

# On blocking: The rhetorical aspects of content-level discourse relations and their semantics

Laure Vieu

IRIT-CNRS, Toulouse and LOA-ISTC-CNR, Trento

## Abstract

Discourse relations play a central role in many discourse theories, e.g., RST, DLTAG, and SDRT, but the nature of these relations remains too often obscure. Often, discourse relations between discourse segments are considered as a shortcut for a relation between the eventualities described in those discourse segments. For instance, *Narration* is defined as the relation of temporal precedence between events, *Result* as the relation of causation, and *Elaboration* as the part-of relation. This paper aims to show why such definitions cannot do, a fact which is underlying SDRT's approach but has not been emphasized enough. Evidence is based on the phenomenon of 'blocking', in which the semantics of some linguistic markers blocks the inference to some discourse relations. Blocking has been particularly well studied by Isabel Gómez Txurruka, who also wrote perhaps the clearest piece of argumentation on the necessity to distinguish relations at the rhetorical or information packaging level, i.e., discourse relations, from relations at the propositional content level, i.e., relations among elements in the world described by the discourse.

**Keywords:** Discourse relations, semantics, pragmatics, blocking

## 1 Introduction

Discourse relations play a central role in many discourse theories, but their nature and identity criteria remain too often obscure. To the point that their number is usually not fixed, except by those theories which reduce them to simple structural properties like coordination and subordination [Grosz and Sidner, 1986] — see [Hovy and Maier, 1991] for a review. Three kinds of descriptions of discourse relations can be found, sometimes claimed to serve as identity criteria. These descriptions are either based on the beliefs and intentions of the speaker and hearer, i.e., how they are cognitively generated and interpreted; on observable marks in discourse, i.e., how they can be recognized; or their effect on meaning, i.e., what is their contribution to truth conditions. Each theory of discourse focuses on one perspective or another. For instance, Rhetorical Structure Theory (RST) [Mann and Thompson, 1987] adopts the first while Segmented Discourse Representation Theory (SDRT) [Asher and Lascarides, 2003] essentially takes the third. SDRT also uses the second perspective for its *Glue Logic*, the theory of how discourse representations are built.

With the aim to contribute to the debate on discourse relations in dynamic semantics, I here take the third point of view on discourse relations and examine

the link between a relation and its so-call “semantic effects”, its contribution to the propositional content of discourse. I also adopt SDRT’s terminology for discourse relations, and SDRT’s formalism to clarify some analyses, although this is not essential. I focus on “content-level”<sup>1</sup> monologue relations, whose semantic effects rely only on elements of the propositional contents of the clauses they relate, and is well-understood. For instance, there is a consensus on the fact that the relations *Narration* and *Result* (roughly) denote, respectively, temporal sequence and causation between the events described, as in the following examples.<sup>2</sup>

- (1) Sue pushed Max. Then he fell.
- (2) Sue pushed Max, so he fell.

In comparison, the semantic contribution of dialogue relations (e.g. *Question-Answer*, *Correction*), structural relations (*Parallel*, *Contrast*) and pragmatic or “meta-talk” relations (see the end of next section) which cannot be exclusively described in terms of facts about the world and often crucially involve reference to speakers’ intentions and speech acts, is less consensual and actually less investigated in formal theories.

The purpose of this paper is to emphasize a fact that went little noticed in my opinion: even in the case of content-level relations whose semantic effects are well-established, the semantics of discourse relations cannot be reduced to relations between eventualities, omitting their rhetorical contribution. The distinction between the rhetorical or information-packaging level and the propositional content level is irreducible.

In the next section, I will review a few works on the nature of discourse relations. I will then explain the phenomenon of blocking, and finally discuss what it tells us on the nature and use of discourse relations.

## 2 The semantics of discourse relations

That discourse relations link discourse segments, or text spans, is part of all discourse theories that make use of discourse relations. A more precise definition of what is actually related when it comes to specifying the truth-conditions of such relations, is generally left much more vague.

**Rhetorical Structure Theory.** In RST, it is made clear that discourse relations involve the intentions of the speaker/writer in presenting the contents of the discourse in a certain way. The following quote makes it clear that this is more than just describing relations between “subject matter” content: “The text structuring relations reflect the writer’s options of organization and presentation; it is in this sense that an RST structure is “rhetorical”. In contrast, one could assume that text structuring relations simply represent relations in the subject matter (e.g. of succession, cause or conditionality).” [Mann et al., 1992].

---

<sup>1</sup>Also called “subject matter” [Mann and Thompson, 1987], “semantic” [Knott, 2001], or “ideational” relations [Hovy and Maier, 1991].

<sup>2</sup>This is of course not to say that the semantics of these relations is not subject to investigations leading to substantial refinements. See, e.g., [Bras et al., 2001b] for a study on *Narration*.

**Discourse Lexicalized Tree-Adjoining Grammar.** However, the later position is more or less explicitly adopted in many works. This is the case for instance in Discourse Lexicalized Tree-Adjoining Grammar (DLTAG) [Webber et al., 2001, Forbes-Riley et al., 2006, Creswel et al., 2002], which focuses on discourse relations explicitly signalled by discourse connectives or adverbials and show how these can be accounted for by an extended notion of syntax-semantic interface (semantic composition). The interpretation of discourse relations in DLTAG assumes they have for arguments the interpretation of discourse segments, which are abstract objects. But such abstract objects may be events as well as facts, textual objects, speech acts, etc. [Forbes-Riley et al., 2006]. For instance, the interpretation of *because* is a causal relation between two eventualities [Webber et al., 2001, Creswel et al., 2002]. If one follows the Davidsonian DRT tradition, events are discourse referents belonging to the subject matter. There is therefore no clear distinction between the contribution of the discourse connective *because* in (3a) and the verb *to be caused by* in (3b), and no explicit account of the rhetorical function of the discourse relation signalled by *because*.

- (3)      a. Max fell because Sue pushed him.  
           b. Max’s falling was caused by Sue’s pushing him.

**Segmented Discourse Representation Theory.** On the other hand, in SDRT, discourse relations are acknowledged to be rhetorical, in the sense that they relate not directly clauses, which denote propositions, but the utterances or speech acts involving those clauses. Discourse relations are in fact assumed to categorize speech acts. For instance, the *Explanation* relation marked by *because* in (3a) categorizes the speech act corresponding to asserting the second clause, in the sense that with his second statement, the speaker also asserts that he intends to explain something (here, an event).

Formally, in SDRT, the interpretation of a discourse relation is taken to *imply* its semantic effects, it is not taken to be equivalent with them. This is encoded in rules of the form:

**Sem**  $\phi_{R(\alpha,\beta)} \Rightarrow Condition(\alpha, \beta)$

where  $\phi_{R(\alpha,\beta)}$  is distinguished from  $R(\alpha, \beta)$  only for getting some dynamic effects on variable assignments right. In fact, such rules are most often simply written:

**Sem**  $R(\alpha, \beta) \rightarrow Condition(\alpha, \beta)$ .

For content-level relations,  $Condition(\alpha, \beta)$  bears on the main eventualities of the propositional content of the utterances  $\alpha$  and  $\beta$ .

Asher and Lascarides [2003] do not focus much on the fact that there is an implication and not an equivalence in such rules; no particular linguistic phenomenon is analysed to motivate this aspect of their proposal. They do however insist much on the necessity to have a rhetorical level distinct from the propositional level, mainly because rhetorical relations are an essential component of the hierarchical structure of discourse. The hierarchical nature of discourse structure accounts for the way propositions are grouped together, ie., for “information packaging”; it is essential to explain intricate phenomena of anaphora or VP ellipsis, among other things.

**Content-level and pragmatic relations.** Before going further on trying to show that some blocking phenomena do bring that distinction between a relation and its semantic effects in evidence, a clarification is in order. Most discourse theories, including DLTAG, do account for “pragmatic” discourse relations whose semantics clearly operate on speech acts.<sup>3</sup> The point I want to make here is that this is usually not considered to be the case for the “semantic” or “content-level” relations as well. As extensively discussed in [Knott, 2001] among other works, there is an essential distinction in the discourse relations involved in (4a) and (4b):

- (4)      a. Bill was starving, so he had a sandwich.  
           b. Bill had five sandwiches, so he was starving.  
           c. Bill had five sandwiches, so I conclude he was starving.

In (4a), *so* signals a content-level *Result* relation whose semantic effects involve the eventuality of Bill being starving being the cause for that of Bill eating a sandwich. The causal link at first sight seems reversed in (4b) which wouldn’t make any sense, but it in fact involves the eventuality of the second speech act itself instead of the eventuality of Bill being starving. The reading obtained with the pragmatic version of the *Result* relation in (4b) is spelled out in (4c), clarifying that this speech act actually is a performative.

Such pragmatic relations, called “meta-talk” relations and starred, are introduced in SDRT to account for similar cases. For instance, the meta-talk relation of *Result\** is involved in (5a), whose reading corresponds to (5b) [Asher and Lascarides, 2003, p.334].

- (5)      a. I’m cold. Please close the window.  
           b. I’m cold. (So) I ask you to please close the window.

Semantic and pragmatic relations can be distinguished not on the fact that some bear on “subject matter entities” and the other on speech acts. All of them bear on speech acts. The difference lies in their semantic effects, i.e., in the *Condition* predicate above, which either involve entities from the propositional content of the clauses or the speech acts themselves (or even mental attitudes associated to those speech acts). In the remainder, we will consider only cases involving monologue content-level relations, i.e., discourse relations bearing on simple assertive speech acts, without implicit performative speech acts.

### 3 Blocking

Blocking is said to occur when a reading disappears *in presence of* a given linguistic marker. In the case of interest here, a discourse relation which is recognized in the absence of the marker is no longer recognized in its presence. That this is at all possible is due to the fact that discourse relations are often not signalled by a discourse connective (like in examples (1), (2) and (3a)), but inferred from a variety of other cues among which lexical and commonsense knowledge. This is the case in the following examples, which respectively exhibit a *Narration* and a *Result* relations.

- (6)      Sue entered. Max greeted her.

---

<sup>3</sup>Actually, there are also cases of pragmatic relations operating on epistemic states [Knott, 2001].

- (7) Sue pushed Max. He fell.

Taboada’s studies [Taboada, 2006] actually suggest that unmarked discourse relations are more frequent than those marked by a discourse connective (60 to 70 %). The unmarked case has been accounted for from the start in SDRT. The Glue Logic makes use of non-monotonic inferences, to account for such defeasible implicatures. Non-monotonic inference clearly is a necessary feature to grasp the blocking phenomenon. In formulas below, the defeasible implication is noted  $>$ , while the classic connective is noted  $\rightarrow$ . For details on SDRT semantics and Glue Logic, the reader should refer to [Asher and Lascarides, 2003].

### 3.1 The standard case in SDRT

The most classical example of blocking used in SDRT is studied in detail in [Lascarides and Asher, 1993]. Here is a variant:

- (8) a. Max fell. Sue pushed him.  
b. Max fell. Then Sue pushed him.

In (8a), the standard reading is that there is a relation of *Explanation* between the two sentences, i.e., that Max fell because Sue pushed him. This non-monotonic inference is based on a particularization of the Gricean Maxim of relevance, which stipulates that if one describes two events that could be causally related —on the basis of some piece of lexical and commonsense knowledge— then one intends to assert that these two events are indeed causally related. They are captured by the following Glue Logic rules, where  $?(α, β)$  means that the two discourse segments  $α$  and  $β$  are related by an underspecified relation (?), and  $[φ](α)$  means that the formula  $φ$  appears in the propositional content of  $α$ :<sup>4</sup>

**GL 1**  $(?(α, β) \wedge [push(e_1, x, y)](α) \wedge [fall(e_2, y)](β)) > Explanation(α, β)$

In (8b) though, such a reading is no longer available. *Then* signals *Narration*, and *Narration* is incompatible with *Explanation*, in the sense that their semantic effects are incompatible. Indeed, *Narration* entails temporal precedence between the two events, while *Explanation* entails reversed causation between the two events, which excludes temporal precedence (reversed causation imposes reversed temporal precedence or simultaneity).

**Sem 2**  $Narration(α, β) \rightarrow e_α < e_β$  (or, more correctly,  $φ_{Narration(α, β)} \Rightarrow e_α < e_β$ )

**Sem 3**  $Explanation(α, β) \rightarrow cause(e_β, e_α)$

**Sem 4**  $cause(e, e') \rightarrow \neg e' < e$

The defeasible inference to *Explanation* is blocked by the presence of *then*, which denotes, in a non-defeasible way, *Narration*.

**GL 5**  $(?(α, β) \wedge [then](β)) \rightarrow Narration(α, β)$ <sup>5</sup>

More generally, the interaction between (monotonic and) non-monotonic rules is guided by a principle that the most specific case —here, the case in which the marker is present— wins [Lascarides and Asher, 1993, Asher and Lascarides, 2003].

<sup>4</sup>These rules are here much simplified, in order to focus on the issue at hand.

<sup>5</sup>This is a simplification, as *then* is a complex discourse connective which may denote other relations.

### 3.2 Different ways of blocking discourse relations

The blocking of a discourse relation through incompatibility between semantic effects doesn't really help in separating the propositional level from the rhetorical level. We need to look for other ways of blocking to show the necessity of distinguishing a (content-level) discourse relation from its semantic effects. Other sorts of blocking can indeed be found.

**Rhetorical effects of lexical items.** That lexical items of all sorts do have rhetorical effects has been shown from the start in SDRT. Lexical knowledge, in conjunction with commonsense knowledge, is at the basis of many Glue Logic rules, for instance rule GL 1 above. But that the addition of a single lexical item, which is neither a discourse connective nor a sentential adverbial, may block the inference to a discourse relation has been much less focused on.

Such more subtle ways of blocking have been brought to the light by the study of the adjective *same* by Alves and Gómez Txurruka [2001], especially in the following example.

- (9)
- a. Paul had a car accident on July 2d, 1998. He spent three months in hospital that year.
  - b. Paul had a car accident on July 2d, 1998. He spent three months in hospital that same year.
  - c. Paul had a car accident on July 2d, 1998. He died that same year.

In (9a), there is a *Result* relation which disappears in (9b) with the simple addition of the adjective *same*. The discourse in (9b) is not incoherent, it describes different (causally unrelated) problems Paul had in 1998; there is a *Continuation* relation between the two sentences.

Let's first note that *Result*'s semantic effects simply are the reverse of those of *Explanation*:

**Sem 6**  $Result(\alpha, \beta) \rightarrow cause(e_\alpha, e_\beta)$

The blocking by *same* in (9b) is subtle for two reasons. First, it would seem that *same* asserts the identity of the years of the two events, an identity already ensured by the anaphoric bare *that year* in (9a), and thus wouldn't contribute anything. Second, the semantics of *same* certainly has nothing to do with causality and doesn't simply block causal relations between events; actually, *same* in temporal adverbials doesn't even systematically block the *Result* relation, as can be seen in (9c), where the dying is understood as resulting from the accident.

[Alves and Gómez Txurruka, 2001] shows that *Result* is indirectly blocked in (9b), because *same* signals "unexpected identity": the identity it operates on, obtained through anaphoric resolution, comes as a surprise. In fact, if Paul had a car accident, it is no surprise that he spent time in hospital *just afterwards*, which means in the same year because the accident was in July. On the other hand, even if the accident is the primary cause of the dying, it doesn't follow that Paul dies immediately after the accident, so the fact that the year of dying is the same as that of the accident is unexpected.

Unexpected identity is formalized in a complex way, which involves the impossibility of inferring the identity from the propositional content of the discourse, when

this identity is omitted from this propositional content after anaphora resolution. So *same* sometimes blocks *Result*, when the semantic effects of this relation, together with appropriate commonsense knowledge, would make this identity inference possible, and sometimes not.

Although the need to reason on such possible and impossible inferences certainly situates the semantics of *same* at a different level from the plain propositional level, the blocking of *Result* still occurs because of this relation’s semantic effects. Let’s therefore examine yet other cases, in which the rhetorical aspects of a relation are at stake.

**Discourse markers directly blocking a relation.** The first example of blocking that addresses our purpose has been discussed in a study on the French discourse connective *puis* [Bras et al., 2001b]. This study showed that *puis* signals *Narration* in French, in a much more exclusive way that *then* does in English.<sup>6</sup>

We thus have a variant of GL 5:

**GL 7**  $(?(\alpha, \beta) \wedge [puis](\beta)) \rightarrow Narration(\alpha, \beta)$

The blocking phenomena involving *puis* are exhibited on examples like:

- (10) a. L’acide tomba dans le liquide. Une explosion se produisit.  
 (*The acid fell into the liquid. An explosion happened.*)  
 b. L’acide tomba dans le liquide. Puis une explosion se produisit.  
 (*The acid fell into the liquid. Then an explosion happened.*)

The *Result* relation, present in (10a), is blocked in (10b). The reading obtained in this second variant is that the two events occurred in sequence —a consequence of the presence of *puis* captured by GL 7 and Sem 2— and that, in addition, the speaker presents these events without any commitment regarding their causal relation, i.e., the speaker conveys “I don’t want to claim that the two events are causally related”. It is essential to notice first that *Result* and *Narration* are not incompatible at all, as *cause*( $e, e'$ ) is certainly compatible with  $e < e'$ . One might even argue that both *Narration* and *Result* are present in (10a). Second, that the discourse in (10b) may still be true in case the two events are causally related in the world. Indeed, there is a significant difference between conveying (or even asserting) “I don’t know want to claim that the two events are causally related” and asserting “The two events are not causally related”.

The discussion in [Bras et al., 2001b], based on examples like (10), leads to the conclusion that *puis* not only marks *Narration* but, in most contexts, directly blocks *Result*:

**GL 8**  $(?(\alpha, \beta) \wedge [puis](\beta)) > \neg Result(\alpha, \beta)$

Axioms like this one can be understood as exemplifications of the Gricean maxim of quantity. Indeed, if what I want to say is that two events are causally related, why should I focus on the less specific fact that the two events occurred in sequence? The explicit assertion with the use of *puis* that a *Narration* is present blocks the inference to the more specific relation of *Result*. In fact, this axiom explains the

---

<sup>6</sup>Note that *puis* is to be distinguished from *et puis*, which is a pragmatic relation marker indicating that the speaker is adding yet another element in a list of arguments.

unacceptability of the following discourse, as, in a neutral context, it is hard to understand why one both intentionally omits a causal link at the rhetorical level (through the connective *puis*) and explicitly asserts it at the propositional level (through the verb *résulter de* (*to result from*)).

- (11) L'acide tomba dans le liquide. \*Puis une explosion en résultat.  
 (*The acid fell into the liquid. Then an explosion resulted from this.*)

However, coherent discourses in which the discrepancy between rhetorical and propositional levels appears can be found. In the following, the causal link is hypothesized. This is both coherent with a cautious presentation of the facts, that is, that the speaker doesn't commit to the existence of a causal link, and with the existence of such a link in the world:

- (12) L'acide tomba dans le liquide. Puis un explosion se produisit, probablement à cause de cela / la chute de l'acide.  
 (*The acid fell into the liquid. Then an explosion happened, probably because of this / of the acid falling.*)

Other similar examples can be found. For instance, the discourse marker *anyway* also blocks causal links in the following example from [Taboada, 2006]:

- (13) a. Tom quit his job. He was tired of the long hours.  
 b. Tom quit his job. He was tired of the long hours, anyway.

Taboada explains [Taboada, 2006, p.568] that *anyway* “voids the causal relation”, an *Explanation* which is inferred in (13a). Besides here signalling the second sentence as contrasting with the negative presupposition conveyed by the first sentence (it's not such a bad thing that Tom quit his job because it wasn't such a good job), using *anyway*, the speaker simply doesn't present the fact described as a cause. He doesn't really deny the causal link at the propositional level; in fact, the following continuation is acceptable:

- (14) Tom quit his job. He was tired of the long hours, anyway. In fact, perhaps this is the reason why he took this decision.

Further investigations are needed to understand in which context, and exactly how, *anyway* blocks *Explanation*, but it is unlikely that it does so because its semantics is incompatible with a causal relation between the described events.

**Blocking through information packaging.** The last kind of blocking examined here is again a phenomenon on which Gómez Txurruka has extensively worked, and which motivated the clearest piece of text arguing for the distinction between the rhetorical level and the propositional level, as we will see shortly.

In her analysis of the connective *and* [Gómez Txurruka, 2003], she showed that *and* is a marker of “coordination”, an information-packaging property of some relations, which is opposed to “subordination”. Coordination and subordination don't have any semantic significance. They only govern the hierarchical structure of a discourse representation, which constrains both anaphora resolution and possible discourse continuations; see [Asher and Vieu, 2005] for an analysis of these properties.<sup>7</sup> Gómez Txurruka's analysis of *and* supersedes Bar-Lev and Palacas's one

---

<sup>7</sup>I here do not take up Gómez Txurruka's proposal that *Coordination* be a discourse relation on its own.

[Bar-Lev and Palacas, 1980], as it explains several blocking examples introduced by them as problematic for their own proposal.

Coordination and subordination are incompatible properties. Since *and* marks coordination, its presence blocks the inference to any subordinating relation. For instance, *Explanation* is subordinating, and the following is a theorem in [Gómez Txurruka, 2003]:

**GL 9**  $(?(\alpha, \beta) \wedge [and](\beta)) \rightarrow \neg Explanation(\alpha, \beta)$

This blocking is illustrated in example (15a-b) from [Bar-Lev and Palacas, 1980] and [Gómez Txurruka, 2003]. The *Explanation* relation in (15a) is cancelled by *and* in (15b), leaving only a reading of a continuation between two causally unrelated events:

- (15)
- a. Max fell. He slipped on a banana peel.
  - b. Max fell, and he slipped on a banana peel.
  - c. If Max fell, and he slipped on a banana peel, and his slipping explains his falling, we don't need to resort to any esoteric or voodoo-related explanation to understand what happened.

Gómez Txurruka argues that the blocking is done at the rhetorical level only, and that the two events described may well be causally related. In fact, in the context (15c), the speaker explicitly asserts the causal link with the verb *explains*. Let's quote her [Gómez Txurruka, 2003, pp272–273]:

“There is a condition in the DRS of the third conjunct [of (15c)] — namely, ‘*explain*( $s, e_2, e_3$ )’ — which is apparently inconsistent with the assumption that *and* blocks Explanation — that is, ‘ $\neg Explanation(\pi, \pi_1)$ ’. We argue that these two conditions are compatible, given that they belong to different information levels in the discourse. It is important to distinguish between the level of discourse structure and the level of other information about the world that can be inferred but it is not intended by the speaker to belong to the discourse structure. This distinction can be captured in SDRT by means of the already introduced distinction between speech acts and propositional content. While the predicate ‘explains’ takes events as arguments, ‘Explanation’ is a DR predicate which takes speech acts. (...) Note that the information about a particular discourse relation not being available ( $\neg$ Explanation) is information about the discourse structure for  $\pi$  and  $\pi_1$  that the speaker intends to communicate, whereas ‘ $\neg$ explains’ is information that the speaker is explicitly giving about certain events in the world.”

Several other similar blocking examples involving *and* have been described by Bar-Lev and Palacas and analyzed by Gómez Txurruka. Again with *Explanation* (16), or with *Elaboration*, another subordinating relations (17):

- (16)
- a. I got caught. My best friend betrayed me.
  - b. I got caught, and my best friend betrayed me.
- (17)
- a. Wars are breaking out all over. Champaign and Urbana have begun having border disputes.
  - b. Wars are breaking out all over, and Champaign and Urbana have begun having border disputes.

In (16b), the speaker is not saying that the betraying is not the cause of his capture, he's just not asserting this causal link. Such a sentence is plausible, for instance, as an answer to the question: why are you so depressed? In (17b), the border disputes of Champaign and Urbana are not considered as instances of war and exemplifying the first statement, but as another element in a list elaborating a non-specified common topic (*troubles*).

Finally, let's mention another example analyzed by Gómez Txurruka (originally from Larry Horn) which involves *Explanation* in a *Question-Answer* context:

- (18)      A: Did John break the vase?  
             B: WELL, the VASE BROKE and HE dropped it.

Gómez Txurruka says of this example that the positive answer is “not asserted but left as an implicature”. In fact, *and* blocks *Explanation*, which means that the speaker only asserts that the two events occurred, disregarding any causal link between them. However, *well* indicates the turn provides an indirect answer, and the intonation signals what are the elements to draw the implicature on. The speaker leaves it to the hearer to draw the conclusions regarding both the causal link and the answer, suggesting that the answer depends on the hearer's definition of breaking, intentional or not.

## 4 Discussion

### 4.1 On defining discourse relations

What these blocking phenomena show us is that it is necessary to distinguish a content-level discourse relation from its semantic effects. Substituting the implication by a biconditional in the schema for semantic effects is impossible. A fortiori, defining content-level discourse relations in terms of temporal or causal relations on eventualities is impossible. For instance, the definitions proposed in [Bras et al., 2006] for the relations of *Weak-Result* and *Result* cannot do.

If one really wants to define discourse relations, the obvious step to take is to enrich such definitions by making reference to the speaker's mental attitudes, in order to characterize properly the underlying speech acts. However, it is not clear that this is enough to explain how the information packaging properties of a relation are grasped, in particular the order of presentation of the facts and the coordinating/subordinating character of the relation.

If definitions for *Result* and *Explanation* are exclusively based on a causal link between eventualities (as in Sem 6 and Sem 3), we would get  $Result(\alpha, \beta) \leftrightarrow Explanation(\beta, \alpha)$ , so the two would always be present simultaneously. But only one of these can appear in a discourse segment to respect the order of presentation of the speech acts  $\alpha$  and  $\beta$  and to respect the fact that *Result* (usually) is coordinating, while *Explanation* (always) is subordinating. That the two discourses (7), involving *Result*, and (8a), involving *Explanation*, are not equivalent is easy to prove with possible and impossible continuations.<sup>8</sup> It is not obvious that refining these definitions on the basis of mental attitudes would enable the characterization of such information-packaging properties.

---

<sup>8</sup>For instance, continuations *So he lost his balance* or *But it wasn't on purpose* are acceptable for (8a) but not for (7).

A corollary of our conclusion is that the DLTAG approach, which reduces discourse coherence to a syntax-semantic interface and anaphora issue, and thus content-level discourse relations to their semantics effects, is clearly limited. Not only DLTAG cannot account for the blocking phenomena seen above, but it also cannot distinguish locative sentential adverbials like *un peu plus tard* (*later*) from semantically similar discourse connectives like *puis* (*then*), which have been proved to be rhetorically different [Bras et al., 2001a].

## 4.2 On lexical semantics

We’ve seen that reducing rhetorical information to propositional content doesn’t work. I would like now to question the feasibility of defining some lexical items (e.g., causative verbs like *to push*, *to sink*, or “discourse verbs” like *to explain*, *to precede*) in terms of rhetorical relations, as is done in [Asher and Lascarides, 2003, chapter 6] and [Danlos, 2006]. This is in some sense the reverse of what DLTAG does, as it introduces a rhetorical level on the basis of propositional content.

The approach developed in [Danlos, 2006] explicitly relies on the equivalence of discourses such as (3a-b), or (19a-b) in which the verb *to precede* is supposed to denote the *Narration* relation, along with the (alleged) equivalence of (7) and (8a).

- (19)      a.    Ted left. Next, Sue arrived.  
             b.    Ted left. This preceded Sue’s arrival.

But on the basis of the argumentation developed here, (19a) and (19b) cannot be considered equivalent, just as (7) and (8a) aren’t. They involve different speech acts, and possibly different information packaging, i.e., different layouts of their structure.<sup>9</sup> Only their propositional content and the conditions in which they truthfully describe the world could be considered as equivalent. And as SDRT studies prove at length, the logical form of a discourse is not reducible to its propositional content. In other words, I strongly disagree with the following quote from [Danlos, 2006, p.59]:

“By definition, periphrastic discourses share the same information content and so should yield to equivalent logical forms in a model-theoretic approach. Discourse structures, based on discourse relations, constitute an intermediary representation level between discourses and their logical forms.”

Discourse structure is an integral part of the logical form of a discourse, as fully acknowledged in SDRT. This is why SDRT is able to account for complex anaphora, VP ellipsis, or lexical disambiguation issues, as well as the blocking phenomena discussed in this paper.

To finish with Danlos’s proposal, let’s note that one of Gómez Txurruka’s examples above, (15c), directly shows that we run into a contradiction if we accept both her proposal for *and* and a rhetorical semantics for the verb *to explain*, that is, that *to explain* denotes the *Explanation* relation.<sup>10</sup>

<sup>9</sup>Continuations again show that the relation involved in (19b) is likely to be subordinating, probably a *Commentary*. (19b) can be continued by *And it followed Max’s finishing up the wine*, while a continuation of (19a) with *Max had finished up the wine* is unable to give the same reading.

<sup>10</sup>The performative use of the verb *to explain* is of course to be distinguished from the simple assertive use occurring in (15c). Further studies are surely needed, but it is very likely that performatives do

Let's now turn to [Asher and Lascarides, 2003]'s proposal, and the possible advantages of including the rhetorical relation *Result* in the lexical entries of causative verbs. We first note that the argumentation in [Asher and Lascarides, 2003, p.268] calls into play the veridicality of this relation, which entails the truth of the content of both "speech acts". It strikes me that this is more simply obtained by putting directly in the entry's semantics the conjunction of both propositional contents and the semantic effects of the relation. In addition, I do not see what sort of argument could be used to motivate the choice of *Result* over *Explanation*.

However, the main reason for adopting this approach is described in [Asher and Lascarides, 2003, pp.273–279]. A semantics in terms of rhetorical relations provides a direct account of the lexical contribution to Glue Logic, so that, in some cases, axioms like GL 1 can be disposed off, relying on the resolution of underspecification (similar to anaphora resolution) instead: *push* is a causative verb, assumed to involve two speech acts related by *Result*, the one of the clause *push* appears in, and a second one asserting the existence of an underspecified moving event; *fall* is a subtype of *move*; and in (7), the *Result* relation is obtained by identifying the second speech act in the semantics of *push* with the one of the second sentence in (7). Simplifications are in principle a good thing. But problematic issues arise here. How the reverse situation (8a), which involves *Explanation* instead of *Result*, can be obtained is not fully spelled out. More importantly, the implicit speech acts so generated, which more often than not are not identified with a previous or subsequent utterance (as in, e.g., *Sue pushed Max. He yelled.*), are not distinguished from the actual ones. And adding such implicit speech acts does affect the rhetorical structure. So if the discourse representation of the single clause discourse (20) already has the same structure as that of the full (7), how can we account for the fact that the continuations of (20) and (7) with *His crying exasperated her* obtain different readings (*Explanation* or perhaps *Narration* with (20), as opposed to *Narration* only with (7))?

(20) Sue pushed Max.

This shows that in order to check whether the semantics of a lexical item operates at the rhetorical level, we should first focus on its information-packaging behaviour, instead on focusing on the fact that its semantic is similar to the semantic effects of some discourse relation.

As the authors of SDRT advocated in many occasions, we need to take rhetorical information and information packaging seriously. For this reason, we can neither forget about the existence of the speech acts in utterances, nor introduce speech acts at will. Now, what exactly do we need to add to their semantics effects to fully characterize the semantics of content-level discourse relations is a question which remains unanswered at present.

## Acknowledgements

I would like to thank first of all Isabel Gómez Txurruka for the deep and illuminating discussions we had on this topic. I also wish to remember here all the wonderful time we had together, especially how well Isabel communicated her refined sense of making life fun. This paper has benefited from discussions with several other

---

denote rhetorical relations.

persons, especially Michel Aurnague, Nicholas Asher and Myriam Bras, whom I'd like to thank here too.

## References

- Ana Teresa Alves and Isabel Gómez Txurruka (2001). The meaning of *same* in anaphoric temporal adverbials. In Myriam Bras and Laure Vieu, editors, *Semantic and Pragmatic Issues in Discourse and Dialogue*, pages 147–181. Elsevier, Amsterdam.
- Nicholas Asher and Alex Lascarides (2003). *Logics of Conversation*. Cambridge University Press, Cambridge.
- Nicholas Asher and Laure Vieu (2005). Subordinating and coordinating discourse relations. *Lingua*, 115(4):591–610.
- Zev Bar-Lev and Arthur Palacas (1980). Semantic command over pragmatic priority. *Lingua*, 51:137–146.
- Myriam Bras, Anne Le Draoulec, and Laure Vieu (2001a). Temporal information and discourse relations in narratives: the role of French connectives *puis* and *un peu plus tard*. In *Proceedings of the ACL'2001 Workshop on Temporal and Spatial Information Processing*, pages 49–56, Toulouse.
- Myriam Bras, Anne Le Draoulec, and Laure Vieu (2001b). French adverbial *puis* between temporal structure and discourse structure. In Myriam Bras and Laure Vieu, editors, *Semantic and Pragmatic Issues in Dialogue: Experimenting with Current Theories*, CRiSPI, pages 109–146. Elsevier, Oxford.
- Myriam Bras, Anne Le Draoulec, and Nicholas Asher (2006). Evidence for a scalar analysis of result in SDRT from a study of the french connective *alors*. In *Proc. of the SPRIK Conference on Explicit and Implicit Information in Text - Information Structure accross Languages*, pages 75–79, Oslo.
- Cassandra Creswel, Katherine Forbes, Eleni Miltsakaki, Rashmi Prasad, Aravind Joshi, and Bonnie Webber (2002). The discourse anaphoric properties of connectives. In *Proc. of the 4th Discourse Anaphora and Anaphor Resolution Colloquium (DAARC2002)*.
- Laurence Danlos (2006). “Discourse verbs” and discourse periphrastic links. In Candy Sidner, John Harpur, Anton Benz, and Peter Kühnlein, editors, *Second Workshop on Constraints in Discourse (CID06)*, pages 59–65, Maynooth, Ireland.
- Katherine Forbes-Riley, Bonnie Webber, and Aravind Joshi (2006). Computing discourse semantics: the predicate-argument semantics of discourse connectives in D-LTAG. *Journal of Semantics*, 23(1):55–106.
- Isabel Gómez Txurruka (2003). The natural language conjunction *and*. *Linguistics and Philosophy*, 26(3):255–285.
- B.J. Grosz and C.L. Sidner (1986). Attention, intentions, and the structure of discourse. *Computational Linguistics*, 12(3):175–204.

- Eduard H. Hovy and Elisabeth Maier (1991). Parsimonious or profligate: How many and which discourse structure relations?, unpublished manuscript.
- Alistair Knott (2001). Semantic and pragmatic relations and their intended effects. In Ted Sanders, J Schilperoord, and W. Spooren, editors, *Text representation: linguistic and psycholinguistic aspects*, pages 127–151. John Benjamins, Amsterdam.
- Alex Lascarides and Nicholas Asher (1993). Temporal interpretation, discourse relations, and commonsense entailment. *Linguistics and Philosophy*, 16(5):437–493.
- William Mann and Sandra Thompson (1987). Rhetorical Structure Theory : A theory of text organization. Reprint Series ISI/RS-87-1190, Information Sciences Institute.
- William Mann, Christian Matthiessen, and Sandra Thompson (1992). Rhetorical Structure Theory and text analysis. In William Mann and Sandra Thompson, editors, *Discourse Description. Diverse linguistic analyses of a fund-raising text*, pages 39–78. John Benjamins, Amsterdam.
- Maite Taboada (2006). Discourse markers as signals (or not) of rhetorical relations. *Journal of Pragmatics*, 38(4):567–592.
- Bonnie Webber, Alistair Knott, and Aravind Joshi (2001). Multiple discourse connectives in a lexicalized grammar for discourse. In Bunt, Muskens, and Thijsse, editors, *Computing Meaning*, volume 2, pages 229–245. Kluwer, Dordrecht.