On classifying connectives and coherence relations

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Abstract

This paper tackles the methodological question of how coherence relations and their surface cues, e.g. causal connectives, may be categorised into different discourse domains. In this context, the central issue is the need for explicit and objective criteria that can be applied by different analysts to all kinds of natural texts. Strengths and weaknesses of different methods that are currently used in corpus studies are passed in review.

Introduction

In this paper, I would like to address a methodological question that starts from the following observation: There is a growing number of corpus studies in the area of the use of coherence relations and discourse markers in natural texts. Most of these studies try to establish a relationship between the coherence relations found in the text and the discourse markers used to signal them linguistically, very often inter-clausal connectives (Degand 1996, 1998; Grote, Lenke & Stede 1997; Knott 1996; Mann & Thompson 1992; Oversteegen 1997; Pit, Pander Maat & Sanders 1997; Pander Maat & Sanders 1995, Sanders 1997). However, the results of these studies are hardly ever straightforward to compare. The main reason for this is that the methods used to classify both the coherence relations and their linguistic markers are very often divergent and in the best cases only partially overlapping. So, in order to enable comparison of the different studies, there is a need for clear and explicit classification criteria. In this paper, I will try to set out a number of such (operationalisable) elements that could function as tools in the categorisation task.

The goal will be reached if the categorisation criteria are formulated in such an explicit way that they can be applied by different analysts to all kinds of natural texts.

1 Coherence relations

A classical approach to coherence relations is to classify them into relational or discourse domains: semantic *vs.* pragmatic (van Dijk 1979; Sanders 1992; Pander Maat & Sanders 1995), content *vs.* epistemic *vs.* speech-act (Sweetser 1990), external *vs.* internal (Halliday & Hasan 1985, Martin 1992), subject matter *vs.* presentational (Mann & Thompson 1988), ideational vs. interpersonal vs. textual (Degand 1996, Maier & Hovy 1993), ideational vs. rhetorical vs. sequential (Redeker 1991). These classifications all account for the fact that there are different types of coherence relations that exist at several "levels", "strata", "planes" or "domains" of the discourse. It is striking to note that there is a great amount of agreement between the authors with respect to the different general types of coherence relations. They can be grossly characterised as follows:

- Ideational / semantic / content / external / subject matter relations establish a link between discourse units that denote states of affairs in the world described in the discourse. Examples are : cause, sequence, contrast, etc.

- Interpersonal / pragmatic / internal / presentational / rhetorical relations establish a link between the illocutionary meaning of one of the discourse units with the locutionary meaning of the other. Examples are:

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justification, motivation, evidence, conclusion, etc. Furthermore, a distinction can be made between (i) epistemic (knowledge of a fact leads to conclusion of a belief), and (ii) speech-act relations (a fact leads to the utterance of a speech-act).

- Textual / sequential relations establish a sequential, text organising relation between ideationally and interpersonally only loosely or indirectly related adjacent discourse segments. Examples are: list, joint, etc. or any other ideational or interpersonal relations when they are used as comment, digression, excursus, etc.

While the characterisation of these relational domains is general enough so as to account for all different kinds of discourse structures, this generality poses a number of problems as soon as one starts to work with *natural* texts. Most of the time there is agreement on *prototypical* examples (very often built-up examples for purposes of illustration), but in actual text analysis one gets rapidly confronted with an important number of ambiguous cases. That is, when one tries to establish what type of coherence relations are present in the text, it becomes rapidly impossible to classify found relations on the basis of these definitions alone. Different elements may account for these problems: (i) coherence relations are not always marked linguistically, (ii) there is no one to one mapping between coherence relation and linguistic discourse marker, and (iii) there is no general consensus on the type of linguistic constructions that may function as discourse markers (connectives, prepositions, adverbials, intonation patterns, cue phrases, etc.).

In the literature, connectives are generally considered to be prototypical linguistic markers of coherence relations. In this paper, I will then concentrate on the problems that arise when one tries to relate to each other the discourse domains as described above, the coherence relations and the connectives that may signal these coherence relations. This will be exemplified on the hand of causal constructions.

2 From connective to coherence relation

While it is clear that coherence relations are *not* always signalled linguistically, and that they may be signalled by other linguistic means than connectives, it seems plausible to accept that inter-clausal connectives *always* mark (at least) a coherence relation. As a matter of fact, this is what appeared from my corpus analyses : any causal connective linking two (minimally propositional) segments always functioned as a linguistic marker of a coherence relation. This means that it is justified to use a bottom-up approach to study coherence relations. The question to answer then is: How does one know what type of coherence relation is signalled by the connective? And corollary to this: In what discourse domain is the connective used? Answering these types of questions implies to combine both a top-down approach in which broad general semantic categories are defined with a bottom-up approach in which the meaning and function of a number of linguistic markers, such as connectives, are described. The combination of these two approaches should (i) guarantee the linguistic validity of the discourse domains and the coherence relations and (ii) help to reach a parsimonious and organised classification of the connectives that function as linguistic markers of these higher-level semantic categories. Working with more than one language in this context may be helpful to reveal the degree of idiosyncrasy of the different types and categories.

Since I will restrict my investigations here to the coherence relations that are linguistically marked by connectives, I will only address one of the three above mentioned problems. Namely, the observation that there is no one to one mapping between coherence relation and discourse marker. This entails that a coherence relation is not always marked by the same connective, and that a given connective does not always signal the same coherence relation. For example, in the causal domain, the ideational relation NON-VOLITIONAL CAUSE may be marked by the Dutch connectives *omdat* and *doordat* ('because'). At the same time, the connective *want* can signal the coherence relations VOLITIONAL CAUSE, NON-VOLITIONAL CAUSE, and CLAIM-ARGUMENT, in either of the ideational or interpersonal discourse domains.

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From what has been mentioned so far it should be clear that there is a need to disambiguate the (sometimes complex) relationship between coherence relations and their surface cues. Objective and explicit methods are needed that operationalise the type of above-mentioned definitions.

Different methods that are used in the field will pass the review, including (i) the meaning of the connective itself, (ii) the substitution test, (iii) the paraphrase test, (iv) the underlying meaning of the relation, and (v) the role of other linguistic markers such as perspective indicators. In my opinion, the combination of different tests together with corpus analyses opens up interesting perspectives with respect to the usability and applicability of these methods in *real* field work.

2.1 The role of the linguistic marker itself

In agreement with the functional approach to language I consider that different surface cues reflect different functions and meanings. In the field of coherence relations, this functional stance leads to the following assumption : If one generalised meaning, e.g. a causal relation, can be expressed by different linguistic expressions, e.g. *because, for, so, therfore, and, etc.*, it is highly probable that these different linguistic markers are (at least) slightly divergent in meaning. The working hypothesis is then that every connective has its own specific meaning and that there are no true synonyms. It follows from this that one should be (at least) suspicious when different linguistic markers end up in a same category. In those cases, finer distinctions might be necessary. A way to test this is to make use of a substitution test.

2.2 Substituting one connective by another

In a substitution test a given connective is substituted by another one (cf. Knott & Dale 1994; Knott 1996 for a systematic study). Acceptability of the substitution is dependent on the degree of similarity between the two connectives. This leads us to various possibilities : from connectives that would be totally overlapping in meaning[1] to partially

overlapping, and exclusive ones. While this substitution test can bring us closer to a linguistically motivated classification of connectives because it groups together surface cues that are close in meaning, the main problem is that the whole classification is based on the analysts' judgement. And it is clear that these judgements may diverge between different analysts, especially when the connectives are largely overlapping in meaning. Analysts' intuitions must certainly be completed by other analyses.

2.3 Paraphrasing the meaning of the connective

The use of paraphrase tests is a very frequent method to analyse the meaning of connectives (Pander Maat & Sanders 1995, 1997; Degand 1996; Pit, Pander Maat & Sanders 1997; Sanders 1997). They help to determine what the meaning of the segments is on their own, i.e. when the influence of the connective itself is left out. The advantage of a paraphrase test is that it forces to be explicit about the interpretation of the meaning of the connective under investigation. Once the connective is left out, the analyst checks whether the segments can be related by the given paraphrase(s) without changing the reading of the overall fragment. Of course, the analyst's intuition is still the ultimate criterion to classify the connective as expressing one or another meaning, but the paraphrase test makes the different interpretations explicit, so it helps the analyst to systematically check his/her intuitions. This is illustrated below on the basis of the following causal paraphrases:

- Ideational, volitional: this action is the consequence of the following fact :
- Ideational, non-volitional: this situation is the consequence of the following fact :
- Interpersonal, epistemic: one may conclude this on the basis of the following situation :
- Interpersonal, speech-act: this utterance is motivated by the following situation :

With the help of these paraphrases, we can classify the use of *because* as being epistemic in

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[1] Note that this in fact opposite to the basic functional

stance which aims for an ideal "one form – one meaning" correspondence.

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example (1) and ideational, volitional in example (2).

1. John loves her *because / one may conclude this on the basis of the following situation* he came back.

2. John came back *because / this action is the consequence of the following fact* he loved her.

Nevertheless, although this paraphrasing gives a number of indications concerning the type of relation that is expressed by the connective, it is not entirely satisfactory. Consider the following examples:

3. D: De rivier zal wel hoog staan **want** het heeft weer de hele nacht geregend.
   D: De rivier zal wel hoog staan **omdat** het weer de hele nacht heeft geregend
   E: The river is surely high because it has been raining all night.

4. D: Het zal weer de hele nacht geregend hebben, **want** de rivier staat erg hoog.
   D: Het zal weer de hele nacht geregend hebben, ***omdat** de rivier erg hoog staat.
   E: It must have been raining all night, because the river is high.

On the basis of the above-mentioned paraphrases, the two examples are best categorised as being epistemic in meaning. This would mean that both the connectives *want* and *omdat* can express an epistemic relation and that they should be mutually substitutable in this context (cf. example (3)). Nevertheless, this seems not to be the whole story. In example (4), for instance, only the use of the connective *want* is acceptable. On the basis of the paraphrase alone one should then accept that the connective *omdat* sometimes *can* and sometimes *cannot* express an epistemic relation. From a functional point of view this is not satisfactory. In the following section, I will show that the underlying meaning of the causal relation also plays a restrictive role on the selection of these causal connectives.

In addition, this example illustrates another problem linked to the use of paraphrases. First, the paraphrase itself should be formulated in a

precise and explicit way so that it can be applied unambiguously. Second, the examples also show that it is not always clear whether the paraphrase vehicles the meaning of the connective alone. On the basis of the paraphrase test, example (5) should be rejected as being odd.

5. ?He's handsome because he loves pasta.

But other linguistic elements may influence the reading of the overall fragment. This is especially the case with the perspective indicators. Adding such a perspective indicator to (5) seems to make it already a little more acceptable to an epistemic reading (see Section 2.5).

6. He really must be handsome, because he loves pasta.

So the underlying assumption of a paraphrase test is that the meaning of a connective is *compatible* with the meaning of the two related segments but that it cannot itself *impose* a relational meaning. In other words, it is not enough to put a causal connective between any of two segments to obtain a causal meaning[2].

2.4 The nature of the underlying relation

In causal relations the underlying meaning reflects the causal inference to be made. This causal reasoning can proceed in three ways: deductively, inductively or abductively. It is my claim that the type of causal reasoning that underlies the causal relation plays a restrictive role on the selection of connectives (at least in Dutch).

In general terms, a causal reasoning process consists of three elements: *rule* (general law), *circumstance* (specific case), and *result*, like in the following example:

Rule: Every time when it rains (a lot), the river is high.
Circumstance: It has rained a lot.
Result: The river is high.

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2 But, Degand (1998) shows that the connective itself may sometimes *force* a given reading. E.g. the subjectifying effect of the connective *want* (`because/for`), and the objectifying effect of the connective *omdat* (`because`).

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Deduction is reasoning from circumstance and rule to the result: *It has rained a lot (and every time when it rains (a lot), the river is high.), so the river is high.* In a backward deductive causal relation the consequence (result) in the first segment (S1) is related causally to the cause/reason (circumstance) in the second segment (S2). In Dutch, this relation can be expressed both by *want* and *omdat* (see example (7)).

7. D: De rivier staat hoog **want** het heeft de hele nacht geregend.
    D: De rivier staat hoog **omdat** het de hele nacht geregend heeft.
    E: The river is high because it rained all night.

Induction is reasoning from (several) results and circumstances to a rule: The river is high (and it has rained al lot, and last week when the river was high, it also had rained a lot, ...), so when it rains a lot, the river is high[3].

Abduction, finally, is reasoning from result and rule to circumstance: *The river is high (and every time when it rains (a lot), the river is high.), so it has been raining a lot.* In a backward abductive causal relation a cause/reason (circumstance) in S1 is inferred on the basis of a consequence (result) in S2. This inference can only take place if there is indeed a real causal link between the two segments (Mackie 1975; Lagerwerf & Oversteegen 1994). If the two segments are substituted by one another, one should again obtain a purely deductive relation. This reversibility of the reasoning pattern is a good way to operationalise the deductive-abductive distinction.

In my opinion, a (backward) abductive relation can exclusively be expressed by the connective *want* (see example (8)).

8. D:Het heeft veel geregend, **want** de rivier staat hoog.
    D: *Het heeft veel geregend, **omdat** de rivier hoog staat.
    E: It has rained a lot, because the river is high.

Now, the question that rises is to what extent the underlying reasoning pattern may contribute to the classification of the causal relation into the "classical" ideational and interpersonal discourse domains. One could argue that a deductive reasoning pattern is ideational in nature because it is close to the real cause-consequence process. This would then mean that example (2) above expresses an ideational relation (marked in Dutch by *want* or *omdat*), in spite of the presence of perspectivising elements. When these are left out as in (7), the ideational nature of the causal relation appears very clearly. With respect to the abductive reasoning pattern one could argue that it is interpersonal, and more specifically epistemic, in nature because it reflects a causal reasoning in the mental space of the speaker[4]. Here, presence or absence of perspectivising elements does not change anything to the situation (see example (8)). If we take this deductive-abductive distinction to be indicative for the ideational-interpersonal distinction, then the discourse domains would have a restrictive role on the selection of connectives. Namely, *want* and *omdat* can both express an ideational (deductive) relation, while an interpersonal (abductive) relation can only be expressed by *want*. However, it might be counterintuitive and contrary to the general domain definitions to classify examples (3), (6), or (9) as being ideational in nature only because they express a deductive reasoning pattern. A closer look should be taken to these other elements which seem to influence the categorisation, namely perspective indicators.

9. D: Door al die milieuwetten mag je het riet niet meer verbranden of in een sloot 'afdrijven'. Dat is allemaal onzinnig, **want** riet is een natuurlijk produkt. (NRC, 1994)
    E: Because of all these environment laws you're not allowed anymore to burn the reed or to drive it 'off' the ditch. That is all nonsense, because/for reed is a natural product.

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[4] Most authors who refer to epistemic relations illustrate these with constructed examples of the abductive reasoning type (e.g. Sweetser, 1990).

2.5 Perspectivisation

In the previous section, it appeared that presence or absence of perspectivising elements can play a role in the categorisation of coherence relations in the ideational or interpersonal (epistemic) domain. Perspective indicators are elements that have to do (i) with the responsibility for the truth of the utterance (verbs of saying and perception, explicit quotes or references, ...), (ii) with the logico-semantic properties of the utterance (negation, epistemic modals, ...), or (iii) with the evaluation of the utterance (predicates of judgement, evaluation, comparatives, etc.). At first view, perspectivised segments are best categorised within the interpersonal domain because they mostly refer to the opinion or point of view of the speaker (or another utterer), i.e. they have an illocutive character.

But then, how do perspectivisation, surface cues, and reasoning pattern relate to each other? And which elements should be taken into account for the categorisation into discourse domains? Contrary to the causal reasoning pattern, perspectivisation does not play a restrictive role on the selection of connectives in Dutch. For instance, both *want* and *omdat* can occur in a perspectivised context. Moreover, as exemplified above, both abductive and deductive reasoning patterns can involve perspectivised segments. If we agree on the fact that perspectivising elements set up an interpersonal context, we then obtain a fairly heterogeneous interpersonal discourse domain that is only partially restrictive on surface cues (in Dutch). To account for this, I propose a triple subcategorisation for the interpersonal domain: epistemic-deductive, epistemic-abductive, and speech-act relations. This subcategorisation is justified by the fact that they share a number of general properties with the interpersonal domain (illocutive character), but that the epistemic-abductive and speech-act relations are far more restrictive with respect to the surface cues that may be used to signal them[5].

A final question is then whether perspectivisation automatically leads to interpersonal categorisation. This seems not to be the case. As a matter of fact, perspective switch (change of perspective between the first and the second segment), type of perspective and explicitness of the perspective also play a role. There seems to be a tendency for segments with perspective switch in which the perspective (implicitly) refers to the evaluation of the utterance to set up an interpersonal context. When there is a continuing perspective, with explicit perspective indicators referring to the responsibility for the truth of the utterance, the tendency is rather ideational. When the perspective has to do with the logico-semantic properties of the utterance the tendencies are not so clear.

What is furthermore interesting to note is that the connectives themselves seem to add some meaning to the reading of the overall fragments. For example, even in absence of any perspectivising elements there is a tendency for the connective *want* to have a subjectifying effect (closer to the interpersonal domain). The relation appears to be one of justification or explanation rather than factual causal relation. This is not the case for the connective *omdat* which tends to impose a factualising reading with an objectifying effect even in presence of perspectivising elements (closer to the ideational domain).

So, the situation appears to be fairly complex since the presence/absence of perspectives and the type of connective used in the fragment seem to influence the categorisation in the discourse domain. The problem is then to find a way to operationalise the different types of perspectives, since a same perspective can have a different effect according to the connective with which it is used.

Conclusion

In this paper, I have tried to show that the classification of coherence relations and connectives into discourse domains is a complex matter in which different elements play a role: the connectives themselves whose meaning can be explicated on the basis of a substitution test and/or paraphrase test; the underlying meaning of the relation (deductive or abductive), which in the case of causals seems to play a restrictive role on the connectives; other features in the fragments like the presence or absence of

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[5] In Dutch, among the causal connectives only *want* ('because') and *dus* ('so') may be used to signal an epistemic or speech-act relation.

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perspectivising elements. Together these elements co-determine the categorisation of the coherence relation into one of the discourse domains.

In my view, some of these elements have a higher weight than others in the classification:

1) the distinction between deductive and abductive reasoning enables to sort out the epistemic-abductive class straightforwardly.
2) Paraphrasing should separate the speech-act relations from the other interpersonal and ideational relations.
3) The distinction between epistemic-deductive and ideational relations would be based on perspectivising elements (perspective switch, explicitness of the perspective and type of perspective).
4) The substitution test should be useful once the categories have been established in order to come to finer distinctions.

The suitability of these different tests will appear from their confrontation with real texts.

Acknowledgements

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