

Directional inferences and the conceptual/procedural encoding distinction

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Abstract

In this paper, I present an original model of discourse interpretation combining procedural, conceptual and contextual information. This model has been developed to explain the interpretation of discourse relations, such as Narration, Explanation, Elaboration, etc. used in discourse semantics. The basic principle is that utterance and discourse interpretation results from combining directional features conventionally assigned to lexical and non-lexical material. Directional features have two directions, forward and backward, and two degrees of strength, strong and weak. Principles of compatibility function as instructions on the way of predicting the conventionally conveyed interpretation. Any of the linguistically projectable interpretations must be validated by a contextual assumption. Thus the directional inference model claims (i) that contextual information is stronger than linguistic information and (ii) that procedural information is stronger than conceptual information. Predictions of the directional inference model will be sketched.

The conceptual/procedural distinction and the representation of events

In Relevance Theory (RT), a major distinction is made between two types of linguistically encoded information : conceptual information and procedural information (Sperber & Wilson 1993a). The conceptual/procedural distinction is motivated both linguistically and cognitively.

1. Conceptual information is mainly encoded within lexical categories (Noun, Verb, Adjective), that is, categories which define open lexical classes. Procedural information is encoded within non-lexical categories (negation, tenses, determiners, connectives, certain adverbials), that is, categories which define non-open morphological classes. Thus the conceptual/procedural distinction covers mainly the distinction between lexical and non-lexical categories.
2. The cognitive motivation for the procedural/conceptual distinction is the following: conceptual information is information through which mental representations are accessible, whereas procedural information encodes instructions relative to how mental representations must be processed.

The conceptual/procedural distinction can best be illustrated with the problem of event representation, in which two types of information must be accessible to the hearer :

- I. The hearer must access the event properties and characteristics : lexical entries of concepts do the right job. In other words, when a specific lexical item occurs in a sentence, as *détruit* (*destroyed*) in (1), the encyclopaedic entry makes accessible a number of properties, as those given in (2) :

(1) Scipion a détruit Carthage (Scipio destroyed Carthage)

(2) a. détruire (x, y): <x causes disappear y>

b. Scipion : < Roman general responsible for the destruction of Carthage >

c. Carthage : < Punic capital, destroyed by Scipio in 146 BC >

- II. Such information, although necessary, is not sufficient to yield a complete mental representation of the event: procedural information allows the location of the event in the time-arrow, to bound or unbound the event, to connect the event with another event or state, or more simply to determine the aspectual class of the eventuality.

Finally, the complete representation of the utterance content, that is, the propositional form described by the utterance, will be computed by combining conceptual and procedural information. (3) is the minimal propositional representation that the interpretive device should produce:

(3) e t [destroy(e) agent(Scipio,e) patient(Carthage,e) happen(e,t) t=146 BC)

Discourse relations

The main topic of this paper is the distribution of conceptual and procedural information in the computation of discourse relations such as Narration and Explanation, as described in discourse semantics (cf. Asher 1993, Lascarides 1993, Lascarides & Asher 1993, Lascarides & Oberlander, Caenepeel & Moens 1994). It aims at proposing a pragmatic analysis of discourse relations based on a dynamic procedure of context formation and on context validation procedures of directional inferences, that is, a RT-based treatment of discourse relations.

Discourse relations such as Narration and Explanation are relations between events described in utterances. Whereas Narration implies a parallelism between temporal order and linguistic order, Explanation expresses the converse order : the event described in the first utterance actually occurs after the event described in the second utterance. (1) and (2) are classical examples :

- (1) Max pushed John. John fell Narration
 (2) John fell. Max (had) pushed him Explanation

In this paper I want to show that what discourse semantics defines as discourse relations are specific kinds of inferences, that is, directional inferences. (1) is a prototypical case of forward inference, (2) a prototypical case of backward inference. The empirical question is what causes these interpretations. The standard solution (see for instance Asher 1993, Lascarides & Asher 1993, Lascarides & Oberlander 1993, Lascarides 1993) uses a non-monotonic inferential device, based on the distinction between linguistic knowledge (defeasible) and world knowledge (undefeasible) and on conceptual default rules (for instance a *push-fall* causal rule). This kind of solution is a very robust solution based on a formal syntax and semantics, and a complete inferential device. It has nevertheless several shortcomings :

1. it is based on an implicit theory of mutual knowledge, which is problematic because of the impossibility of a consistent definition of what mutual knowledge is (cf. Sperber & Wilson 1982, 1995);
2. it states that temporal inferences, as well as causal ones, are implicatures (generalised conversational implicatures), whereas the temporal relations determine the truth-conditions of the utterance (cf. Wilson & Sperber 1993b, Carston 1993);
3. it presupposes an implicit theory of discourse, namely of narrative discourse, in which temporal order is the basic feature (see for instance Caenepeel & Moens 1994);
4. it provides no real account of pragmatic interpretation: interpretation can consist in a disjunctive conclusion.

The first two points have been sufficiently discussed; the third point has been definitively challenged (Smith 1990); the last point must be discussed. In discourse semantics, some discourse relations are undecidable, because there is a conflict between two types of default rules, discourse default rule (Narration) and causal conceptual rule. The toy-example given by Lascarides (1993) is (4) :

- (4) John hit Max. Max turned round.

As Lascarides (1993, 4) states, « if we believe that John hit Max and that Max turned round and that these events occurred in closed spatio-temporal proximity (but we don't know in which order) then we cannot derive any conclusion, even tentative ones, as to their order ». And she concludes that in case of conflict between two default rules (Narration and a conceptual causal rule), the conclusion is disjunctive: either e1 caused e2 or e2 caused e1.

Before presenting the core argument of the theory of directional inferences, I would like to discuss Lascarides' analysis. It seems to me that the disjunctive conclusion, as a result of conflicting default rules, cannot be anything but a standard ambiguitist analysis. But this seems a somewhat unrealistic way of conceiving utterance interpretation processes. As RT claims, ambiguity is something that is solved by pragmatic processing. So it would appear somehow odd that the result of pragmatic interpretation processes would be an ambiguity statement.

The conclusion about discourse semantics is the following: discourse relations are not the result of default rules confirmed by consistent world knowledge; they are more basically the result of a

pragmatic interpretation process combining contextual, conceptual and procedural information. I will now present a model of discourse relations based on this assumption.

The evidence for a directional model

The directional model has been constructed because of several shortcomings of semantic accounts of discourse relations (DRs). More precisely, the anaphoric approach (Kamp & Rohrer 1983) encodes semantic rules within tenses (time goes forward with *passé simple*, backward with *plus-que-parfait* and does not move with *imparfait*). The aspectual approach (Dowty 1986) encodes a relation between DRs and aspectual classes (time goes forward only with accomplishments/achievements, and does not move with states and activities). The limits of these approaches have been shown (for a summary see Moeschler et al. to appear, chapter 7). Basically, these approaches are descriptively inadequate. For instance they are not able to explain the following facts:

1. Time may not move forward with the French *passé simple*:

- (5) a. Bianca chanta le récitatif et Igor l'accompagna au piano.
(Bianca sang the recitative and Igor accompanied her at the piano)
b. Ce soir-là, notre héros écrivit une lettre à Lady Ann et but une bouteille de whisky.
(That evening, our hero wrote Lady Ann a letter and drank a bottle of whisky)

2. Time may move forward with French *imparfait*:

- (6) a. Max entra dans la pièce. Elle était complètement noire.
(Max entered the room. It was pitch dark)
b. Max alluma une cigarette. La fièvre donnait au tabac un goût de miel.
(Max lighted a cigarette. Fever gave tobacco a honey taste)

The problem is the following : how can we account for the fact that the « standard » use of the French *passé simple* makes time move forward, and the standard use of the French *imparfait* is inclusive, and how can we account at the same time for facts such as those given in (5) and (6)? The explanatory system must also account for the following subsidiary facts:

- a) In a « unmarked context », (7) has a preferred reading, the forward one; the backward reading is possible if we add some contextual information, although it seems a very costly and hence poorly relevant way of communicating the backward inference:
(7) Max a poussé Jean. Jean est tombé. (Max pushed John. John fell)
- b) In a « unmarked context », (8) has a preferred reading, the backward one; the forward reading is possible, if we add some contextual information, although it seems a very costly and hence poorly relevant way of communicating the forward inference:
(8) Jean est tombé. Max l'a poussé. (John fell. Max pushed him)
- c) If we change tenses, results are different. The French *passé simple* in both sentences implies a forward reading, whereas the French *plus-que-parfait* in the second sentence implies a backward reading¹:
(9) a. Max poussa Jean. Jean tomba. (Max pushed John. John fell)
b. Jean tomba. Max le poussa. (John fell. Max pushed him)
(10) a. Max poussa Jean. Jean était tombé. (Max pushed John. John was fallen)
b. Jean tomba. Max l'avait poussé. (John fell. Max had pushed him)
- d) Finally, if we add connectives like *et* (*and*) and *parce que* (*because*) the results are almost unequivocal : *et* implies a forward reading, and *parce que* a backward one:
(11) Max poussa Jean et Jean tomba. (Max pushed John and John fell)
(12) Jean tomba, parce que Max le poussa. (John fell, because Max pushed him)

¹ I will not give the whole paradigm of the change in verbal tenses and connectives. The results indicate preferences, but some interesting cases are contradictory with the prediction or are ambiguous.

Outline of the directional model

The directional model must describe complex directional facts and explain why preferences arise. As it stands, the directional model is based on the idea of preferences: linguistic information encoded in lexical and morphological items yields interpretive preferences. These preferences can be confirmed or invalidated by contextual information. This does not mean that contextual information is just a checking point, as in standard pragmatics belonging to the mutual knowledge framework. It means first that linguistic information is not able to do the job alone, and second that linguistic information is weaker than contextual information. Thus:

- I. The directional model explains temporal and non-temporal interpretations as the result of combining linguistic information and contextual information, where contextual information is not given, but constructed as a premiss of the directional inference process.

The second characteristic of the analysis of DRs within the directional model is that DRs are no longer implicatures in the Gricean sense: the temporal relation of precedence and the causal relation between events can be either explicated or implicated depending on the informative intention of the speaker. It has been proposed elsewhere (see Moeschler et al. to appear, chapter 13) that, in Narration, the temporal relation is explicated, whereas the causal relation between events is implicated, and that in Explanation, the converse relation stands (causality is explicated, temporal order implicated). So the second proposal contrasting with discourse semantics is the following:

- II. Temporal and causal relations are implicatures or explicatures depending on the informative intention of the speaker.

Thus it should be clear that the directional model will give no preference to any discourse-based explanation: DRs are just what emerges as a natural interpretation of utterance sequencing. So:

- III. No specific discourse rules are necessary to account for DRs: they result from the process of utterance interpretation.

The question is now: How can such a pragmatic interpretation device account for temporal and causal DRs? The answer is that the directional model is just what gives instructions for the interpretation consistent with the principle of relevance. Before making explicit the relation between the directional model and RT, I would like to sketch the outlines of the model. It can be summed up in four points:

- A. Directional inference is a by-product of directional features and contextual assumptions: the function of a contextual assumption is to validate a hypothesis about linguistically implied time direction.
- B. Directional features are of two types: strong and weak; a strong feature or a string of strong features give the direction of the inference, whereas a weak feature or a string of weak features must be validated by a strong feature.
- C. Weak features are encoded by conceptual and procedural information: predicates and tense; strong features are encoded by procedural and contextual information: connectives and contextual assumptions.
- D. Contextual information is stronger than linguistic information; procedural information is stronger than conceptual information.

This model has been tested in French for the *push-fall* cases implying French tenses such as *passé simple* and *plus-que-parfait*, and connectives as *et* and *parce que*. The basic description claims that *passé simple* bears a weak forward feature, *plus-que-parfait* a weak backward feature, *et* a strong forward feature and *parce que* a strong backward feature.

Turning back to the toy-examples (7) and (8), the preferred forward inference in (7) is obtained by a convergence of conceptual and directional features, whereas the preferred backward reading in (8) is due to the divergence between conceptual and procedural information. Principle D (procedural information is stronger than conceptual information) is ruled out here, because no strong feature is linguistically encoded, although it is accessible through a contextual assumption. On the other hand, principle D gives the right prediction with examples where the French *passé simple* and connectives occur, as (9-12).

Descriptive and explanatory power of the directional model

For this model to be seriously tested, it should give adequate descriptions of counter-examples to classical semantic analyses. The lack of space makes this exercise difficult if not impossible. But the general principle is the following. There are no direct correlations between the verbal tense and the type of DR, nor between the nature of aspectual classes and the appropriate DR. When a counter-example occurs, the explanation proceeds as follows (Saussure in progress):

1. Look for a conceptual rule; if you find one, check its temporal implication and its compatibility with the hypothesized DR.
2. Look at the temporal feature: is it compatible or not compatible with the conceptual information? If not, look for the most accessible contextual assumption.
3. Infer any time direction compatible with the direction implied by the contextual assumption.
4. Check the compatibility of this time direction with what has been hypothesized by conceptual and procedural features: if the result is contradictory, conclude the oddity of the discourse.

I would like to comment briefly on point 4. I previously gave an example of how such an odd interpretation could emerge, with the dispreferred backward interpretation of (7) and the dispreferred forward interpretation of (8). I would like to give now another example, which illustrates the so-called inferential use of French *parce que*. We saw that *parce que* bears a strong backward feature. This analysis makes the correct prediction for (12), as the strong backward *parce-que*-feature cancels the weak forward *passé-simple*-feature and is codirectional with the conceptual information given by the predicate *poussa* (pushed). But what about (13)?

(12) Jean tomba, parce que Max le poussa. (John fell, because Max pushed him)

(13) Max poussa Jean, parce que Jean tomba. (Max pushed John, because John fell)

Clearly, the interpretation of (13) should be, following principle D, backward. But the most salient interpretation is forward: *parce que* has an inferential use here, following the principle of invited inference by Geis & Zwicky (1971) (see also Sperber & Wilson 1995). Thus, for the forward interpretation to occur, the accessibility of the conceptual information (a causal *push-fall* rule) is not sufficient, since it should be ruled out by the strong backward feature of the connective (*parce que*). What then should be the answer? It must take into account the fact that these examples have two properties:

1. They are not accepted as such by all French native speakers: the prediction of clause 4 is thus empirically valid.
2. They indicate a double-bind constraint for the speaker. Let us assume that she wants to communicate at least two pieces of information :
 - a) the causal relation between two events: Max's pushing of John causes John's falling;
 - b) the focal status of Max's pushing of John.

These two constraints cannot be satisfied, because French has no forward causal connective. The speaker has only two possibilities : either she uses a high-level standard French with *parce que* in fronting position, as in (14), or she gives the connective its standard non-fronting position, as in (13).

(14) Parce que Max poussa Jean, Jean tomba. (Because Max pushed John, John fell)

(14) is unequivocal, but requires a great deal of discourse planification. (13) is easier to use, but the risk is greater : prescriptive rejection, interpretation conflict, oddity judgement, etc.

To sum up, the present version of the directional model has several advantages:

- I. It explains the difference between preferred and non-preferred interpretations.
- II. It explains why sequences of utterances are interpretable within a specific context, but are odd, « incoherent » out of that context.
- III. It correctly describes classical counter-examples of standard analyses.

The last question I would like to address is: In what sense is the directional model RT-based?

RT and directional inferences

The directional model is RT-based for the following reasons:

1. It is based on the procedural/conceptual distinction.
2. It gives contextual assumptions a central role in discourse interpretation.
3. It does not require a specific discourse model device, and is integrated within a discourse-RT-extension (as described in Reboul & Moeschler 1998).
4. It is able to distinguish preferred and dispreferred readings.
5. It gives a central role to the explicature and implicature discovery process.
6. It is procedural in a strong sense: any interpretation is the result of procedures implying conceptual, procedural and contextual information.

This model, as a development of RT, has to be developed in several dimensions:

- I. It must be formalised.
- II. It must be tested with interpretive uses of tenses, mainly in reported speech and thought.
- III. It must be extended to other tenses and connectives.
- IV. It must be combined with other types of procedural expressions like negation, and other types of conceptual expressions like modalities.

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