions about the speaker.

Relevance theorists reject the Gricean view that inferential processes intervene only in delivering what is implicated: in their framework not only the determination of both what is said and what is implicated is a pragmatic affair, but, moreover, one and the same process is responsible for the two, and this is precisely an inferential process involving assumptions about the speaker. In contrast, on this point Recanati has a more conservative view in the sense that it preserves Grice's intuition about the special character of implicatures. Recanati believes in fact that the processes delivering the explicit content of the utterance (what is said), although pragmatic in their own right, are of a different nature from the properly inferential processes which Grice had proposed as an explanation of the implicit content (what is implicated). Primary pragmatic processes – as Recanati calls the former, while the latter are dubbed secondary pragmatic processes – are conceived of as local associative processes, based on the spreading of activation within conceptual networks and the consequent degree of activation of concepts in the network. In other words, a concept would be contributed to the explicit content of the utterance insofar as that concept is the most accessible (i.e. the most activated) for the system given the situation. In Recanati's words:

“In the model I have in mind, the literal meaning of the expression is accessed first and triggers the activation of associatively related representations. That literal meaning is a natural candidate for the status of semantic value, but there are others: some of the representations activated by association contribute further candidates for the status of semantic value. All candidates, whether literal or derived, are processed in parallel and compete” (Recanati, 2004: 28).

It is important to consider the temporal dynamics of this parallel processing and competition. In Recanati's picture, literal meanings have an initial advantage over other possible candidates; this cannot imply of course that literal meanings – or, more generally, concepts endowed with an initial advantage – always win the competition. Recanati (2004) emphasizes the importance of what he calls “accessibility shifts”: in the course of processing, contextual information may change the

accessibility of any concept activated previously, by adding a new train of activation to the process.

For a very simple example of disambiguation (see Carston 2007), let us consider the following utterance:

- (1) I'm going to the bank now to get some cash.

Since there are two possible meanings for “bank” (FINANCIAL INSTITUTION, RIVER SIDE)<sup>3</sup>, the problem is how the system may come to choose the right one. Let us suppose that, for whatever reason, at the moment when the lexical form “bank” is processed the most accessible meaning is the wrong one (RIVER SIDE). However, we can expect an accessibility shift as soon as the word “cash” is processed, since this word activates its meaning, which in turn triggers a number of concepts having to do with money, and this presumably provides further activation to the concept of bank as financial institution. As Carston (2007) notes, it is also possible that starting from the activation of CASH, a stereotypical frame or script for GETTING MONEY FROM A BANK<sub>1</sub> (where BANK<sub>1</sub> = FINANCIAL INSTITUTION) is recalled, thus further strengthening the activation of BANK<sub>1</sub>.

This last suggestion is crucial, and it goes in the same direction as Recanati's discussion of the role of schemata: the key point is the contribution of knowledge frames in bridging conceptual contents in the service of comprehension. Recanati (2004) addresses this issue through the analysis of the following utterance:

- (2) John was arrested by a policeman yesterday; he had just stolen a wallet.

Here the focus is on how to assign a reference to the pronoun “he” in the second sentence. Just as in the above case of ambiguity, as soon as the pronoun is uttered we may assume to have two candidates, John and the policeman, and even supposing that for some reason the policeman is at that moment a more accessible candidate than John, the situation can be expected to change when the whole sentence is processed. The reason is that the predicate “had stolen” can be thought to recall a frame or schema where stealing and being arrested are connected in such a way that one and the same person is the subject of both.

“This schema is jointly activated by the predicates 'was arrested' and 'had stolen'. An interpretation in which the same person steals and is arrested (and in which he is arrested because he has stolen [...]) satisfies the schema, and is more likely to be selected than one which violates it” (Recanati, 2004: 36).

In this way, schemata drive the interpretation process by promoting the search for coherence in interpretation: “Coherent, schema-instantiating interpretations [...] tend to be selected and preferred over non-integrated or 'loose' interpretations” (Recanati, 2004: 37). It must be emphasized that this coherence-producing role of schemata is said to depend on an entirely associative mechanism: on the one hand, “a schema is activated by, or accessed through, an expression whose semantic value corresponds to an aspect of the schema”; on the other hand, the “schema thus activated in turn raises the accessibility of whatever possible semantic values for other constituents of the sentence happen to fit the schema” (ibidem).

As an account of primary pragmatic processes and the role of schemata within them, this is enough for our purposes. Now, relevance theorists, and especially Robyn Carston (2007), have argued against Recanati's distinction between primary and secondary pragmatic processes with arguments that I find in part convincing. Nonetheless, as far as I can tell, the thesis that the sort of associative processes described above have a role to play in utterance understanding cannot be easily dismissed, for reasons we will address in the next section.

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<sup>3</sup> We follow the convention of writing concepts with capital letters.

## 2. The dynamics of accessibility

To put it simply, a first general point is that associative processes are a well-established fact with regard to the basic functioning of our cortex in its entirety, and it is very hard to find a domain of cognitive processing which stays entirely unaffected by them. In particular, there is the largest possible evidence that we collect information from the environment by coding regularities thanks to the strengthening of synaptic connections between neurons and between neuron assemblies, and that we can subsequently exploit that information thanks to a simple dynamics of accessibility: the more two pieces of information are regularly connected in our experience, the more the connections between them (between their representations) are strong, and the more accessible they are to each other. Since this is basically the way in which we detect and store information, it can be expected that associative access forms the basis of the brain's automatic activity every time we have to resort to our stored knowledge.

I see no reason why pragmatic processes should be an exception to this generalization: to the extent that they need to resort to information of sorts – be it lexical information linked to words, or more general world knowledge – it is reasonable to expect that associative processes of the kind described above are at play. Interestingly, as a matter of fact such an assumption appears to be made in many places within relevance theorists' work. For instance, let us consider Wilson and Carston's (2007) explanation of how, in accordance with RT, the word “angel” could be interpreted metaphorically in the following question-answer pair:

- (3) Peter: Will Sally look after the children if we get ill?  
Mary: Sally is an angel.

Wilson and Carston (2007: 28)<sup>4</sup> make appeal to the fact that “the stereotypical angel is a good angel, and the encyclopaedic properties of stereotypical category members are likely to be highly accessible as a result of frequent use”. This would cause that certain properties – such as EXCEPTIONALLY GOOD AND KIND, WATCHES OVER HUMANS AND HELPS THEM WHEN NEEDED, etc. – “are likely to be strongly activated” (ibidem). These properties could then “receive additional activation from other items in the context” (ibidem): for instance, Peter's question may arguably reinforce the features of goodness and helpfulness. Although this account is intended to be embedded in a relevance-theoretic framework, here a key role is clearly assigned to the dynamics of accessibility: stereotypicality and frequency of use are said to account for the accessibility of concepts and properties, and hence for their degree of activation; moreover, activation may change as an effect of new contextual inputs – an accessibility shift, in Recanati's terms.

Apart from specific examples, a vast number of explanations in RT's writings are framed in terms of representation accessibility and activation. Such a propensity has also been explicitly theorized and embraced in some occasions. For instance, Wilson and Carston (2006) ask themselves how much their explanation of metaphors should

“mesh with psycholinguistic investigations of the online comprehension process designed to show, for instance, [...] at what stage a particular feature associated with the encoded concept may be activated or suppressed. Let's suppose that the feature FEMALE ROYAL is closely associated with, hence activated by, the encoded concept PRINCESS [...]” (Wilson and Carston, 2006: 405).

Wilson and Carston's answer is that RT, along with other cognitively oriented approaches, aims to provide an account of metaphor which is consistent with the sort of explanations here referred to. In their “Concluding remarks”, they explicitly explain where associative considerations of this sort would dovetail RT. While other accounts of metaphor

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<sup>4</sup> Here and below, page numbers refer to the online version of the paper:  
<http://www.phon.ucl.ac.uk/home/robyn/pdf/Wilson-Carston-Unitary-Approach-2007.pdf>.

“(specifically those in the cognitive linguistics literature) appeal to (non-inferential) associative mechanisms based on domain mappings of one sort or another [...] on our inferential account, such associative links may affect the outcome of the mutual adjustment process by altering the accessibility of contextual assumptions and implications, but the resulting overall interpretation will only be accepted as the speaker’s intended meaning if it satisfies the hearer’s expectations of relevance and is properly warranted by the inferential comprehension heuristic discussed [above in that paper]” (Wilson and Carston, 2006: 429).

What this citation suggests is that associative mechanisms might play their role in the initial stages of pragmatic processing, by determining the degree of activation of concepts and properties which are then to be injected in the properly inferential component of the process. Wilson and Carston (2007) propose a unitary account of lexical pragmatics according to which, in the usual inferential jargon, an appropriate set of encyclopaedic assumptions is selected “to act as premises for the derivation of the expected contextual implications”; but we are explained that

“The appropriateness of different sets of encyclopaedic assumptions depends, on the one hand, on their degree of accessibility in the particular discourse context, and, on the other, on the potential contextual implications they yield” (Wilson and Carston, 2007: 31).

In other words, derivation of contextual implications and the dynamics of accessibility are seen as two distinct components of the comprehension process, with concepts and properties being at the junction of the two: on the one hand, concepts are activated by associative processes, while, on the other hand, they feed the properly inferential side of the process. To be more precise, RT is clearly committed to a non-linear conception of pragmatic processing: they speak of a mutual adjustment mechanism working in parallel, without a rigid sequential order. In this vein, the integration between associative activation and derivation of implications should not be thought of as if the former necessarily came before the latter. Expectations about possible contextual implications could drive the process from the beginning, while derivations fed by new inputs could change the degree of activation of some concepts or properties.

In sum, relevance theorists acknowledge that associative processes are a well-established psycholinguistic fact, and assign a role to these processes in their account of utterance understanding. However, this role is only peripheral, insofar as it is inferential derivation of contextual implications which is judged to be a genuine pragmatic process. Here the first thing to notice is that, on epistemological grounds, associative activation and inferential derivation do not have the same status: the latter is not nearly as established as the former; it is in fact largely hypothetical.<sup>5</sup> Secondly, if it is true – as I am going to argue in a moment – that associative processes have the power to produce inferential effects, then the hypothesis of a genuine inferential process in utterance understanding appears to be wholly redundant, or even worse, difficult to accommodate.

### **3. Inferences by associations?**

In his reply to Carston (2007), Recanati (2007: 3)<sup>6</sup> suggests that “[his] 'dumb' processes of activation and association may well mimick the smart, inferential processes posited by Relevance Theory”. Is it possible to make sense of this suggestion? Is it possible to mimick inferential

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<sup>5</sup> Of course, here I do not refer to inferential derivations in general, but to the hypothesis of automatic inferential processes in pragmatic processing. There is no doubt that we humans do make inferences in explicit reasoning. The question is how much empirical support has the claim that we understand utterances by way of automatic inferences we are not conscious of.

<sup>6</sup> Here and below the page numbers refer to the online version of the paper:  
[http://jeannicod.ccsd.cnrs.fr/docs/00/05/36/65/PDF/ijn\\_00000633\\_00.pdf](http://jeannicod.ccsd.cnrs.fr/docs/00/05/36/65/PDF/ijn_00000633_00.pdf)

processes by way of association-and-activation processes?

Within RT, the clearest and most extensive argument against associative accounts has been put forth by Wilson and Carston (2007) in the context of a discussion of lexical pragmatics, where the authors take into consideration, besides RT's inferential account, also some purely (or predominantly) non-inferential accounts and mixed associative/inferential approaches. The general line of thought is made clear through the analysis of Kintsch's (2000, 2001) connectionist model. Kintsch

“uses a spreading activation model based on *statistical associations among lexical items in a corpus* to account for differences between the literal and metaphorical interpretations of the predicate 'is a shark'. According to his data, close associates of the word 'shark' include the words 'fins', 'dolphin', 'diver', and 'fish', and these associations provide the basis for his account. These are classic cases of non-inferential association, in which the associates of 'shark' are *not logically related to it in any systematic way* (for instance, 'x is a shark' entails 'x is a fish', but does not entail 'x is a dolphin' or 'x is a diver') and the associations provide *no basis for drawing warranted conclusions*” (Wilson and Carston, 2007: 21, my emphasis).

Wilson and Carston presume that there is a general cognitive lesson to be learned, and it is that although all inferential relationships are also associations (in that “an inferential mechanism establishes systematic correspondences between (constituents of) premises and (constituents of) conclusions”, *ibidem*), not all associations are inferential.

“In the minds of many speakers of English, for instance, 'shark' is non-inferentially associated with 'diver', 'salt' with 'pepper', 'love' with 'hate', and so on” (Wilson and Carston, 2007: 23).

As a consequence, “purely or partly associative accounts will vastly overgenerate, and some method of filtering out unwanted associations will be required” (*idem*: 35). To sum up, the general idea seems to be that associative processes are unconstrained with respect to drawing warranted conclusions about both what is said and what is implicated by an utterance. So the question is: is there any way in which associative processes could constrain themselves, so to speak?

First of all, it is important to keep in mind a mechanism which is part of Recanati's account of primary pragmatic processes: apart from the mere spreading of activation in a conceptual network, we need to consider the dynamics of different trains of activation interfering with each other by adding or subtracting activation to previously activated items. More specifically, Recanati has focussed on how this dynamics could promote a search for coherence thanks to the mediating role of abstract schemata.

Let us recall the two examples we considered before:

- (1) I'm going to the bank now to get some cash.
- (2) John was arrested by a policeman yesterday; he had just stolen a wallet.

In the first example, a schema for GETTING MONEY FROM A BANK<sub>1</sub> (=FINANCIAL INSTITUTION) is supposed to account (at least in part) for the fact that the right meaning is chosen between the two candidates for “bank” (FINANCIAL INSTITUTION, RIVER SIDE). In the second example, in order to explain how the right reference for “he” is selected, Recanati appeals to a schema connecting stealing and being arrested in such a way that one and the same person is the subject of both (more formally: STEAL (X) – IS ARRESTED (X)). To be more precise, Recanati thinks that the information coded by the schema might be richer than this: presumably, it also includes a causal relationship between the predicates, so that

“[a]n interpretation in which the same person steals and is arrested (and *in which*

*he is arrested because he has stolen [...] satisfies the schema, and is more likely to be selected than one which violates it*" (Recanati, 2004: 36, my emphasis).

In this sense, according to Recanati schemata provide the world knowledge which is apt to drive the interpretation process in a top down way: not only they constrain the blind spreading activation process, they also add information which does not correspond to any aspect of the uttered sentence (Recanati, 2004: 37). In our example, the schema may provide the stereotypical information that the relation between stealing and being arrested is a causal one.

A first consideration to be made is that, once again, Recanati is making appeal to a piece of explanation which cannot be dismissed easily, and that is in fact presupposed by RT's account as well: the need for schemata accounting for our world knowledge. Let us consider, for instance, the following example made by Carston (2007) to illustrate how RT explains utterance interpretation:

- (4) Ann: I expected Jane to be here by now.  
Bob: She missed her coach.

Carston's account of how the meaning of "coach" is selected is along the usual lines of RT: it has the form of a derivation of conclusions from certain assumptions. Now, what is of particular interest to us is one of the assumptions:

MISSING A DESIGNATED COACH<sub>2</sub> IS A REASON FOR A PERSON NOT ARRIVING WHEN EXPECTED

where COACH<sub>2</sub> stays for the interpretation of "coach" as a bus, rather than an instructor. This assumption is clearly a frame of knowledge rooted in our experience; a script of this sort is probably part of people's world knowledge in Western countries. Not only is the assumption a schema in Recanati's terms, it is also structurally similar to the schema

STEALING IS A REASON FOR A PERSON BEING ARRESTED

in our previous example. Therefore, Carston's explanation can be certainly said to make use of schemata. But this conclusion plausibly applies to any of RT's examples since, without frames of knowledge of this kind, no pragmatic derivation could be performed at all.

Moreover, schemata appears to serve the same purpose in both Recanati's and RT's accounts we have considered: they help to select the correct meaning of ambiguous words. Conceptually, we may say that schemata narrow the logical space of interpretation, by discarding properties (reference assignments, etc.) which might suggest alternative lines of interpretation, and by preserving only the conceptual pieces which can be made sense of, insofar as they are subsumed under a rule – so to speak. In a word: schemata contribute to filter out unwanted associations. In this perspective, it makes perfectly sense that RT adopts an association-and-activation mechanism as the first stage of processing in lexical pragmatics (see our discussion in section 2). A proliferation of the concepts potentially involved in interpretation is needed anyway – it accounts for the treatment of polysemy, for the adjustment of meaning to contexts, including meaning transfers etc.. In Carston's example (4), we may well imagine that both meanings of "coach" (BUS, INSTRUCTOR) are associatively activated. But then, we need a mechanism for discarding the wrong associations, and this is where schemata intervenes: they tell us which pieces of information fit each other, and which do not, in accordance with our world knowledge.

Where RT and Recanati part company is with regard to how this conceptual description of the role of schemata – as filtering out unwanted associations – is cashed out in processing terms: whether by way of associative or inferential processes. In RT's perspective, schemata are assumptions acting as premises (or conclusions) in inferential derivations. However, this is not the only possibility: contrary to Wilson and Carston's claim, also associative accounts may grant an

explanation of how schemata filter out unwanted associations. In practice, as Recanati has insightfully observed, schemata can be associatively activated by any of their constituents, and then in turn activate concepts they are constituted of while presumably inhibiting competing ones. In the previous example, the activation of the schema MISSING A DESIGNATED COACH<sub>2</sub> IS A REASON FOR A PERSON NOT ARRIVING WHEN EXPECTED may be expected to further activate the concept BUS while inhibiting the concept INSTRUCTOR. Schemata thus bridge pieces of information (the concept BUS and other contextual items) in a motivated manner, thus filtering out unwanted associations. Since schemata are structured patterns of information, they in fact introduce a conceptual structure within the activated network of contents, so that the final outcome of the associative dynamics is far from random. This is probably why Recanati claims that associative processes may well mimic inferential processes: because schemata constrain the associative dynamics so as to obtain a motivated outcome, i.e., the same outcome that would be obtained through an inferential process employing the same schemata as assumptions (or conclusions).

For instance, the schema

MISSING A DESIGNATED COACH<sub>2</sub> IS A REASON FOR A PERSON NOT ARRIVING WHEN EXPECTED

may be intended both as an assumption in an inferential derivation and as an activated pattern of representation in an associative process: in both cases, it may play a key role in the explanation of how the right meaning of “coach” is selected. Or, for another example, let us recall the question-answer pair in (3):

- (3) Peter: Will Sally look after the children if we get ill?  
Mary: Sally is an angel.

As we saw, Wilson and Carston observe that some of the features associated to “angel” could receive further activation from items in the context: for instance, Peter's question might reinforce the features of goodness and helpfulness. This amounts to suggesting the existence of a schema which correlates these features with certain behaviors (looking after the children, helping ill people). Such a schema could also be recruited as an assumption in an inferential account of (3). However, it is interesting that in this case even Wilson and Carston (2007) seem to explain the augmented activation of certain features by way of an associative dynamics implicitly involving schemata, rather than by way of an inferential derivation recruiting those schemata as assumptions.

In sum, Wilson and Carston's argument against associative accounts does not seem to be conclusive: associative accounts may have an explanation of how unwanted associations are filtered out. This explanation, based on the notion of schema, has also the resources to explain how inferential effects might be obtained without inferential processing: associative processes constrained by schemata have a motivated outcome, that is, an outcome that can be accounted for by post hoc reconstructions where the same schemata are taken as assumptions (or conclusions) in inferential derivations. But then, one may wonder why we should appeal to a genuinely inferential account, insofar as we may count on a largely best established explanation – that is, by associative processing – of the same phenomena.<sup>7</sup> Even worse, one may wonder how a genuinely inferential account can be reconciled with an associative one. Since nearly everyone grants that associative access forms the basis of the brain's automatic recovery of stored knowledge, and since schemata are but patterns of stored knowledge, why and how the contribution of schemata – as it has been described by Recanati – should be blocked within associative processes, while schemata would rather be recruited in processes of a completely different kind, that is, inferential derivations?

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<sup>7</sup> To repeat: as it should be clear, I am not denying that post hoc, conscious inferential reconstructions are occasionally made and have a role to play in human reasoning and communication. I just want to suggest that we do not need to postulate an automatic inferential process of comprehension.

#### 4. Schemata and contingencies

The previous considerations do not imply that there is nothing unconstrained in association-and-activation accounts: the spreading of activation in conceptual networks *is* relatively unconstrained, insofar as it is a blind bottom up process. But, as Recanati has noticed, the dynamics of accessibility has in itself a counterbalance to spreading activation, since we can count on a number of structured representations which constrain the process in a top down way. In other words, to the extent that activated contents are already arranged in a motivated manner – they are in fact constituents of schemata – their blind activation is soon submitted to a reciprocal assessment of coherence: each accessed content activates related schemata, which may compete or integrate with each other, until they coherently frame the whole situation. It should be emphasized that this assessment is top down only in the limited sense that current inputs are arranged and understood thanks to the contribution of (more) general information. We are not making appeal to any top down personal process – as I said, the contribution of that kind of processes is matter for another paper. So, in a sense we are still speaking of blind, subpersonal processes, delivering smart effects all the same.

Now I would like to go even a bit further: it is not only that Wilson and Carston's argument is not conclusive, in that it underestimates the possibility that associative processes constrain themselves; also the premise of their argument is at risk of misrepresenting associative phenomena. The premise is that associated contents are “not logically related [to each other] in any systematic way” (to repeat Wilson and Carston's words). This assumption, to be honest, is widespread through the literature, probably for the same reason that it is adopted by Wilson and Carston: because scholars have in mind “statistical associations between lexical items in a corpus” (again, in Wilson and Carston's words). However, some considerations are in order. First, the fact that lexical items in a corpus have no other relation with each other than their co-occurrence in texts does not mean that they have no motivated relation at all: they have in fact a rather specific type of relation, one of the greatest importance for human cognition. The sensitivity to the distribution of words in texts is a component of our ability to arrange new utterances – more or less so depending on the theory of syntax and semantics one embraces. Second, there is no reason on earth why we should identify associative relations exclusively with statistical associations between lexical items. Our cognitive system is sensitive to different types of contingencies (also outside texts, luckily): part-whole contingencies, spatial contingencies, temporal contingencies, causal contingencies and so on. Co-occurrence of words in a text is but one of these many types. Third, as it seems, it is not as if something from outside had to tell our cognitive system what to do with temporal, rather than – let's say – causal or textual, contingencies: in other words, contingencies are not stored in such a way that the relationships between their elements are in need of interpretation. On the contrary, our coding of contingencies preserves information on both which contents are connected with each other and *how* they are connected. Thus, stored spatial contingencies are put to use in arranging inputs spatially, stored causal contingencies bridge inputs in accordance with causal schemata, and so on and so forth.

In sum, it is wrong to equate associative relationships with statistical co-occurrences of lexical items, insofar as the latter are only a particular kind of the former. And it is wrong to assume that associative relationships are not logically related to each other in any systematic way; on the contrary, any kind of associative relationships has its own logical structure (causal, spatial, textual and so on). Therefore, one may doubt that there is a clear boundary between representation of contingencies in general, on the one hand, and the notion of abstract schema we considered above, on the other: in the end, all our representations are endowed with structure. In this sense, schemata, frames, scripts and the like can be considered just different manifestations of a more basic phenomenon: our brain's capacity to detect and code patterns of contingencies of different sorts in our sensory and motor experience (e.g. Fuster 2001, 2003; Mazzone and Lalumera 2010; Plebe and Mazzone in preparation). The abstract schemata (frames, scripts, etc.) we are used to refer to in pragmatics – such as, for instance, MISSING A DESIGNATED COACH<sub>2</sub> IS A REASON FOR A PERSON NOT ARRIVING WHEN EXPECTED, or STEAL (X)-IS ARRESTED (X) and so on –

are simply stored contingencies that we need for our explanatory purposes, and that we assume are general enough for being attributed to normal speakers, or to normal cognitive subjects in general. But all associations have a schematic structure, insofar as associated contents are logically related to each other in a variety of systematic manners.<sup>8</sup>

If this is true, we should expect that our previous considerations on the associative dynamics generalize to many other phenomena than the ones considered by Recanati. As we have argued, throughout our experience associative relationships arrange mental contents into the same logical structure we may also occasionally exploit in reflective reasoning. Associative relations are then rich enough for associative processes to explain cognitive phenomena which have been thought instead to ask for rule-based, specialized processes. An important example is linguistic theory, as we are going to show in the next section.

### 5. Schemata and linguistic theory

It can be shown that constraint-based accounts in linguistics<sup>9</sup> make implicitly use of the very same notion of associative schema we described above. This opens the possibility to imagine a unified explanation for strictly linguistic and pragmatic phenomena – and of course, for extralinguistic phenomena as well. Moreover, an argument can be arranged (along the same line of reasoning as above in section 2) to the effect that linguistic theory should take into account associative processes and that this leaves little room for alternative rule-based explanations.

Let us start from this last point. As we already noticed, associative processes based on the detection of regular co-occurrence of stimuli in the world are the basic mechanism for storage of information in the brain and for its subsequent exploitation. Besides, for all we know, there is no evidence that such a mechanism is specifically dismissed or neutralized in the presence of linguistic input. Therefore, we should not disregard the role plausibly played by associative processes in language processing, although this might raise the problem of how to integrate associative and specialized linguistic processes. But a further question is: once we grant that associative processes play a role in linguistics, is it the case that we still need specialized processes? A negative answer has been given for instance by Jackendoff (2002, 2007a, 2007b). Although his theory has its roots in Generative Grammar, he has maintained that linguistic phenomena – syntax included – may be explained by a general-domain, constraint-based mechanism. Crucially, while in the mainstream view of Generative Grammar phrase structure has been represented in terms of *procedural rules*, Jackendoff proposes that any linguistic information including phrase structure is rather captured by regular patterns of representation essentially abstracted away from experience:<sup>10</sup>

“words, regular affixes, idioms, constructions, and ordinary phrase structure rules [...] can all be expressed in a common formalism, namely as pieces of structure stored in long-term memory” (Jackendoff, 2007a: 11).

As a consequence, Jackendoff's explanation does not rely anymore on specialized linguistic

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<sup>8</sup> These ideas are very close to Fillmore's conception of concepts as embedded in frames which logically link them with other concepts (e.g. Fillmore 1976). To put it differently, Fillmore's idea that our knowledge is entirely structured by frames is in line with the fundamental neurobiological assumption that our brain is essentially oriented towards the detection of contingencies and, therefore, sensitive to structured patterns of information. This is a consequence of the Hebb's rule governing natural neural networks (Fuster 2001, 2003; Mazzone and Lalumera 2010; Plebe and Mazzone in preparation).

<sup>9</sup> In psycholinguistics, “the term 'constraint-based' seems generally to be used to denote a lexically driven connectionist architecture along the lines of MacDonald et al. (1994)” (Jackendoff 2007a, 9). However, in linguistics the term has been used more generally to refer to models in which parallel activation of, and competition between, representations substitute for procedural rules, in syntax and elsewhere (e.g. Trueswell et al. 1994; Ferreira et al. 2002; Jackendoff 2007a; Breheny et al. 2006). In this sense, constraint-based processes and associative processes can be seen as two sides of the same coin: as a consequence of spreading of activation within an associative network, each activated representation may act as a constraint on the overall process, since it may contribute to inhibit the outcomes which are not compatible with it.

<sup>10</sup> With the possible exception of a very restricted number of innate constraints.

(namely, syntactic) processes operating in accordance with procedural rules; rather, linguistic representations (“pieces of structure”) have inside them the information on how to be assembled with each other, and all we need is a general-domain process which mechanically assembles representations in accordance with that information:

“The ‘generation’ of novel sentences is accomplished across the board by the operation of clipping together pieces of stored structure, an operation called *unification*” (Jackendoff, 2007a: 11, his emphasis).

For instance, in order to produce (or to parse) a nominal phrase (NP) we do not need a procedural rule such as

NP → Det – N;

it is enough to have a stored pattern delivering the same information. Now, it is easy to see that such a stored pattern is a schema in the sense we proposed above: an arrangement of items which prescribes how to bridge pieces of information (Det, N) in a regulated manner.

If by substituting pieces of stored structure for procedural rules we don't lose information, since the former preserves the logical structure of the latter, it is further claimed that a constraint-based account do even better than mainstream Generative Grammar in accounting for linguistic data. This is because “constraints can be violable and can compete with each other” (Jackendoff, 2007a: 9), and therefore “structural complexity (and less than perfect grammaticality) [which is attested in linguistic data] can arise through constraint conflict” (Jackendoff, 2007b: 10)<sup>11</sup>. As it can be seen, constraint-based processes are conceived of as an overall alternative to specialized linguistic processes, rather than as complementary to them.

The so-called “stored pieces of structure” act as constraints insofar as they produce the reciprocal assessment of coherence we described above (section 4): seen from the side of language perception, linguistic items activate the stored pieces of structure they are constituents of, and these pieces of structure then compete or integrate with each other, until some (more or less) stable and coherent integration is reached. In constraint-satisfaction models this mechanism is thought to involve different levels of linguistic and extra-linguistic information, in parallel and without any rigid sequential order. Jackendoff (2007a) provides an example where disambiguation of phonological structure is accomplished thanks to semantic interpretation. Let us consider the utterance:

(5) It's not a parent, it's actually a child.

Jackendoff (2007a: 14) observes that (“at least in [his] dialect”) “a parent” and “apparent” are phonetically identical. So how can the hearer select the right phonological structure? The answer needs to make appeal to the meaning of the utterance. In particular, Jackendoff assumes that at a certain moment the construction *It's not X, it's (actually) Y* is activated: this construction implies a semantic contrast between X and Y; as a consequence, as soon as the content A CHILD is linked to the role Y, the interpretation “a parent” is strongly favored over “apparent” for the role X. It should not be necessary to emphasize how much this reconstruction is similar to the above explanations of the utterances (1) and (2):

(1) I'm going to the bank now to get some cash.

(2) John was arrested by a policeman yesterday; he had just stolen a wallet.

In these two examples, the way a certain linguistic form is interpreted (respectively, “cash”, “he”) depends on the fact that other inputs recall from long-term memory a schema (respectively,

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<sup>11</sup> The page number refers to the online version of the paper:  
<http://ase.tufts.edu/cogstud/incbios/RayJackendoff/LinguisticsinCognitive.pdf>

GETTING MONEY FROM A BANK<sub>1</sub>, STEAL (X) – IS ARRESTED (X)) which hooks – so to speak – one of the possible contents as the most coherent with the schema. In Jackendoff's example, a certain input ("a parent") is given the correct phonological interpretation thanks to the fact that other inputs recall from long-term memory a schema which selects one of the possible phonological interpretations as the most coherent with it. In each of these cases, the explanation hangs on the dynamics of accessibility and an assessment of coherence driven by schemata.

I do not insist further on Jackendoff's account, since my purpose here is not to advocate it in the first place, but rather to show an important theoretical convergence. As it seems, it is possible to conceive of a unified account of pragmatic and other linguistic phenomena, in accord with what is known about the basic, associative processes through which we store and exploit information. My previous considerations on associative relationships (section 4) suggested that the associative account of pragmatic phenomena put forth by Recanati would naturally apply to other domains as well. Now we find that in fact a growing body of research in linguistics makes a similar appeal to associative processes and schematic information.<sup>12</sup> This gives an indirect support to a main thesis of this paper: both in syntax and in pragmatics, it can be argued that associative processes have enough logical structure to account for cognitive operations which can be ex post reconstructed as derivations based on rules or schemata. Therefore, in both domains we can do without the hypothesis of automatic inferential derivations, to the extent that the same cognitive effects may be obtained through associative, constraint-based processes.

In this section, we have briefly shown how associative accounts are appealed to in linguistics in order to explain a variety of phenomena, from phonological recognition to syntax. In the next section, we intend to ask whether more complex pragmatic phenomena than the ones considered above can be accounted for within a purely associative account. The purpose is to suggest that we should consider seriously the possibility to apply associative explanations to a number of different phenomena in pragmatics.

## 6. Reading minds without mind-reading abilities

Couldn't it be the case that associative processes explain utterance understanding for very simple pragmatic phenomena – disambiguations, reference assignments, lexical pragmatics and the like – while more complex phenomena, especially the ones involving consideration of the speaker's beliefs and intentions, ask for more sophisticated explanations?

In fact, as we already saw, Recanati (2004) conceives of primary pragmatic processes as not involving assumptions about the speaker, but it is not clear that even the explanation of the simplest pragmatic phenomena can do without assumptions of that kind.<sup>13</sup> Carston (2007) has made a case to this effect. Let us suppose that Mary is addressed by her student Sarah with the utterance in (6), and that Mary knows two people called "Neil", her young son (NEIL<sub>1</sub>) and a colleague in the linguistics department where she works (NEIL<sub>2</sub>).

(6) Neil has broken his leg.

Now, let us further suppose that Mary is constantly worried about her son, who tends to get into a lot of trouble, therefore her NEIL<sub>1</sub> concept is candidate to become more active than NEIL<sub>2</sub>, whatever the circumstances in which (6) is uttered. In Carston's opinion, the simple dynamics of activation cannot account for the fact that presumably, in that scenario, Mary's preferred interpretation will be instead NEIL<sub>2</sub>, since she is aware that Sarah does not even know her son Neil,

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<sup>12</sup> In this vein, one should also mention construction-based approaches (e.g., Goldberg 1995, 2006), which can be showed to share the basic principles of Jackendoff's (2007a) approach here referred to.

<sup>13</sup> As an anonymous referee has correctly emphasized, everyone in pragmatics acknowledges that in genuine communication people must appreciate the speaker's communicative intentions as such (the fact that the speaker intends to say *p* and to implicate *q*) and that, to this extent, consideration of the speaker's mind is a necessary part of any process of interpretation. What is at issue here is just whether *specific information* about what the speaker knows or intends need to be considered in any pragmatic stage of processing and in that case, which kind of process is responsible for this consideration.

while she knows that Mary has a colleague whose name is Neal. As it seems, then, even the most trivial attribution of reference to proper names may involve consideration of the speaker's beliefs and intentions.

In his reply to Carston (2007), Recanati (2007) concedes the point and proposes a partial revision of his previous position. The suggestion is that the degree of activation of mental contents may change not only as a consequence of a new train of activation, but also as a consequence of a meta-representational process, as when an “externalization of the explicature” – as Recanati calls it – occurs. In practice, an accessibility shift would occur at the moment when the meaning provided by primary pragmatic processes is embedded within the meta-representational schema “The speaker says that ...”, in that Sarah (the speaker) is unconnected to Neil<sub>1</sub> while she's got some connection to Neil<sub>2</sub>.

What this proposal exactly implies with regard to the issue of associative processes is not very clear to me. On the one hand, it seems that Recanati wants to extend his associative account to cases involving consideration of the speaker's mind. For instance, this is how Recanati explains why the meta-representational schema may produce an accessibility shift:

“That is because, owing to the connection between them in the knowledge base of the interpreter, the concept of Sarah and the concept of Neil<sub>2</sub> mutually reinforce their activation, so that the winning interpretation at s' (the externalization stage) is *Sarah tells me that Neil<sub>2</sub> has broken a leg*” (Recanati, 2007: 2, his emphasis).

These lines make appeal to the dynamics of accessibility and activation argued for in Recanati (2004). Also schemata appear to keep their explanatory role unchanged. Recanati (2007) takes into consideration an objection to the effect that schemata are often conceived of as instances of *general* world-knowledge, while Carston's example involves an instance of *particular* world-knowledge, that is, Mary's knowledge that Sarah does not know Neil<sub>1</sub> while she's acquainted with Neil<sub>2</sub>. Recanati dismisses the objection by simply saying that he does not believe (and he never claimed) that only *general* world-knowledge can trigger accessibility shifts; on the contrary, *particular* world-knowledge could play exactly the same role. This seems to show that, according to Recanati, his explanation based on schemata and the dynamics of accessibility also applies to Carston's example.

On the other hand, it is worth considering how Recanati summarizes this revision of his previous position. He does not say that, contrary to what he maintained in Recanati (2004), consideration of the speaker's mind can be accounted for in subpersonal, associative terms. He rather says that some meta-representational component may be involved even in primary pragmatic processes. In other words, Recanati puts the emphasis on the necessity to occasionally supplement primary pragmatic processes with a component which is presumably not reducible to them. Thus, it seems, meta-representational schemata of the form “The speaker says that ...” are not taken to behave as schemata in Recanati's (2004) sense. In fact, there is a large literature where meta-representations are assigned a key role in how we humans understand others as intentional agents, and in particular, as communicative intentional agents. This mind-reading faculty – as it is called – is thought to involve a personal process, rather than a subpersonal, associative one. Therefore, Recanati is presumably appealing to a component which he believes to go beyond mere subpersonal, associative processes.

Assuming that this is the case, I would like to suggest the opportunity to consider a different possibility. As I said, I do not claim that personal processes do not have any role to play in pragmatic processing. My claim here is rather that these processes are presumably not required in order to account for the aspects evidenced by Carston's (2007) example and by similar cases where the speaker's knowledge is taken into consideration. First of all, I do not follow Recanati when he concedes that Carston's objection obliges him to introduce any meta-representational device. In particular, I can see no reason why the particular world-knowledge at issue (that Sarah does not know Neil<sub>1</sub> while she's acquainted with Neil<sub>2</sub>) could not produce its effects independently from any embedding of the primary meaning within the meta-representational schema “The speaker says

that ...". Remember that for the contextualist view embraced by both Recanati and Carston, contextual information may affect the interpretation even if that information is not mandated by any linguistic item. Therefore, it is not clear that we need reference to the speaker in some sort of *propositional* schema (such as "The speaker says that ...") for information on the speaker to become active. In practice, I suggest that speaking with Sarah could automatically trigger (in the standard associative sense) Mary's knowledge about her, including information about the environment where Mary usually meets her, the people associated to that environment or the like. Incidentally, the hypothesis that our concepts preserve information about the most typical situations where we meet their referents has some support in the psychological literature. As Yeh and Barsalou (2006: 31) have observed, our cognitive system greatly simplifies many tasks by organizing knowledge around situations: for instance, in representing chairs it is useful for subjects to store information about locations where they can be found. In general, Yeh and Barsalou propose that concepts have a situated nature: they are to be thought of as rich representations that may include a variety of events, entities and environments associated with their referents. Analogously, we may well assume that our representation of specific people (Mary's representation of Sarah, in the example) preserves information about related environments, events and entities – including other people they are connected to (Neil<sub>2</sub>, in the example).

In sum, as far as I can tell, not only can the representation of particular contingencies be expected to produce accessibility shift exactly as general contingencies do, but also it seems rather ad hoc to assume that particular contingencies *about the speaker* need to produce this effect by way of a wholly different process. It is not plausible that information on people, their behavior, habits, and so on, is wholly subtracted to the dynamics of association-and-activation. Therefore, we should take into serious consideration how this dynamics can contribute to an explanation of pragmatic phenomena, including our expectations about the speaker.

## 7. Conclusions

As even relevance theorists admit, associative mechanisms must be at least part of an overall account of pragmatic phenomena if pragmatics intends to stay in contact with current psycholinguistic research – and I would add, with neurobiological and computational research as well. In this paper I have tried to show that, far from merely feeding pragmatic inferential processes of the kind envisaged by RT, associative processes might rather mimic these processes: associative relations have enough structure to deliver the inferential effects which are exploited in reflective inferencing and made explicit in pragmatics by way of post hoc reconstructions.

A key to the understanding of this associative structure is the notion of schema employed by Recanati in order to explain how associative processes can be constrained and driven by general information without the intervention of any personal process. Schemata permit to bind together different pieces of information in the utterance and the situation, discarding utterance interpretations which lacks coherence. Here I proposed a generalization of the notion of schema, on the basis of the consideration that associative relations are not devoid of information about the way in which their terms are related: on the contrary, associations preserve information about the spatial, temporal, causal etc. relations between their constituents.

As a consequence, the dynamics of association-and-activation is able to explain a number of phenomena without appealing to specialized cognitive processes, as it has been done in some cases. We have made the example of syntactic and other linguistic phenomena (in the strict sense of "linguistic"), and also of pragmatic phenomena concerning the consideration of speaker's beliefs.

Although I am well aware that further research has to be done in assessing the merits and limitations of associative approaches in pragmatics, I believe that these approaches have a strong point in their connection with the best established explanation of how we detect, store and exploit information by way of automatic processes.

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**Bio-note**

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