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Discourse contribution of Enumerative structures involving *pour deux raisons*

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Abstract. We propose to study the discourse contribution of enumerative structures involving the prepositional phrase *pour deux raisons*. We would like to highlight the contribution of the textual information conveyed by enumerative structures and the prepositional phrase both to the discourse structure and the discourse content within the SDRT model. We will show that prepositional phrase like *pour deux raisons* must introduce a discourse constituent in the structure attached by the *Commentary* relation to the left context and the *Enumeration* relation to the right context. Finally we propose to treat *pour deux raisons* as a new kind of discourse marker: We will show that its discursive role within enumerative structures is to signal the content-level relation *Explanation*.

Keywords: enumerative structures, discourse structure, SDRT

1 Introduction

Description of discourse structure is a major topic of ongoing research [13, 15]. The importance of the discourse level [2, 8, 9, 12] is commonly accepted but the exact nature of its contribution and the rules that govern the interpretation are still debated. We would like to pay particular attention to enumerative structures as a textual pattern that constrain, in some way, their interpretation and their treatment in the SDRT model [2].

Following [3] and [4]’s proposition to introduce a new textual discourse relation, *Enumeration*, we would like to go into this solution in depth in order to question its relevance. In brief, is the *Enumeration* relation necessary to construe the right representation of texts containing enumerative structures? To suggest possible answers to this question, we will consider discourse segments including the

prepositional phrase *pour deux raisons* (for two reasons) in order to examine its relations with subsequent segments¹.

2 Discourse Relations for Enumerative Structures

Let's start with this attested example from the web:

- (1) [Domenech refuse obstinément cette concession **pour deux raisons**.]_a
[**D'abord**, il ne la comprend pas.]_b [**Ensuite**, en l'acceptant, il aurait le
sentiment de ruiner une autorité déjà amplement chancelante.]_c
[Domenech stubbornly refuses this concession for two reasons.]_a [First he does not understand
it.]_b [and then, accepting it would feel like ruining his already faltering authority.]_c

This is an example of an enumerative structure composed of an introducing sentence or “trigger”, here (a), including a plural Noun Phrase *deux raisons* called “prospect NP”, and of several co-items, here (b) and (c). Co-items are, in this case, introduced by linguistic markers (*d'abord* (first) and *ensuite* (then) in initial-detached position) [10].

In earlier work [3,4], we proposed the introduction of a new discourse relation called *Enumeration* to account for enumerative structures such as the one illustrated in (1). *Enumeration* belongs to the group of text structuring relations, like *Contrast* and *Parallel*, which is opposed by [2] to the content level relation group including *Narration*, *Elaboration*, *Explanation*. *Parallel* and *Contrast* do not have a clear subordinating/coordinating nature, they only have coordinating flavor. In fact the subordinating/coordinating nature of text structuring relation may not be relevant since they may simply follow the nature of a co-occurring content-level relation. *Enumeration* however, is subordinating since it relates a constituent with a list of subordinating items. The first constituent includes some kind of trigger signaling the enumeration structure. The subordinating constituents include co-items and are linked together by the coordinating *Continuation*². Discourse structures such as the one in Figure 1 will be constructed.

One may wonder about the need of introducing this new relation in the framework. For the time being, we do not take a firm decision on this issue. Our approach is to show that enumerative structures are essential ingredients to discourse coherence. We have to understand and model them even in a semantic approach of discourse. A remaining question is whether these structures need a specific discourse relation or can be used as clues (for example with specific predicates) for inferring discourse relations (e.g. in SDRT's Glue Logic). The crucial point to take such a decision is the possibility to define a new kind of semantic effects (not only at the information packaging level but also at the information content level). Indeed, even if *Contrast* and *Parallel* are text structuring relations, they do have (rather underspecified) semantic effects. We will come back to this issue in the conclusion.

¹ Our study is based on the analysis of a collection of attested examples from various corpora. For the sake of simplicity, we will mainly use invented examples in this short paper.

² The List relation of RST [7], which is actually used to analyze enumerative structures, is close to *Continuation*.

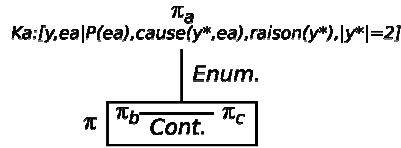


Figure 1. Discourse structure for (1)

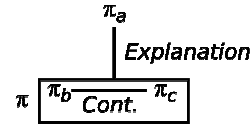


Figure 2. Discourse structure for (2)

For (1), in presence of a trigger such as (a) and of item introducers such as *d'abord* and *ensuite*, an *Enumeration* relation will be inferred (see section 3) at the textual level. An alternative is to consider, at the semantic level, an *Explanation* of the refusal. In this case, the discourse structure obtained is close to the one we get for example (2):

- (2) [Domenech refuse obstinément cette concession.]_a [**D'abord, parce qu'il** ne la comprend pas.]_b [**Ensuite, parce qu'en** l'acceptant, il aurait le sentiment de ruiner une autorité déjà amplement chancelante.]_c
[Domenech stubbornly refuses this concession.]_a [First because he does not understand it,]_b [and then, because accepting it would feel like ruining his already faltering authority.]_c

The discourse marker *parce que* is considered an explicit marker of *Explanation*³. Moreover, taking into account the role of the item introducers *d'abord* and *ensuite*, we get the discourse representation of Figure 2.

We shall now examine the discourse contribution of enumerative structures including *pour deux raisons* in their trigger, in order to find out whether they are able to signal an *Explanation* relation.

3 Information sources for *Explanation*

SDRT identifies two kinds of information source to infer *Explanation*.

The first one is the existence of a potential causal link between the types of eventualities at stake, relying on lexical semantics and world knowledge. This link is encoded by the predicate *cause_D*. When *cause_D* holds, *Explanation* can be inferred (defeasibly). This is the case for example (3):

- (3) [Domenech refuse obstinément cette concession.]_a [Il ne la comprend pas.]_b
 [En l'acceptant, il aurait le sentiment de ruiner une autorité déjà amplement chancelante.]_c
[Domenech stubbornly refuses this concession.]_a [He does not understand it.]_b [Accepting it would feel like ruining his already faltering authority.]_c

The second one is the presence of an explicit lexical marker, as illustrated by example (4) with *parce que*:

- (4) [Marie a abandonné le projet]_a [**parce qu'**elle a perdu son boulot.]_b
[Mary abandoned the project]_a [because she lost her job.]_b

For (4), where *cause_D* does not hold, it is the presence of *parce que* that leads to the inference of *Explanation*⁴. For (2) above, both kinds of information sources co-occur.

³ *Parce que* can, in some cases, signal a meta-talk relation called *Explanation**.

Now, in order to account for the contribution of enumerative structures with a trigger involving *pour deux raisons* as a prospect PP, let us start from an invented example similar to (4) for which cause_D does not hold and where there are no explicit markers, as:

- (5) [Marie a abandonné le projet.]_a [Elle a perdu son boulot.]_b [Elle a dû aller habiter ailleurs.]_c
 [Mary abandoned the project.]_a [She lost her job.]_b [She had to move away.]_c

As such, without left context, this discourse only has a weak coherence, but can nevertheless be interpreted as a series of segments coordinated by *Narration* or *Continuation*⁵. Now, when these segments are embedded in an enumerative structure as in (6), all the elements in the structure (the trigger with its prospect and the item introducers) contribute: (i) a textual structure and (ii) a semantic specification to this structure, thus setting out a kind of explicative structure that can be represented in a similar way as (2) as illustrated in Figure 2.

- (6) [Marie a abandonné le projet **pour deux raisons**.]_a [**Premièrement**, elle a perdu son boulot.]_b [**Deuxièmement**, elle a dû aller habiter ailleurs.]_c
 [Mary abandoned the project for two reasons.]_a [Firstly, she lost her job.]_b [Secondly, she had to move away.]_c

The semantic content of the noun in the prospect NP plays a crucial role. To illustrate, compare (7) (admittedly not structurally identical to (6)) which presents segments (b) and (c) not as reasons but as results of abandoning the project. Moreover, as (7) illustrates explicitly, often what “has consequences” or “reasons” is not the eventuality itself but the whole fact, an abstract object corresponding to the whole proposition [1]. The precise nature of the objects related (eventualities vs. facts) will be a crucial point later for proposing our final solution.

- (7) [Le fait que Marie ait abandonné le projet a eu **deux conséquences majeures**.]_a [**Premièrement**, elle a perdu son boulot.]_b [**Deuxièmement**, elle a dû aller habiter ailleurs.]_c
 [The fact that Mary abandoned the project had two major consequences.]_a [Firstly, she lost her job.]_b [Secondly, she had to move away.]_c

The role of *pour deux raisons* is essential in example (6) because it determines the explicative reading. In other cases, it co-occurs with other cues for explanation: cause_D in (1), *parce que* in (8), or both in (9). In these cases, its presence is not crucial, but it still has a role, guiding the interpretation in a prospective way⁶.

- (8) [Marie a abandonné le projet **pour deux raisons**.]_a [**Premièrement, parce qu'**elle a perdu son boulot.]_b [**Deuxièmement, parce qu'**elle a dû aller habiter

⁴ Without *parce que*, as in [Mary abandoned the project.]_a [She lost her job.]_b the discourse relation is underspecified : it could be *Continuation*, *Narration*, *Explanation*, or *Result*.

⁵ The interpretation would be easier with (5'): [Mary abandoned the project.]_a [she lost her job.]_b [and she had to move away.]_c

⁶ The prospective role is not always fulfilled, see the example below where no items are introduced, thus preventing recognition of an enumerative structure: [Domenech stubbornly refuses this concession for two reasons.]_a [But he does not wish to declare them to the press.]_b

ailleurs.]_c
 [Mary abandoned the project for two reasons.]_a [Firstly because she lost her job.]_b [Secondly, because she had to move away.]_c

- (9) [Domenech refuse obstinément cette concession **pour deux raisons**.]_a
 [D’abord, parce qu’il ne la comprend pas.]_b [Ensuite, parce qu’en l’acceptant, il aurait le sentiment de ruiner une autorité déjà amplement chancelante.]_c
 [Domenech stubbornly refuses this concession for two reasons.]_a [First because he does not understand it.]_b [And then, because accepting it would feel like ruining his already faltering authority.]_c

4 Contribution of Enumerative Structures involving “pour deux raisons”

The contribution of the prospect PP *pour deux raisons* may be considered either at the propositional content level, or at the discourse structure level, two levels that must be clearly distinguished [17].

The first approach (illustrated in Figure 1, repeated here as Figure 3), taking the contribution of *pour deux raisons* into account in the propositional content of its host constituent π_a , results in representing the NP *two reasons* in the DRS of π_a , and in assigning it the role of expressing a causal relation between eventualities or facts. The subsequent constituents will then be attached to the trigger constituent π_a , and further specification of the two reasons will be enabled by this attachment. But it seems to us that the role of *pour deux raisons* is much closer to that of a causal connective such as *parce que*, operating at the rhetorical level, as it encodes the speaker’s communicative intention. Moreover, this first solution does not benefit from the information given by the enumerative structure.

The second approach (illustrated in Figure 4) is to consider the contribution of the whole enumerative structure directly at the rhetorical level, and to take all its linguistic markers – prospect NP or PP as well as item introducers – into account at that level. In a first step of the interpretation, the recognition of the enumerative structure gives rise to the inference of *Enumeration* as mentioned in section 1 and formalized in Rule 1.

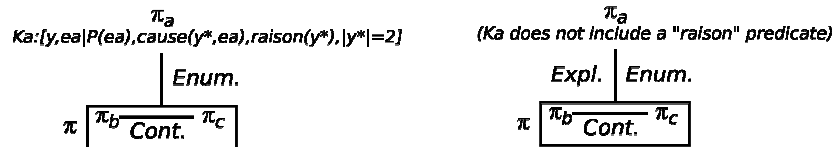


Figure 3. First approach for example (1) Figure 4. Second Approach for example (1)

(Rule 1) Infer Enumeration

$(?(\alpha, \beta, \lambda) \wedge Trigger(\alpha) \wedge First\ Item\ Marker(\beta)) > Enumeration(\alpha, \beta, \lambda)$

Then, we take the semantic content of the head of the prospect NP identifying the trigger, here *reason*. The noun *reason* can be classified as a relational noun, represented as a two place predicate [14, 6 and others]. We propose that it acts as a

parameter for the *Enumeration* relation in order to infer an additional content relation, which we assume to be *Explanation* for the noun *reason* as formalized by Rule 2.

(Rule 2) Infer Explanation

$Enumeration(\pi_a, \pi_b, \lambda) \wedge \text{ProspectNoun}(\pi_a) = \text{“raison”} > \text{Explanation}(\pi_a, \pi_b, \lambda)$

Other relational nouns, such as *cause* (*cause*) or *explication* (*explanation*) on the one hand, and *conséquence* (*consequence*), *résultat* (*result*), *effet* (*effect*) on the other hand, appear in plural NPs of enumerative structure triggers and should be compared to *reason* in their contribution to a causal semantic link or to a rhetorical relation (*Explanation* for the first group, *Result* for the second one). Other relational nouns, such as part nouns, support *Elaboration*, see for example the temporal nouns *étape* (*step*), *phase* (*phase*). Non-relational nouns such as *chose* (*thing*), *point* (*point*), *choix* (*choice*) are also very frequent in the plural NPs of the triggers. In these cases, the content relation co-occurring with *Enumeration* may also be *Elaboration*, but not due to the semantic relation induced by the noun. Those cases will be important to look at when deciding whether *Enumeration* as a relation is needed. If *Enumeration* brings some more semantic effects than *Elaboration* then it would be justified to introduce it.

5 Between propositional content and rhetorical structure

Considering the prospect PP in the trigger together with the first item marker as discourse markers, as done in the second approach, enables us to obtain a better rhetorical structure than with the first one. In this second approach, the propositional content of the prospect PP disappears altogether from the propositional content of the discourse representation. However, enumeration triggers are not exactly comparable with sentence adverbials that are standard discourse markers such as *parce que* or *à cause de* (*because*). These adverbials are grammatically fixed, while prospect PP aren't. They can be modified as in *for two good reasons*, *for two contradictory reasons* etc. So in such cases, removing them from the propositional content entails an information loss, as there is no way to take such qualifications into account.

In addition, the prospect is not always the modifier of a clause as in (1) or (6)-(9). It can constitute a separate clause, as in (10)-(12) where the trigger segment (a') is semantically lighter than the trigger segments (a) in the example (1) and (6)-(9). For this reason, we will call them “light triggers” and “heavy triggers” respectively.

- (10) [Marie a abandonné le projet.]_a [Il y a **deux raisons** à cela.]_{a'}
 [**Premièrement**, elle a perdu son boulot.]_b [**Deuxièmement**, elle a dû aller
 habiter ailleurs.]_c
[Mary abandoned the project.]_a [There are two reasons for this.]_{a'} [Firstly, she lost her job]_b
[Secondly, she had to move away.]_c
- (11) [Marie a abandonné le projet.]_a [Et ce **pour deux raisons**.]_{a'} [**Premièrement**,
 elle a perdu son boulot.]_b [**Deuxièmement**, elle a dû aller habiter ailleurs.]_c
[Mary abandoned the project]_a [For two reasons.]_{a'} [Firstly, she lost her job]_b [Secondly, she had
to move away]_c
- (12) [Marie a abandonné le projet.]_a [ce qui a eu **deux conséquences majeures**.]_{a'}
 [**Premièrement**, elle a perdu son boulot.]_b [**Deuxièmement**, elle a dû aller

habiter ailleurs.]_c
 [Mary abandoned the project.]_a [which had two major consequences.]_{a'} [Firstly, she lost her job.]_b
 [Secondly, she had to move away.]_c

The question raised by these examples is the status of segment (a'). Considering the segment in its entirety as a kind of discourse marker would lead to both the speech act and its propositional content not being represented in the SDRS. This is not only odd, but wrong because in (12) the fact that the consequences are major ones is lost. In other words, we need a solution that combines both approaches from section 4.

Enumeration structures, which provide a description of the discourse structure itself, lie between the propositional and the rhetorical levels, a position not yet really addressed in SDRT. One could wonder whether SDRT topic segments with a propositional content summarizing a complex segment do not already have such an intermediate character. The answer is no, as the propositional content of the topic describes content-level material just as other segments, not the discourse structure.

Let's though examine more closely a third possible approach based on discourse topics. In this new solution, light triggers introduce topic segments dominating the complex segment collecting the items of the enumeration as in figure 5 representing example (12). But this approach is not adequate. The structure is wrong as soon as the content relation is by default a coordinating one, as *Result* is [3]: on figure 5, segment (a) is not accessible from (b) and (c) and the anaphora in *elle* (*she*) cannot be solved. The semantics too is problematic. The propositional content of (a') is not topic-like, that is, it doesn't summarize the content of (b) and (c). Worse still, the *Result* relation holding between (a) and (a') has the undesired semantic effect that the giving up caused the fact that this very event of giving up has two consequences, which is meaningless.

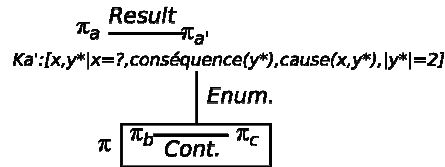


Figure 5. Third Approach illustrated on (12)

Our final proposal considers that prospect PP have both a propositional content, as in the first approach, and a rhetorical effect as in the second one. The solution we propose is to give to both light triggers as in (12a') and prospect PPs as in (1) the status of discourse segment. This move is in line with previous work in SDRT in which it has been shown that sentence modifiers constitute speech acts. This choice is also motivated by the fact that what is caused by the reasons (or what has consequences) in such elements often are facts rather than events. The separation of the prospect noun from the context segment allows the reference to that segment (Ka), while if left within the segment, only the event (ea) is available.

Thus we consider that we always have light triggers. These are rather special segments whose content concerns only the discourse structure (information packaging) and not the standard semantic content. It is nevertheless built up compositionally in the same way as the other constituents, as in our first approach. The difference lies in its "meta-level" nature. To our knowledge, such constituents

have not been modeled in semantic approaches of discourse yet⁷. As just explained, this segment is not some sort of topic, and in particular the content discourse relation, i.e., *Result* for (12) or *Explanation* for (1), holds directly between segment (a) —not the trigger segment (a') as in the third approach— and the complex segment collecting the items, as in the second approach. This is also supported by the nature of the object involved in this constituent. The “reasons” or the “consequences” are actually the facts corresponding to each sub-segment in this complex segment, i.e., the items. This is accounted for by our final solution in which the two levels are present: the “meta-level” content in the trigger describes a relation between facts, and a relation between eventualities is obtained as a semantic effect of the content level discourse relation.

Now, how is the trigger inserted in this structure? The relation that seems the most appropriate for attaching the trigger segment to its context, i.e., to the segment (a) in (12), is *Commentary*. Although this is one of the relations less well understood in the SDRT framework, it is chosen because of its ability to introduce a change of level: the narrator perspective, a character's viewpoint or, like here, discourse structuring information. The relation between the trigger segment and the complex segment collecting the items naturally is *Enumeration*. This relation also involves a change of level, this time from the discourse “meta-level” to the standard content-level. At the inference level, these modifications are performed by modifying rules (1) and (2) in rules (3), (4) and (5). We therefore get a representation for (1) and (12) as in figures 6 and 7, a structure that makes the right predictions with regard to accessibility.

(Rule 3) Infer Commentary $(?(\alpha, \alpha', \lambda) \wedge \text{Trigger}(\alpha')) > \text{Comment}(\alpha, \alpha', \lambda)$

(Rule 4) Infer Enumeration modified

$(?(\alpha', \beta, \lambda) \wedge \text{Trigger}(\alpha') \wedge \text{First Item Marker}(\beta)) > \text{Enum}(\alpha', \beta, \lambda)$

(Rule 5) Infer Explanation modified

$(?(\alpha, \beta, \lambda) \wedge \text{Comment}(\alpha, \alpha', \lambda) \wedge \text{Trigger}(\alpha') \wedge \text{First Item Marker}(\beta) \wedge \text{ProspectNoun}(\alpha') = \text{“raison”}) > \text{Explanation}(\alpha, \beta, \lambda)$

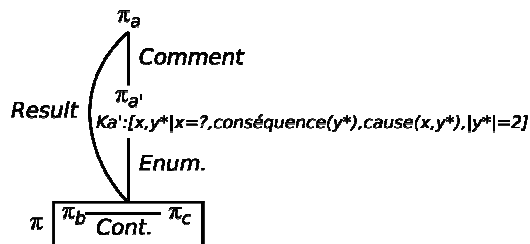


Figure 6. Final Approach for (12)

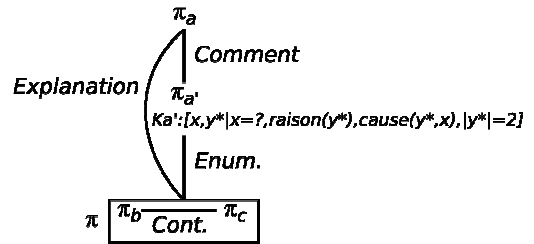


Figure 7. Final Approach for (1)

⁷ This meta-level is different from the so-called meta-relations in SDRT (e.g. *Explanation**) that are discourse relations involving speech acts in their semantics, something also called pragmatic discourse relations in [11]. Here, it is the constituent itself that concerns the level of discourse structuring.

6 Conclusion

In this paper we proposed a novel account of enumerative structures involving prospect nouns such as *raisons* (*reasons*). This preliminary study affords new insight into the contribution of textual information – enumerative structures – to discourse structure and discourse content. It allowed us to approach discourse constituents whose content address primarily packaging and not semantic content, the modeling of such constituents in semantic/pragmatic approaches of discourse structure such as SDRT having been largely overlooked. On this issue we treated these “discourse packaging constituents” as constituents attached to the structure with specific relations. *Commentary* has been used to attach the trigger, the discourse packaging constituent, to the context while a relation called *Enumeration* is used for attaching the enumerative items textually to their enumeration trigger. This still allows for a semantic relation between the context and the items.

Going back to our original question regarding the necessity of using an *Enumeration* relation, one could think that the items could be related to the trigger through the *Entity-Elaboration* relation[16], as the “reasons” are detailed in the items. However, here the “reasons” are identified by the facts corresponding to whole discourse constituents (the items) themselves, while the semantics of *Entity-Elaboration* would imply that properties of the reasons are described within these constituents. *Commentary* and *Enumeration* are therefore allowing us to juggle between constituents describing semantic content and constituents describing discourse packaging while *Entity-Elaboration* would not have allowed so. A broader study on such constituents (in particular in cases where the relation between the context and the items would be *Elaboration*) as well as on the semantics of the *Commentary* relation is however needed. On a more global level, we need to investigate how the proposal made here can help modeling “other-levels” than semantic content (expressives, discourse packaging, grounding in dialogic data,...) in SDRT.

Another interesting phenomenon to explore further concerns the interaction between the information conveyed by the relational noun in the trigger and discourse markers that may occur in the items of enumerative structure. In an example such as (8), *raison* and *parce que* both mark *Explanation*. We should expect an example such as (13), where *conséquence* indicates a result instead of an explanation, to be semantically odd or infelicitous:

- (13) [Marie a abandoné le projet]_a. [L’abandon du projet a eu **deux conséquences majeures**]_a. [**d’abord, parce qu’elle** a perdu son boulot]_b. [**ensuite, parce qu’elle** a dû aller habiter ailleurs]_c

[Marie abandoned the project]_a [Abandoning the project had two major consequences for Mary]_a.
[first because she lost her job.]_b [then because she had to move away.]_c

However, this example is acceptable since we are able to interpret the items as meta-explanations of the two consequences (“*I explain why I told you that there are two consequences*”). In other words, here, we obtain a structure like that of Figure 6, with, in addition to the *Enumeration* relation, an *Explanation** meta-relation between π_a and π . Representing the light trigger as a constituent, i.e., taking it into account as a

speech act of its own makes it possible to account for such meta-relations, something that would be impossible with the other approaches evoked in this paper.

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