Discourse markers as signals (or not) of rhetorical relations

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Abstract

Ever since the formulation of Rhetorical Structure Theory (RST) by Mann and Thompson, researchers have debated about what is the 'right' number of relations. One proposal is based on the discourse markers (connectives) signalling the presence of a particular relationship. In this paper, I discuss the adequacy of such a proposal, in the light of two different corpus studies: a study of conversations, and a study of newspaper articles. The two corpora were analysed in terms of rhetorical relations, and later coded for external signals of those relations. The conclusion in both studies is that a high number of relations (between 60 and 70% of the total, on average) are not signalled. A comparison between the two corpora suggests that genre-specific factors may affect which relations are signalled, and which are not.

1. Rhetorical relations and discourse markers

> The analysis of discourse markers is part of the more general analysis of discourse coherence—how speakers and hearers jointly integrate forms, meaning, and actions to make overall sense out of what is said. (Schiffrin, 1987:49)

Coherence in discourse can be achieved by different means. Coherence relations—relations that hold together different parts of the discourse—are partly responsible for the perceived coherence of a text. More specifically, the recognition of coherence relations by the hearer or reader enables

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them to assign coherence to a text. Discourse markers guide the text receiver in the recognition of those relations.

The relations I am concerned with here are referred to as coherence relations, discourse relations, or rhetorical relations. They are paratactic or hypotactic relations that hold across two or more text spans. When building a text (just as when building a sentence), speakers choose among a set of alternatives that relate portions of the text (or sentence). The two parts of the text that have been thus linked can then enter, as a unit, into another relation, making the process recursive throughout the text.[1] Rhetorical relations have been proposed as an explanation for the construction of coherence in discourse. It is not clear how much speakers and hearers are aware of their presence (Sanders et al., 1993), but it is uncontroversial that hearers and readers process text incrementally, adding new information to a representation of the ongoing discourse (van Dijk and Kintsch, 1983; Hobbs, 1985; Meyer et al., 1980; Sanders, 1986; Sanders et al., 1993). Rhetorical relations are similar to what other researchers call discourse relations, or coherence relations. There are, however, differences between Rhetorical Structure Theory (RST) and other theories, mainly in that rhetorical relations place emphasis on the writer's intentions and the effect of the relation on the reader. (For a comparison of rhetorical relations to other approaches, see Taboada and Mann, in press-b.) For the present study, I will use the term 'rhetorical relations' and the framework of Rhetorical Structure Theory, as described in Mann and Thompson (1988). A brief introduction is presented in section 2.

One of the issues in the study of rhetorical relations is how to recognize them, both from the point of view of the analyst, and from the point of view of the hearer or reader. There are many different mechanisms at play: morphological, syntactic, semantic, and pragmatic. Morphologically, tense, for instance, helps mark temporal relations, guiding the reader in the interpretation of progressions or flashbacks in time. One syntactic mechanism is sentence mood (indicative, imperative, interrogative). Fraser (1990:386), for instance, refers to mood as a structural marker of pragmatic meaning. Semantically, verb meaning can point to certain relations: *cause*, *trigger*, *provoke*, or *effect* can all indicate a causal relation. Pragmatically, phenomena such as implicature establish relations between propositions that are not explicitly present in the text, but are constructed in the minds of the speakers.

This paper is concerned with a particular type of marking that is not easily classified as syntactic, pragmatic, or semantic. Discourse markers are as pervasive in language as they are difficult to define for the linguist. Section 3 will provide a definition of discourse markers as they have been applied in this paper. For now, let us think of them as signals that the piece of text being processed is to be linked to some other piece of the text in a particular way. Experimental evidence shows that discourse markers are used in the recognition of rhetorical relations. Haberlandt (1982) tested reading times with marked and unmarked relations between two sentences, and found that the pairs that were marked with a discourse marker were processed faster. In some cases, it can be argued that a relation is present, although not explicitly indicated. For instance, in Example (1), readers would agree that sentence (1b) is related to (1a) through a causal relation: the reason why Tom quit was that he was tired of the long hours. The relation can be made explicit through the conjunction *because*, as in Example (2). A different marker would void the causal relation, as is the case with *anyway* in (3).

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[1] Rhetorical relations, as we shall see, are not limited to written text.

(1)   a.   Tom quit his job.

           b.   He was tired of the long hours.

(2)   Tom quit his job because he was tired of the long hours.

(3)   Tom quit his job. He was tired of the long hours, anyway.

Some discourse markers are straightforward conjunctions; for instance, in Example (4) (which is part of a conversation from Taboada (2001:215), the conjunction *if* indicates that what follows is a condition on the previous statement (namely, that August 8th is a good date for the speaker).

(4)   [Arranging a meeting]

          Uh . . . August eighth at nine thirty would be, fine. If, that's okay with you as well.

Other discourse markers are more difficult to identify. For instance, in (5), an example from the RST web site (Mann, 2005), the relation between segments b and c is one of condition: ''if the software is divided, the copyright notice should be attached to every part of the software''. Here, what signals that there is a condition is the prepositional phrase starting with ''in the event that''. The main content of that unit is in an embedded clause within the prepositional phrase, which cannot stand alone.

(5)   [Copyright notice]

          a.   This notice must not be removed from the software,

          b.   and in the event that the software is divided,

          c.   it should be attached to every part.

There are different ways one could approach a study of rhetorical relations and discourse markers. One possibility is to create a taxonomy of discourse markers, and then observe which types of relations they signal. This is basically the approach that Knott (1996), Knott and Dale (1994), and Knott and Sanders (1998) have followed. However, the present study is not one of discourse markers, but of rhetorical relations; it is concerned with how and when rhetorical relations are marked in the discourse. The study provides a characterization of a particular type of signalling for rhetorical relations; but there could be other ways of signalling such relations. In providing this characterization, the paper tries to answer a fundamental question about rhetorical relations and about coherence in general: how do hearers and readers construct the relations in a text, i.e., what kind of signalling is available to them in order to process the text?

The procedure is one that moves from analysing rhetorical relations to examining how those relations are marked. I carried out corpus analyses in order to study the occurrence of discourse markers, and how they signal (or do not signal) the presence of a rhetorical relation. Two different types of data were studied: one collection of spoken, task-oriented conversations, and a set of newspaper articles.

The paper has five main sections. Following the Introduction, section 2 provides a very brief introduction to Rhetorical Structure Theory, the main framework for the analysis. Section 3 discusses markers for coherence relations, including discourse markers and other types of signalling devices. The next two sections explain the corpus analyses and the results: section 4 discusses the analysis of the spoken data, including an account of how RST was applied to conversation, and section 5 presents the results of the written corpus. Finally, in section 6 the results are discussed and evaluated.

2. Rhetorical Structure Theory

Rhetorical Structure Theory is an approach to textual coherence and organization. RST addresses text organization by means of relations that hold between parts of a text. It explains coherence by postulating a hierarchical, connected textual structure in which every part of a text has a role to play, a function to fulfil, with respect to the other parts of the text. The notion of text coherence through text relations is widely accepted; the relations have also been called *coherence relations*, *discourse relations*, or *conjunctive relations* in the literature.

RST provides the analyst with a systematic way for annotating a text. If the annotation involves an entire text, or a fairly independent fragment, then the analyst seeks to find an annotation that will include every part of the text in one connected whole. An analysis is usually done by reading the text and constructing a diagram similar to that in Fig. 1. This particular text consists of the title and abstract appearing at the top of an article in *Scientific American* magazine (Ramachandran and Anstis, 1986). The original text, here broken into numbered units, is:

1.   [Title:] The Perception of Apparent Motion
2.   [Abstract:] When the motion of an intermittently seen object is ambiguous,
3.   the visual system resolves confusion
4.   by applying some tricks that reflect a built-in knowledge of properties of the physical world.

The main way in which one unit becomes connected to another is by adding an RST relation to the diagram, such as the one in Fig. 1, represented by the arrow from unit 2 to the *span* of text numbered 3–4. At each end of the arrow, there is a span of text; the arrow is labelled with the name of a relation, in this case *Condition*. The arrowhead points to a span called the *nucleus* (units numbered 3–4); the arrow points away from another span called the *satellite* (unit 2). All of the units are also spans, and spans may be composed of more than one unit. Span 3–4 has been built, using the *Means* relation to relate unit 4, the satellite, to unit 3, the nucleus. The analyst has decided that the author of the text considered unit 3 more important than unit 4, or, conversely, that the author considered that unit 4 was dependent on unit 3.
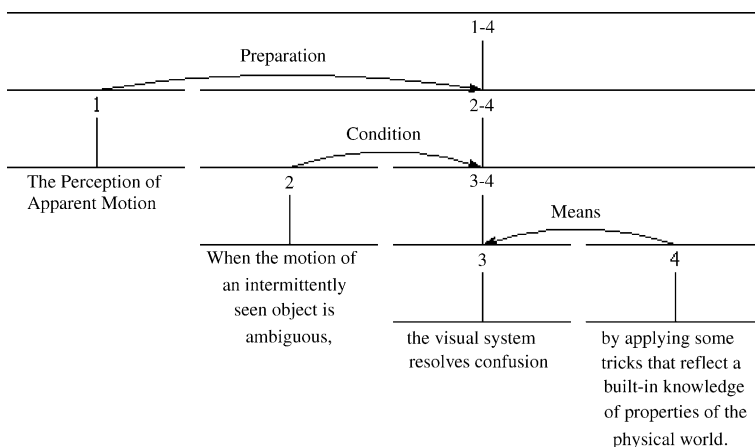

Fig. 1. Diagram of an RST analysis.

The diagram is equivalent to a set of judgments that the analyst has made, all of which can be explicitly identified, using the relations and their definitions. Every relation is defined in terms of intentions that lead authors to use that particular relation. Thus, an RST diagram provides a view of some of the author's purposes or intentions for including each part. The analysis is inherently subjective, being based on a reader's understanding of texts. When analysts study and diagram texts, they use their knowledge of the culture, situations, and language that the texts represent.

Spans of texts can be related recursively by using relations. Relations are defined in terms of four fields:

1. Constraints on the nucleus;
2. Constraints on the satellite;
3. Constraints on the combination of nucleus and satellite;
4. Effect (achieved on the text receiver).

To specify each field for any instance of a particular relation, the analyst must make a plausibility judgment, based on the contextual situation and the (presumed or declared) intentions of the writer. That is, the analyst judges whether it is plausible that the writer had such-and-such intentions or desired to obtain such-and-such effects when creating the text. The original set of relations (Mann and Thompson, 1988) and their organization is presented in Fig. 2.

The set is not definitive or closed; it is one possible listing of relations. Other relations have been added as new examples were encountered, and researchers investigated new text types or applications; thus, Rösner and Stede (1992) proposed Alternative and Until. Among the relations added to the original set of Fig. 2 are: Joint, List, Means, Preparation, and Unconditional (Mann, 2005). All relations are defined in terms of the four fields mentioned above. Definitions are based on functional and semantic criteria, not on morphological or syntactic signals, because no reliable or unambiguous signal for any of the relations was found.

The introduction to RST above has been quite a bit simplified. Many details have been left out; only those relations that will be necessary to understand the rest of the paper were mentioned. For a more extensive introduction, one should consult the original description of RST (Mann and Thompson, 1988), or the RST web site (Mann, 2005). Taboada and Mann (in press-a) provide a

Circumstance
Solutionhood
Elaboration
Background
Enablement and Motivation
    Enablement
    Motivation
Evidence and Justify
    Evidence
    Justify
Relations of Cause
    Volitional Cause
    Non-Volitional Cause
    Volitional Result
    Non-Volitional Result
    Purpose

Antithesis and Concession
    Antithesis
    Concession
Condition and Otherwise
    Condition
    Otherwise
Interpretation and Evaluation
    Interpretation
    Evaluation
Restatement and Summary
    Restatement
    Summary
Other Relations
    Sequence
    Contrast

Fig. 2. One set of RST relations.

review of recent research carried out within RST; in another paper (Taboada and Mann, in press-b), they examined some of the open issues within the theory.

3. Markers for coherence relations

The most frequently studied markers signalling coherence relations are discourse markers. The first difficulty in examining these markers lies with the definition of exactly what they are, and what to call them. Among the terms used we find: coherence markers, discourse markers, lexical markers, discourse operators, discourse connectives, pragmatic connectives, sentence connectives, cue phrases, clue words, discourse signalling devices, or even *pesky little particles*—the latter coined by Grimes (1975). The definitions are equally diverse. Fraser (1999) proposes that discourse markers are conjunctions, adverbs and prepositional phrases that connect two sentences or clauses together. Redeker (1990, 1991) suggests that discourse markers link not only contiguous sentences, but the current sentence or utterance with its immediate context. Schiffrin (1987, 2001), on the other hand, believes that discourse markers can have both local and global functions (i.e., they may connect propositional meaning or, in conversation, determine the structure of the exchange). Schiffrin also includes items that Fraser would probably not consider discourse markers: *oh*, *y'know*, *I mean*. For Blakemore (1987, 1992, 2002), who works within the framework of Relevance Theory (Sperber and Wilson, 1995), these markers impose constraints on the implicatures the hearer can draw from the discourse: discourse without connectives is open to more than one type of implicature. Louwerse and Mitchell (2003) consider connectives as cohesive devices that cue coherence relations, marking transition points within a sentence, between sentences, or between turns, both at the local and the global levels of conversation and discourse. Their consideration of discourse markers as cohesive devices is in line with Halliday and Hasan's (1976) account of cohesion, by which conjunctions signal cohesiveness by means of additive, adversative, causal and temporal relations. (See also Martin (1992) for a detailed account of conjunctive relations.)

The study of discourse markers—to choose one of the more popular terms—constitutes an extensive area of research in itself. It has been characterized as "a growth industry in linguistics" (Fraser, 1999:932). At least eight books and edited volumes have been devoted to the issue in English alone (Abraham, 1991; Andersen, 2001; Blakemore, 2002; Brinton, 1996; Fischer, 2000, in press; Jucker and Ziv, 1998; Schiffrin, 1987); several more in a number of other languages (Fuentes Rodríguez, 1995; Martín Zorraquino and Montolío Durán, 1998; Pasch et al., 2003; Portolés, 1998; Travis, 2005)[2]; as well as a large number of articles, references to which can be found in the books mentioned and in Cortés Rodríguez (1995a, 1995b), Fraser (1999), Grote et al. (1997), and Louwerse and Mitchell (2003). Most relevant to our discussion are studies that combine the study of discourse markers with that of coherence relations (Knott, 1996; Knott and Dale, 1994; Pit, 2003; Sanders et al., 1992, 1993).

Different motivations have led to the study of lexical markers of rhetorical relations. Working in Dutch, Sanders et al. (1992), for instance, were interested in the adequacy of a taxonomy and in the psychological plausibility of coherence relations. To those ends, they presented subjects with pairs of clauses that had a connective removed,[3] and asked the subjects to join the two clauses by

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[2] This list is not meant to be exhaustive; it is limited to studies in languages I am familiar with.

[3] The authors do not offer a clear definition of the types of connectives used; apparently, they include both conjunctions (such as Dutch *maar*, 'but') and conjunctive adjuncts (e.g., *daarentegen*, 'on the contrary').

choosing from a set of connectives. The authors found that categories of coherence relations were typically marked by the same Dutch connectives.

Another goal of studies of coherence relations and discourse markers has been to generate the most appropriate markers in a text generation system. Grote et al. (1997) focus on the many possible ways of marking the Concession relation in English and in German. They classify different instances of concessive relations, and map markers to those types. Their generation system can then choose a marker suitable for the type of concessive relation being generated, in either of the two languages. They propose that similar studies be carried out for other relations.

In this paper, I am interested in how discourse markers signal a particular rhetorical relation as being used by a speaker/writer. One obvious question in the study of such markers is the issue of unsignalled relations. Some authors take the position that the absence of signals does not mean that the relations are not present, just like zero anaphora does not mean that an anaphoric relation is not present. The issue is, then, how to classify those relations that are not overtly signalled. Knott and Dale (1994) suggest that "[t]here is no need to make a subtle distinction in the taxonomy unless cue phrases exist that reflect it". Such a statement obviously assumes that cue phrases are the only indicators of the various discourse relations.

It is worth noting that, with some exceptions, the study of how relations are signalled has mostly been confined to explicit discourse markers, preferably in written texts. Very little attention has been paid to other linguistic signals, including mood, modality, or intonation. For example, a question (as expressed by an interrogative mood) is a potential signal for a Solutionhood relation (Taboada, 2004a). Some of the examples from the LDC (Linguistic Data Consortium) corpus of Wall Street Journal articles (Carlson et al., 2002) take a non-finite gerund clause as indicating a Circumstance relation, as shown in Example (6), where the relationship between spans 1 and 2–5 is one of Circumstance. Here, the satellite, *insisting that they are protected by the Voting Rights Act*, has no other marking than the non-finite form of the verb *insisting*.

(6)   [1] Insisting that they are protected by the Voting Rights Act, [2] a group of whites brought a federal suit in 1987 [3] to demand that the city abandon at-large voting for the nine-member City Council [4] and create nine electoral districts, [5] including four safe white districts.

In spoken language, two other types of signalling are relevant: intonation and gesture. Adverbs such as *now* have different prosodic contours when they are used as discourse markers and when they are sentence adverbials (Hirschberg and Litman, 1987, 1993). The function of intonation as signalling relations has been treated in depth by den Ouden (2004). She found that pause duration and pitch were strong indicators of the RST structure of read-aloud texts.

Cassell et al. (2001) found that some aspects of discourse structure, such as topic changes, were signalled by changes in posture. New discourse segments at the beginning of a turn are likely to be accompanied by posture shifts. When speakers produce the end of a discourse segment at the end of a turn, their posture shifts last longer than when the two ends (of discourse segment and turn) do not co-occur. The authors point out that these findings relate to unit boundaries, but that further research may indicate a relationship between posture and information content of units (and possibly relationships among units, one could add).

Some studies report a higher frequency of discourse markers in speech than in written discourse. Louwerse and Mitchell (2003) found 10 times as many discourse markers in spoken as in written discourse, and twice as many in informal as in formal discourse. Although their study

included particles such as *well*, *anyway*, and backchannels (Yngve, 1970) such as *yeah* and *right*, typical of speech, they report that the result is also true for connectives like *because*, *although*, and *if*. Other research has also found a higher incidence of discourse markers in speech (Dahlgren, 1998; Soria and Ferrari, 1998). This is interesting, since in face-to-face communication other signalling devices (intonation, gesture) are also available. Louwerse and Mitchell (2003) postulate that the markers are necessary because dialogue is a dynamic and emergent type of discourse, in which participants do not have access to an organized structure or outline.

Finally, there is the question of punctuation and layout in written texts, including the problem of how these devices correlate with rhetorical relations—until recently a fairly unexplored area of research. Two exceptions are the work of Bateman et al. (2001) in natural language generation, and preliminary work reported by Dale (1991) on the meaning of punctuation and paragraph breaks.

A first conclusion upon reviewing different types of marking is that the signalling of discourse relations is not restricted to discourse markers; many other devices are used to signal the presence of such relations. The question I address in this paper is whether rhetorical relations can be identified where no signalling, lexical or otherwise, is present. To that end, I carried out analyses of two different corpora, first identifying rhetorical relations using the traditional RST methodology, and then examining the amount of signalling involved in those relations.

The next two sections describe the two different analyses, starting with descriptions of the corpora. I also provide the results of the analyses. For each corpus, a slightly different definition of discourse markers was adopted; the definitions are provided in the next sections.

4. First corpus: scheduling dialogues

The first corpus studied was a collection of task-oriented dialogues. The dialogues were collected by Carnegie Mellon University and the University of Pittsburgh as part of JANUS, a large speech-to-speech machine translation project. I have described this data in terms of rhetorical, thematic and cohesive relations elsewhere (Taboada, 2004a, 2004b; Taboada and Lavid, 2003), in its English and Spanish versions. Here, I concentrate on the English data.

The participants were recruited and brought to a lab for recording purposes. In their instructions, it was explained to them that the conversation were taking place between two participants with conflicting agendas (provided by the researchers), covering a period of two to four weeks; the point was to have the participants agree on a two hour appointment within that time frame. For the purposes of this study, I selected 30 conversations between native speakers of American English. The conversations were selected from a total of 881 dialogues, and were divided into three groups: 10 male–male, 10 female–female, and 10 female–male exchanges. The selection was made to obey, besides the gender balance, two other constraints: that they be approximately the same in length, and that as many different speakers as possible be represented (in the recording of the large corpus, speakers often recorded more than one conversation). Most speakers had been raised in the United States, primarily in Pennsylvania, and they had a mean age of 25 years. Further details on the corpus are provided in Taboada (2004a). Table 1 provides the raw count and the mean length of the 30 dialogues in terms of turns, units of analysis (RST spans), and words.

The corpus was divided into RST-like units (one clause per unit, for the most part, although subject and complement clauses were included in one unit with their matrix clause). Then I

Table 1
Total figures and mean length of the conversations

	Total for the 30 conversations	Mean length
Turns	249	8.30
Units of analysis	784	26.13
Words	6804	225.93

performed an RST analysis of the conversations. Finally, I observed which discourse markers were used in each relation.

Before we move on to a discussion of the analysis proper, it needs to be pointed out that this study was slightly unusual in that it considered conversation, an area traditionally not covered by RST studies. The next section describes some of the challenges encountered in performing a rhetorical analysis of conversation.

4.1. Rhetorical Structure Theory in dialogue

An RST analysis of a text presupposes that the text in question is functionally and hierarchically organized. On the one hand, the dialogues in the corpus were, likely, driven by functional purposes. Although not spontaneous, the dialogues were meant to be representative of a dialogue with a particular purpose, that of setting up an appointment. On the other hand, it is more difficult to postulate hierarchical organization in dialogue, given that speakers do not plan and rework their conversations. Some researchers believe that RST cannot be applied to conversation, whereas others have proposed modifications that would account for turn-taking phenomena (e.g., Daradoumis, 1996; Stent, 2000). It has been argued that even casual conversation carries a certain level of organization, encoded as knowledge of the particular script, frame, or genre being used (Aijmer, 1996; Dorval, 1990; Eggins and Slade, 1997; Paltridge, 1995; Stenström, 1994; Tsui, 1994). If that is the case, then RST can tell us something about the organization of conversation.

Considering functional and hierarchical organization, there are two different ways in which the analysis can proceed, according to two different points of view, that of the analyst and that of the participants. From the point of view of the analyst, the conversation is a product of the interaction of the two speakers, an autonomous piece of text. The analyst is an observer, and he or she is detached from the original context. In the participants' view, the conversation is a process to which both speakers contribute in their respective turns. Each turn is an independently created text; while representing a response to the overall context, it is nevertheless a text in itself.

The two points of view could lead to two different analyses. In the first analysis, each of the turns is examined in isolation, without the analyst relating them to each other. In the second analysis, the whole conversation is considered to be a text, and then studied as such. Elsewhere, I have performed both analyses, and compared the results (Taboada, 2004a). In this paper, I will concentrate on the first type of analysis, examining only one turn at a time. This involves a certain detachment from the original context and the original purpose of the conversations, but I believe it can provide insights into how each speaker contributes to the conversation. The discourse relations used and their markers are internal to the turn. It is worth mentioning here that very few signals of inter-turn relations were found.

The analysis proceeded as follows: I segmented the conversation into units; the segmentation was not changed later on as a result of the analysis. This was for several reasons, the most

important of which was that different types of analyses were performed on the corpus: in addition to performing the rhetorical analysis, I analysed cohesive relations and information structure (Taboada, 2004a). In order to compare the data across analyses, the units were made the same for all of the analyses, and were fixed from the outset of the study. The set of relations used was that in Mann and Thompson (1988), as listed in Fig. 2. I was the only annotator for this corpus, in contrast with the annotations for the corpus discussed in section 5, which were carried out by different annotators, and for which inter-annotator agreement measures are provided. Validity and reliability are often in question when undertaking RST analyses,[4] and my analysis is both subjective and after-the-fact. There is no straightforward answer to those charges, except that trained analysts do show high degrees of agreement, indicating that their analyses are not completely subjective (see, e.g., Carlson et al., 2001; den Ouden, 2004). For a more detailed discussion, see Taboada and Mann (in press-b).

4.2. Discourse markers in scheduling dialogues

In this particular corpus, the discourse markers were very narrowly defined: coordinate and subordinate conjunctions were the only ones considered. I excluded pause fillers or other hesitation markers (*I mean*, *you know*), because these markers realize many different functions and do not always relate two spans of talk as tightly as other markers do.

The results of the analysis are presented in Table 2. For each relation, I indicate how many times it appeared, and how many times it was signalled by a discourse marker when it did.

The percentages for the markers represent the number of times the relations are marked in comparison to the number of occurrences of that relation; for instance, Condition is marked 50% of the time it occurs in the corpus. Overall, relations were marked about 31% of the time, quite a low figure in light of other studies that indicate a high percentage of signalling in spoken discourse; this could be due to the narrow definition of markers in the present study. Intuitively, the numbers seem to make sense: relations typically expressed through subordination (Concession, Condition, Cause, Result, Purpose) are more heavily marked than relations that may hold between two or more sentences (Elaboration, Evidence).

Example (7) illustrates a few relations. Of all the relations present, the only one marked is the top-level relation, Concession. The other relations, Elaboration, and two instances of Evaluation, are not signalled by a discourse marker or any other signalling device. We can infer that the relationship between units 2–3 and 4–5 is one of Elaboration, because the speaker specifies exactly what time on the ninth she would like to meet. The two Evaluation relations are clear from the content of the span: *that sounds perfect*; *that'd be good*. A diagram for Example (7) is presented in Fig. 3.

(7)   [1] No, the eighth doesn't look good at all, [2] but the ninth, [3] that sounds perfect. [4] Before two, [5] that'd be good.

One of the most frequent cases of signalling is Purpose. It is signalled 90% of the time, by four different markers: *and*, *so that*, *that*, and *to*. Examples (8) through (10) show some of those Purpose relations, signalled by *and*, *to*, and *that*, respectively. In these and other examples, the nucleus and satellite are indicated by S and N in square brackets at the beginning of the

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[4] This point was, in fact, raised by one of the anonymous reviewers.

Table 2
Rhetorical relations and markers in task-oriented dialogue

	Frequency	%	Discourse markers	%
Antithesis	1	0.17	0	–
Background	13	2.24	1	7.69
Circumstance	5	0.86	0	–
Concession	71	12.24	38	53.52
Contrast	9	1.55	2	22.22
Condition	66	11.38	33	50.00
Elaboration	166	28.62	2	1.20
Enablement	10	1.72	0	–
Evaluation	8	1.38	0	–
Interpretation	1	0.17	1	100
Joint	29	5.00	16	55.17
Justify	34	5.86	3	8.82
Motivation	3	0.52	0	–
Non-volitional cause	37	6.38	23	62.16
Non-volitional result	43	7.41	27	62.79
Otherwise	4	0.69	2	50.00
Purpose	10	1.72	9	90.00
Restatement	28	4.83	3	10.71
Sequence	7	1.21	4	57.14
Solutionhood	7	1.21	0	–
Summary	4	0.69	1	25.00
Volitional cause	7	1.21	1	14.29
Volitional result	17	2.93	14	82.35
n	580	100	179	30.86

corresponding segment. It is often the case that the segments under discussion contain further relations, but those are ignored, as I consider only the relation under discussion.

(8)   [N] Maybe we should get, together some time, [S] and talk about this a little longer.

(9)   [N] Um when can we get together again, on our m–, [S] um to discuss our project.

(10)   [N] I think we are gonna have to work something out, [S] that we can extend the deadline somehow.
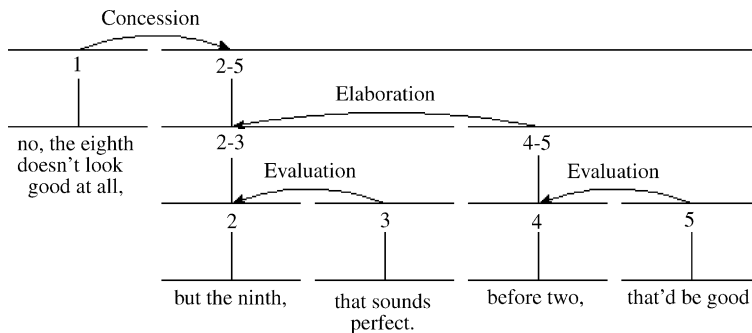

Fig. 3. Rhetorical relations in Example (7).

There are few safe correlations between relation and marker. The conjunction *and*, used to indicate Purpose, is also present in Elaboration, Joint, Non-Volitional Cause and Sequence. *So* is present in Background, Condition, Justify, Non-Volitional Cause, Non-Volitional Result, Restatement, Summary and Volitional Result. Example (11) shows an Elaboration relation where the nucleus and the satellite are joined by *and*. Other examples of *so* are (12), a Volitional Result, or (13), a Restatement.

(11)   [N] Um I have a meeting from nine thirty to noon, [S] and, that'll give me some
         time to catch some lunch.

(12)   [N] What about, the eleventh? Because I have a meeting, with Mark, your favorite
         person, from three to four, [S] so, depending on how long it'll be I can schedule
         you in, before that?

(13)   [N] Okay, next week, again, Thursday, or maybe Friday, [S] so the tenth or the eleventh.

There are instances of these markers that do not qualify as connectives between relations, although they may be labelled as discourse markers. Example (14) is the first turn in a conversation. The speaker starts with *okay*, followed by falling intonation,[5] and continues the utterance with *so*. That *so* does not link its sentence to anything else, and cannot be considered a marker of any particular relation.

(14)   Okay. So, when, would you like to meet. I think that, the twenty first at, nine thirty
         am, would be a really good time, that we should meet.

In summary, a corpus analysis of spoken conversation shows that only a small percentage of relations (about 31%) are signalled by a conjunction. Although a wider definition of marker would yield a slightly higher percentage, it is clear that some relations are not signalled by any particular device.

5. Second corpus: newspaper articles

The second corpus studied is an already available collection of RST-annotated texts. The RST corpus (Carlson et al., 2002) is a subset of Wall Street Journal material containing 385 articles (about 176,000 words) from the Penn Treebank distributed by the Linguistic Data Consortium (LDC), from which the corpus is directly available.

The texts selected are a heterogeneous collection of articles, letters to the editor, and editorials; they cover financial reports, general interest stories, business-related news, and cultural reviews (Carlson et al., 2001). They were annotated manually, with the use of a tool; the annotations were checked for agreement among annotators. The process of corpus annotation is described in Carlson and Marcu (2001) and Carlson et al. (2003). The analyses followed the traditional RST system, with some modifications: a larger number of relations, 78 in total, was used, in part because some of the relations were further subclassified. For instance, Elaboration has the following subclasses: elaboration-additional, elaboration-general-specific, elaboration-

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[5] Intonation is indicated with common punctuation symbols: comma for slightly rising intonation, question mark for marked rising intonation, and period for falling intonation.

object-attribute, elaboration-part-whole, elaboration-process-step, and elaboration-set-member. In fact, it has been argued that Elaboration is so diverse and difficult to define that it should not be considered a proper relation at all (Knott et al., 2001).

The text, as annotated with the corresponding relation, includes information on the nucleus and satellite, but no information on signalling. For the purpose of this study, a subset of the relations were manually annotated with information on how they are signalled. I decided to compare three relations that are frequently marked against three relations that are not. The first group, the frequently marked relations (according to data from other studies), comprised: Concession, Circumstance, and Result. Relations that are rarely signalled included Background, Elaboration, and Summary. These few relations cover a large subset of the entire corpus. The first set includes about 45,000 words, and the second group covers spans of text totalling 113,000 words. It should be noted that, in the Carlson et al. corpus, some of the relations include further relations. For example, Elaboration is an umbrella label for six different sub-relations, as mentioned above. Summary has two types: summary-s and summary-n. In summary-s, the satellite is the summary (of the information provided in the nucleus); in summary-n, the nucleus summarizes the satellite. My study included both types of summary.

The types of signalling considered for this part of the study were determined according to broader criteria than was the case for the task-oriented dialogue study, inasmuch as I let the analysis be open-ended, allowing myself to examine the presence of any type of signal. At first, the usual suspects were considered: conjunctions, adverbs, adverbial phrases and prepositional phrases. As the analysis proceeded, other types were incorporated: finiteness in certain clauses, or the order of nucleus and satellite. The next section presents the results and discusses the types of marking found.

5.1. Relation markers in newspaper articles

The overall level of signalling in newspaper articles is slightly higher than that observed for task-oriented dialogue: 43.48% of the relations are signalled in one way or another, as we can see in Table 3. We should bear in mind that the definition of 'signal' was also broader for this type of analysis, as it included signals other than discourse markers. When the definition is narrowed to include only discourse markers comparable to those in the task-oriented dialogue study, the level of marking is approximately 31% for all six relations together, roughly the same percentage as for the conversations.

As is obvious from Table 3, however, there are clear differences in the two groups of relations that were established for this study. In the group of relations that were a priori considered more

Table 3
Rhetorical relations and markers in newspaper articles

	Number of relations	Marked	%
Concession	228	206	90.35
Circumstance	539	358	66.42
Result	117	78	66.67
Background	192	51	26.56
Elaboration	521	51	9.79
Summary	75	3	4.00
n	1672	727	43.48

Table 4
Most frequent signals in the Concession relation

	Times present	% of signalled relations ($n = 206$)
But	82	39.81
Although	22	10.68
Though	18	8.74
Despite	16	7.77
While	14	6.80
Even though	12	5.83
However	10	4.85
Still	6	2.91
Even if	5	2.43
Even when	2	0.97
Even	2	0.97
Yet	1	0.49
Whether	1	0.49
Whereas	1	0.49

frequently marked (Concession, Circumstance. and Result), the overall level of signalling is 72.62%. In the group of less commonly marked relations (Background, Elaboration, and Summary), the percentage of marked relations overall drops to 13.32%.

Examining each relation more closely, we find distinct patterns of marking. In Concession relations, which are very frequently marked (90.35% of the time they appear), by far the most preferred signal is a conjunction: *but* appears 82 times of the 206 that Concession has a signal. Table 4 summarizes the most frequent markers in the Concession relation. Other markers not in the table include *regardless*, *rather*, *nevertheless*, *in spite of*, *even while*, *even as*, *but even so*, and *and even then*.

Although most Concession relations are signalled by a conjunction, two of them are signalled by the verb in the nucleus. In Example (15), we can see that the relation between nucleus and satellite is not clearly indicated, except for the beginning of the nucleus, which is indicated by the words "they concede". Another example had the verb *concedes*. The relation in (15) is very similar to many other Concession relations, as can be seen by comparing it the relation in Example (16), which is signalled by *but*.

(15)   [S] Some entrepreneurs say the red tape they most love to hate is red tape they would also hate to lose. [N] They concede that much of the government meddling that torments them is essential to the public good, and even to their own businesses.

(16)   [S] The Securities and Exchange Board of India was set up earlier this year, along the lines of the U.S. Securities and Exchange Commission, [N] but New Delhi hasn't pushed the legislation to make it operational.

A few relations seemed to have no external signal, although they were clearly Concession relations. Example (17) is part of a letter to the editor, where the concession establishes that although the problems are not impossible to solve, they (the people in the Delta) are not ready to solve them yet. The adverb *just* in the nucleus conveys some of that contrast in the concession, but it is not, in my opinion, a clear signal of the relation.

(17)   [S] Delta problems are difficult, not impossible, to solve — [N] I am just not
        convinced that we are ready to solve them yet.

One last remark with regard to Concession relations has to do with the most frequent placement of the signal. The relations were coded, according to whether the signal was placed in the satellite or the nucleus portion of the relation. The marking is quite balanced: 110 of the relations were signalled through some marker in the satellite, and 96 were signalled through a nucleus marker. Examples (15) and (16) illustrated the nucleus marking, whereas Example (18) shows marking on the satellite segment, which is a prepositional phrase introduced by *despite*.

(18)   [N] [...] sales rose [S] despite the adverse effect of Japan's unpopular consumption
        tax, introduced in April.

The Circumstance relation is less heavily marked (66.52% of the Circumstance relations were signalled), but it is marked in a variety of different ways. First of all, a total of 50 different strategies are used. Most of them are simple conjunctions: coordinate, subordinate, and correlative (*and*, *but*, *if*, *because*, *whether ... or*, *either ... or*), while others are complex conjunctions (*and then*, *and when*), adverbials (*at first*, *sometimes*), prepositions introducing prepositional phrases (*with*, *under*), or phrases introducing complements (*it would be*, *now that*). A few seem to be only indicated by a non-finite verb in the satellite (see examples below). Table 5 summarizes the most frequent signals.

Circumstance is a heterogeneous relation, as reflected in the type and diversity of signals present. A large number of Circumstance relations are temporal, as illustrated in Example (19).

(19)   [N] Sterling plunged about four cents Thursday and hit the week's low of $1.5765
        [S] when Mr. Lawson resigned from his six-year post because of a policy squabble
        with other cabinet members.

Table 5
Most frequent signals in the Circumstance relation

	Times present	% of signalled relations ($n = 358$)
When	105	29.33
As	59	16.48
After	27	7.54
Following	16	4.47
Since	15	4.19
And	12	3.35
Without	12	3.35
But	11	3.07
Once	10	2.79
Until	9	2.51
With	9	2.51
Before	7	1.96
Now	7	1.96
While	7	1.96
If	6	1.68
Given	5	1.40
Because	2	0.56

It is interesting to note that 16 of the relations were indicated with *following*, to indicate temporal succession, as seen in Example (20). Here, relations marked with *following* occur both in the satellite-nucleus order and in nucleus-satellite order, the latter being the most frequent.

(20)   [S] Following the impeachment conviction, [N] Dr. Benjamin Hooks, executive
        director of the National Association for the Advancement of Colored People,
        issued a restrained statement, warning that the Hastings case could set a ''dangerous
        precedent,'' but adding, ''We must respect the considered judgment of the Senate.''

Non-finite forms of other verbs (*having*, *listening*, *commenting*) were also used in similar way. In most cases, background knowledge helps the reader understand the temporal relation expressed (*listening* may happen at the same time as another action, whereas something happens after something else *having* happened). Similar instances occur with gerunds in prepositional phrases, as in Example (21), where the satellite is introduced by *in calculating*, and with past participle non-finite clauses, as in Example (22), which exhibits another temporal relation (''after having been rated . . ., the issue will be sold'').

(21)   [N] Interest on the bonds will be treated as a preference item [S] in calculating the
        federal alternative minimum tax that may be imposed on certain investors.

(22)   [S] Rated single-A-1 by Moody's Investors Service Inc. and single-A by Standard
        & Poor's Corp., [N] the non-callable issue will be sold through underwriters led
        by Merrill Lynch Capital Markets.

Finally, in Example (23), I present a Circumstance relation that is not marked at all. The satellite in the example provides the framework for interpreting the nucleus.

(23)   [N] Imelda Marcos asks for dismissal, says she was kidnapped. The former first
        lady of the Philippines asked a federal court in Manhattan to dismiss an indictment
        against her, claiming among other things, that she was abducted from her homeland.
        [S] Mrs. Marcos and her late husband, former Philippines President Ferdinand
        Marcos, were charged with embezzling more than $100 million from that country
        and then fraudulently concealing much of the money through purchases of prime
        real estate in Manhattan.

As for the placement of markers, they appear more often in the satellite portion of the relation (322 times, almost 90% of the signalled relations) than in the nucleus (a mere 36 relations had a nucleus marking).

The third most frequently marked relation is Result. There were fewer Result relations in the corpus, a total of 117, of which 78 were signalled (66.67%), making the level of signalling comparable to that of the Circumstance relation. Variety among the markers occurred as well, with over 20 different signals observed. Table 6 provides the respective numbers and percentages of some (most are conjunctions and prepositional phrases).

The most frequent marking of this relation is through a complex preposition (*because of*, *as a result of*). Interestingly *result* also occurs as illustrated in Example (24), where the marking consists of introducing the nucleus with the words ''the result:''.

Table 6
Most frequent signals in the Result relation

	Times present	% of signalled relations ($n = 78$)
Because of	16	20.51
As a result of	14	17.95
Because	8	10.26
And	6	7.69
So	5	6.41
As a result	4	5.13
When	4	5.13
As	3	3.85
Since	2	2.56
Now	2	2.56
After	2	2.56
The result	1	1.28
So far	1	1.28
Now that	1	1.28
And so	1	1.28
Thus	1	1.28
But	1	1.28

(24)   [S] To answer the brokerage question, Kidder, in typical fashion, completed a task force study. [N] The result: Kidder will focus on rich individual investors and small companies, much closer to the clientele of Goldman, Sachs & Co. than serve the world firms like Merrill Lynch or Shearson Lehman Hutton Inc.

In Example (25), we are dealing with an unmarked relation. Though presented as unmarked, the relation does bear some resemblance to the Circumstance relations discussed above, where a non-finite clause is used as an underspecified representation of the meaning.

(25)   [S] Bowing to criticism, [N] Bear Stearns, Morgan Stanley and Oppenheimer joined PaineWebber in suspending stock-index arbitrage trading for their own accounts.

Marking in Result relations happens more frequently on the satellite (about 73% of the times).
We now turn to the discussion of those relations that were, from the outset, considered to be less frequently marked: Background, Elaboration, and Summary. As was to be expected (see Table 3), these relations were marked less frequently, to an overall level of about 13%.
In a Background relation, the satellite increases the reader's ability to comprehend the nucleus, unlike Elaboration, where the information is not considered necessary, only additional. It is also important to remember that Background is a presentational relation, whereas Elaboration is a subject matter relation.[6] Background is signalled 26.56% of the times it is present, or 51 signalled relations out of 192. The signalling devices are varied. Many of them are prepositional phrases indicating time: *X earlier*, *X later*, *over X*, *from X to Y*, *but X after*, *between*

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[6] Subject matter relations (such as Cause, Purpose, Condition, Summary) relate the subject matter of two text spans. Presentational relations (such as Motivation, Antithesis, Background, Evidence) are used to facilitate presentation, usually to increase some inclination in the reader (desire, positive regard towards a statement, belief). See section 6 for a discussion of this classification in relation to signalling.

X, *in X*, where X and Y indicate temporal expressions. Other signals include *but*, *now*, *for*, *and*, *previously*, *since*, *thus*, and *up to now*.

One example of a temporal expression is presented in Example (26), where the satellite that provides the background information begins with *shortly before*. Example (27) shows an interesting case of marking on the nucleus. The background information is presented first, but the conjunction *and* seems to introduce the nucleus as related to that satellite.

(26)   [N] Financial Corp. said it agreed to buy the bonds after a representative of Ivan F. Boesky Corp. visited it in November 1983 and said Financial Corp. could improve its financial condition by purchasing the bonds. [S] Shortly before the visit, Mr. Boesky and Drexel representatives had met with Financial Corp. officials and had signed a letter of intent to acquire the 51% stake in the company. However, the agreement was cancelled in June 1984.

(27)   [S] Concern about the volatile U.S. stock market had faded in recent sessions, [N] and traders appeared content to let the dollar languish in a narrow range until tomorrow, when the preliminary report on third-quarter U.S. gross national product is released.

In many of the Background examples, tense seems to play a role, whether accompanied by a temporal expression or not. In Example (28), the background information (presented in the satellite) is not marked at all, but the tense of the verb in the satellite is past perfect, whereas the nucleus conveys a future action. Similarly, in Example (29), the nucleus is in the present perfect tense, whereas the satellite contains a past perfect, indicating that the event in the satellite occurred first. This inference is additionally supported by the concession at the end of the example, explaining that the legislator had backed the plant's construction at another, original, site.

(28)   [N] Alexander Brody, 56, will take on the newly created position of president of the world-wide agency and chief executive of its international operations. [S] He had been president of the international operations.

(29)   [N] As previously reported, a member of the Philippines' House of Representatives has sued to stop the plant. [S] The legislator, Enrique Garcia, had actively backed the plant, but at the original site in his constituency northwest of Manila.

The final example, (30), of Background shows another unsignalled relation. This is an interesting case, because the rhetorical structure of the article seems to follow what the person actually said: the background is that Edwards fights each year for BART funds (BART is an acronym for the [San Francisco] Bay Area Rapid Transit), and the information conveyed is that they could be in danger if the president had a line-item veto.

(30)   [S] He notes that, as a lawmaker from the San Francisco area, he fights each year to preserve federal funds for the Bay Area Rapid Transit system. [N] If a president had a line-item veto and wanted to force him to support a controversial foreign-policy initiative, Rep. Edwards says, the president could call and declare that we would single-handedly kill the BART funds unless the congressman ''shapes up'' on the foreign policy issue.

Elaboration had a level of marking at 9.79%, with signals such as conjunctions (*and*, *but*) and adverbials (*in fact*, *in addition*); quite often, the signals were simply punctuation marks, such as colons, semi-colons, dashes, and parentheses. In a few cases, the elaboration may be expressed with a relative clause, as already pointed out by Scott and de Souza (1990). The elaboration is frequently a result of the structure of newspaper articles: the entire article is an elaboration of the headline, and the second part of the article, often on another page in the original newspaper layout, is an elaboration of the first. In Example (31), there are two embedded Elaboration relations. The first one is signalled by a parenthesis, and elaborates on the first part of the news item. The second elaboration is signalled by a dash, and it elaborates on the title of the article quoted. The high-level structure of this example is presented in Fig. 4. Notice that there are further relations present in the segments outlined here.

(31)   [N1] QUANTUM CHEMICAL Corp.'s plant in Morris, Ill., is expected to resume
         production in early 1990. The year was misstated in Friday's editions. [S1] ([N2]
         See: "Dividend News: Payout Stalled at Quantum Chemical Corp.—[S2] Firm Posts
         Quarterly Loss, Plans a Stock Dividend to Take Place of Cash—WSJ Oct. 27, 1989)

Most elaborations, however, are interpreted as such, given only the content of the nucleus and the satellite, without any external signal. Example (32) provides another instance of embedded relations. In the first relation, the satellite starts with "Recently, the boards . . ." and continues to the end of the paragraph, which is longer than displayed in the example here. The only possible signal that an Elaboration relation is present is the adverb *also* before the main verb *voted* in this satellite. The second Elaboration relation has that "Recently, the boards . . ." sentence plus the next sentence as nucleus. The satellite starts with "The transaction . . ." and continues for a while. This second satellite has no adverb, punctuation mark, or any other device that indicates an
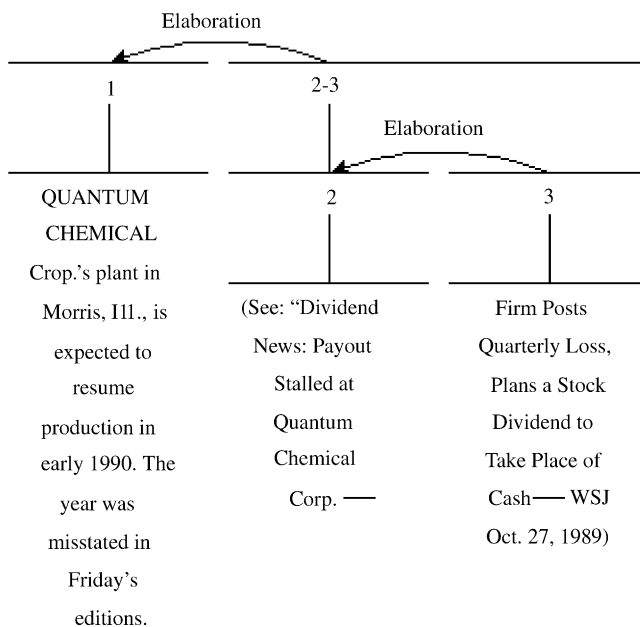

Fig. 4. Relations in Example (31).

elaboration on what has gone before. Knowledge of the newspaper genre leads us to think that an article, unless otherwise stated, proceeds in a series of elaborations.

(32)   [N1] American Pioneer Inc. said it agreed in principle to sell its American Pioneer Life Insurance Co. Subsidiary to Harcourt Brace Jovanovich Inc.'s HBJ Insurance Cos. for $27 million. American Pioneer, parent of American Pioneer Savings Bank, said the sale will add capital and reduce the level of investments in subsidiaries for the thrift holding company. [S1] [N2] Recently, the boards of both the parent company and the thrift also voted to suspend dividends on preferred shares of both companies and convert all preferred into common shares. The company said the move was necessary to meet capital requirements. [S2] The transaction is subject to execution of a definitive purchase agreement and approval by various regulatory agencies, including the insurance departments of the states of Florida and Indiana, the company said. [. . .]

The least marked relation of the six studied is Summary. Out of the 75 times that Summary is present, it is marked only three times, with the following signals: *all this*, *in any case*, and *but*. Example (33) is one of those cases, where the satellite is introduced by *in any case*.

(33)   [N] Many agencies roll over their debt, paying off delinquent loans by issuing new loans, or converting defaulted loan guarantees into direct loans. [S] In any case, they avoid having to write off the loans.

Most other examples involve no overt signalling, as can be seen in (34), where the satellite summarizes the information presented earlier, and does so by quoting somebody in the company that the article makes reference to.

(34)   [N] Lion Nathan Ltd., a New Zealand brewing and retail concern, said Friday that Bond Corp. Holdings Ltd. is ''committed'' to a transaction whereby Lion Nathan would acquire 50% of Bond's Australian Brewing assets. Lion Nathan issued a statement saying it is applying to Australia's National Companies & Securities Commission, the nation's corporate watchdog agency, for a modification to takeover regulations ''similar to that obtained by'' S.A. Brewing Holdings Ltd. SA Brewing, an Australian brewer, last Thursday was given approval to acquire an option for up to 20% of Bell Resources Ltd., a unit of Bond Corp. Bell Resources is acquiring Bond's brewing business for 2.5 billion Australian dollars (US $1.9 billion). S.A. Brewing would make a takeover offer for all of Bell Resources if it exercises the option, according to the commission. Bond Corp., a brewing, property, media and resources company, is selling many of its assets to reduce its debts. [S] ''Lion Nathan has a concluded contract with Bond and Bell Resources,'' said Douglas Myers, chief executive of Lion Nathan.

Summary has two versions, one (summary-s) where the satellite summarizes the information provided in the nucleus, with an emphasis on the situation presented there. According to the annotation manual (Carlson and Marcu, 2001), in this type of relation, the summary (the satellite) is shorter than the nucleus. In the other type of relation (summary-n), the nucleus summarizes the information presented in the satellite, with an emphasis on the summary. Here, too, the summary

is shorter than the satellite, but in this case the summary is the nucleus. Many of the examples of summary-n in the corpus are of the type where the introduction to the article is the nucleus, while the rest of the article elaborates on it. It is not always clear from the corpus coding, however, how some of these summary-n relations are different from elaboration relations. For example, in (35), the summary is in the nucleus part, and the rest is an expanded version of the summary. Alternatively, it is possible to think of this an Elaboration relation, with the nucleus as the first sentence, and the rest of the article as an elaboration, as we have seen in some of the Elaboration examples above. In any event, in both examples (34) and (35), the relation is present without clear signalling.

(35)　　[N] Combustion Engineering Inc. reported a third-quarter net income of $22.8 million, reversing a $91.7 million year-earlier loss. [S] The Stamford, Conn., power-generation products and services company said per-share earnings were 56 cents compared with the year-ago loss of $2.39. Sales fell 1.5% to $884 million from $897.2 million. Strong profit in the process industries, including chemical and pulp and paper, were offset by higher interest expense and by lower earnings as the company closed out certain long-term contracts. Combustion reported improved profits in its automation and control products business, and it narrowed its losses in its public sector and environmental segment. Power generation had higher sales but lower earnings; the company cited factors including work on certain low profit-margin contracts from previous years.

6. Discussion and conclusions

In this article, I have addressed the relationship between discourse markers and rhetorical relations, and, more generally, the signalling of rhetorical relations. I have presented the results of analyses carried out on two different corpora, one spoken and one written. In the first corpus, a set of 30 conversations was coded first for rhetorical relations (turn-internal). Then those relations were examined as to whether or not they were marked with a discourse marker (mostly restricted to conjunctions). The level of marking for this corpus is about 31%. The second corpus was an already available collection of Wall Street Journal articles, coded with rhetorical relations. In that corpus, signalling devices other than discourse markers were also considered, such as punctuation and, in certain clauses, verbal (non-)finiteness. I examined six relations, divided in two groups: frequently marked and less frequently marked ones. The signalling level of the relations in this corpus ranged from 4 to 90%, with an average marking of 43%.

One objection that could be raised to the second study is that I intentionally chose the relations to represent the two extremes of signalling that have been mentioned in the literature, and that consequently, there was a bias from the beginning. It is my belief that one would find similar results in whatever set of relations chosen for analysis: some relations are very rarely signalled, others are signalled very frequently. Moreover, signalling, when present, is never sufficient to identify one particular relation. Frequent signals, such as *and*, *so*, and even verbal tense or (non-)finiteness, appear in multiple relations, rendering the signalling ambiguous as to the relation indicated.

Coming back, then, to the questions posed at the beginning of the paper ((i) how are relations signalled? (ii) how do readers and hearers recognize relations? (iii) are unsignalled relations

actually relations?), the answers to the first two questions are not clear at this point. One proposal suggests that texts are expected to proceed in certain ways corresponding to their genre structure. For example, a newspaper article is expected to proceed by a series of elaborations, such that the title and the first few sentences capture most of the information, and the rest of the article provides further detail. This is how readers can interpret the relation between certain sections of the text as an elaboration relation.

As for the third question, existing research suggests a positive answer, namely, that unsignalled relations are indeed relations. Marcu and Echihabi (2002) carried out a study using in part the same newspaper corpus as the one discussed in the present paper, with the aim of detecting relations automatically. They reported that Contrast relations were signalled by a discourse marker in 26% of the cases where they appeared. Relations labelled as Explanation-Evidence were found to be signalled also around 26% of the time. This level or signalling is, obviously, a problem for an automatic system that purports to identify relations based on discourse markers, such as the one proposed by Marcu (2000a, 2000b). The innovation reported in Marcu and Echihabi (2002) is that these authors were successful in training an automatic classifier to recognize the relations that were not signalled by a discourse marker. The classifier was trained on examples of actual relations, versus examples of non-relations (random pairs of units, sometimes each taken from different documents), using lexical patterns. It learnt to distinguish relations that were not signalled by a discourse marker, increasing accuracy over a discourse-marker-based method by as much as 77%. Although we cannot claim that the automatic classifier is using the same cues that humans do, it is still remarkable that the classifier, compared to humans, detected more relations (out of the total set that human annotators had proposed).

In general, I would like to argue that unsignalled relations are rhetorical relations, but possibly of a different kind. Recall that what I term 'unsignalled relations' are relations that are sometimes (but not too often) signalled.

Traditionally, coherence relations have been binarily classified into two major classes: either semantic versus pragmatic relations (van Dijk, 1979; Schiffrin, 1987); or internal versus external relations (Halliday and Hasan, 1976; Martin, 1992); or, finally, in RST, into presentational versus subject matter relations. Presentational relations (Antithesis, Background, Concession, Enablement, Evidence, Justify, Motivation, Preparation, Restatement, Summary) are those whose intended effect is to increase some inclination in the reader, such as a desire to act, or to heighten the degree of positive regard for, belief in, or acceptance of, the nucleus. Subject matter relations (Cause, Circumstance, Condition, Elaboration, Evaluation, Interpretation, Means, Purpose, Result, Solutionhood) are those whose intended effect is that the reader recognize the relation in question (Mann, 2005).[7] Let us examine one relation in the presentational group, Summary. Example (36) presents the familiar genre of literary reviews. The author provides some basic information about a novel at the beginning of the text (such as who is the author, and that this is his sixth novel), followed by an elaboration on the plot of the novel. The final few lines are a summary, not of the novel itself, but of the author's opinion about the novel. It would be hard not to interpret the section marked as "S" (for satellite) as a summary. A summary is not an external fact; it is not about a situation in the world outside the text, but presents the text itself, and therefore it is called a presentational relation.

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[7] Multinuclear relations are excluded from this discussion.

(36)   [N] For his sixth novel, Mr. Friedman tried to resuscitate the protagonist of his 1972 work, "About Harry Towns." Harry is now a 57-year-old writer, whose continuing flirtation with drugs and marginal types in Hollywood and New York seems quaintly out-of-synch. Harry fondly remembers the "old" days of the early '70s, when people like his friend Travis would take a psychiatrist on a date to analyze what Travis was doing wrong. "An L.A. solution," explains Mr. Friedman. Line by line Mr. Friedman's weary cynicism can be amusing, especially when he's riffing on the Hollywood social scheme—the way people size each other up, immediately canceling the desperate ones who merely almost made it. Harry has avoided all that by living in a Long Island suburb with his wife, who's so addicted to soap operas and mystery novels she barely seems to notice when her husband disappears for drug-seeking forays into Manhattan. [S] But it doesn't take too many lines to figure Harry out. He's a bore.

If it is the case, then, that in RST, relations can be generally classified into the two groups: presentational and subject-matter, we still have to account for the fact that the relations in one of the groups tend to be more (lexically or otherwise) signalled, whereas the relations in the other group occasionally are not signalled at all. The position taken in this paper is that whether signalled or not, the rhetorical relations occurring in either group are recognized as such by the recipients. Future work should explore how readers construct representations for relations that are not explicitly signalled.

Acknowledgements

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