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# Representing speech acts as events to treat dialogue

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## Résumé

In this paper, we examine the way in which formal semantics such as SDRT (Asher, 1993) treat dialogue. We point out that SDRT offers two different solutions to combine utterances in a dialogue, one based on reported speech and one based on new discourse relations specific to sequences of utterances (Asher & Lascarides, 1998). We show how this can be problematic especially for access to discourse referents. We think that even at a semantic level, treating dialogue cannot be done in a context-free way. Specifically, we show how representing events of utterance production allows for an homogeneous treatment of both dialogue and its representation in reported speech. We claim that such an approach allows accounting for the structure of dialogue and show the advantages which it offers for the treatment of reference, especially where deictics are concerned.

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## 1. Introduction

In this paper, we want to show that it is impossible to account for dialogue without taking into account the context of its production. Specifically, we think that the events of utterance production must be represented as such in utterance representation. To justify this claim, we will compare dialogues and the corresponding reported speeches. Thus, to describe a dialogue such as (1), we will rely on the reported speech in (2):

- (1) *Mary to Paul:* " Write a letter to John and don't forget to send it! "  
*Paul to Mary:* " Consider it done. "
  
- (2) *Mary ordered Paul to write John a letter and not to forget to send it.*  
*Then, Paul answered that she should consider it done.*

This method will allow us to link the way SDRT (Asher, 1993) treats a discourse such as (2) and the way in which it treats a dialogue such as (1) (Asher & Lascarides, 1998). It seems indeed that SDRT proposes two highly different methods to combine the utterances in a dialogue, one using the notion of topic (which we will define as a singular sum of events) computed on the

reported speech to establish a *Narration* relation and the other based on discourse relations such as Question-Answer-Pair. SDRT does not explicitly deal with the link between the semantic representation of a dialogue and the representation of the corresponding reported speech. We will defend the idea that the computation of the topic for a reported discourse corresponding to a question-answer pair must be co-constrained by the rules on the computing of the relation Question-Answer-Pair. We will deduce from this that positing dialogue relations may not be the most economic way of dealing with dialogue.

We will then propose that, to model dialogue, one should actually represent the events of utterance production in terms of illocutionary acts. We will show that in the case of a sequence of assertions, this is compatible with classical DRT (Kamp & Reyle, 1993) or SDRT (Asher, 1993). This approach allows us to keep the narration relation as well as the computation of the topic in the case where a sequence of illocutionary acts with identical agents and patients (assertions for instance) is treated. In the case of other illocutionary acts, as a question-answer pair, we propose to consider both the plural sum of the two events, which is the only solution when one wants to categorize one of them as the answer to the question, and the singular sum of these two events (topic) which only gives access to the common theme to both question and answer. We will conclude on some advantages of the representation of dialogue advocated here, especially where deictic reference is concerned.

## 2. Combining the utterances in a dialogue in SDRT

As said above, we consider both dialogues and the corresponding reported speeches. The dialogue situation can thus be seen as the model (semantically speaking) of the discourse reporting this dialogue. For instance, the situation where (1) occurs is a model for the discourse in (2):

- (1) *Mary to Paul:* " Write a letter to John and don't forget to send it! "  
*Paul to Mary:* " Consider it done. "
- (2) *Mary ordered Paul to write John a letter and not to forget to send it.*  
*Then, Paul answered that she should consider it done.*

Discourses examined here will be *chronological*, i.e. they will report the dialogue in the order in which it occurred. In SDRT, the operational discourse relation in such a case is *Narration*. We will thus describe it quickly in a general way, to apply it afterwards to reported speeches. Then we will describe the way in which SDRT treats the corresponding dialogue through the use of the dialogue relation *Question-Answer-Pair* (Asher & Lascarides, 1998). We will finally show the link between the representation of reported speech and the representation of dialogue.

### 2.1. The Narration-relation in SDRT

Confronted with successive sentences representing events in the order in which they occur and when no other discourse relation applies, SDRT proposes the default discourse relation *Narration* to connect the SDRSs representing sentences. This is what happens for examples such as (3).

- (3) *Paul flew from Nice at 10 AM.*  
*He slept during the flight.*  
*He arrived in Paris at noon.*

However, for Narration to apply, one must compute a topic which in Asher's words ((Asher, 1993) page 267) must be:

(Topics are) summary constituents for a group of constituents. A topic is a proposition that summarizes the content of a constituent in an SDRS, and bears a particular structural relation to that constituent. The topic structure is a way of organizing the content of a text. One constraint on topics is that they be simple; they should summarize not repeat. So one constraint on topics is that they be simple constituents with only one main event.

In example (3), the topic would be something like *Paul's journey*. Given this computation for the topic, SDRSs for this example are represented in figure 1, the topic corresponding to SDRS  $k_0$ . Discourse referents accessible for pronoun resolution are those defined in the discourse universes of SDRSs  $k_0$  and  $k_3$ , that is on the right border of the SDRS tree.

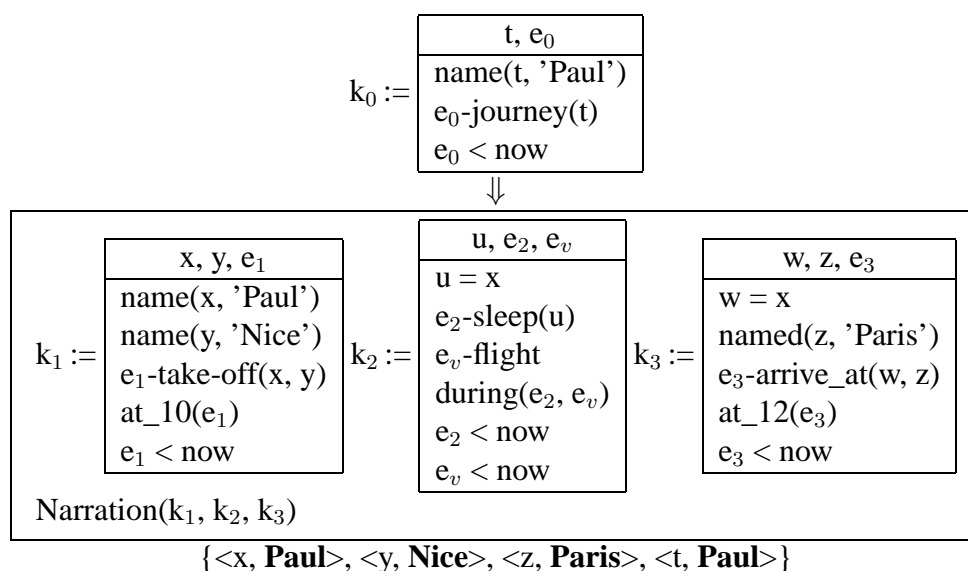


FIG. 1 – *Exemple (3)*

As Asher himself notes, determining a topic is not always an easy task:

A problem with topic-based updating is that it may often not be clear what the topic of a segment is. Topics may have to be constructed in the course of building an SDRS. But the definition of topic places few constraints on what a possible topic for a constituent might be<sup>1</sup>.

The constraint on the computation of topic remains rather vague. We will interpret Asher's recommendation (simple constituents with a single event) as a strong constraint on the fact that the topic must be a singular sum of events, in a sense which we will now precise.

1. (Asher, 1993), page 276.

## 2.2. Groups of events and simple events

If our interpretation is correct, computing the topic to establish a *Narration* in SDRT supposes recategorizing several events as a single simple event. It is a quite general problem and it is certainly not specific to the computation of topic. The construction of a group of several events is always possible, but the difficulty lies in deciding whether this group can correspond to a single event, that is to a singular sum of events. This raises two questions:

1. justifying the existence of a single event;
2. not being reduced, for this event, to the very general category: *event*.

Several situations can occur. First, if two transition events  $e_1$  and  $e_2$  have a common patient, the first event transforms the initial state  $S_1$  of the patient in a state  $S_2$  which, in its turn, is modified by the second event which leads the patient to a final state  $S_3$ . One can then legitimately consider these two events as a single event  $e_1 \oplus e_2$  which ensures the passage from  $S_1$  to  $S_3$ . Note that, without any more precise description of  $e_1$  and  $e_2$ , the category of the sum  $e_1 \oplus e_2$  is much more general than the categories of  $e_1$  and  $e_2$  and that the resulting event concerns *a priori* only the patient and not the other participants. For instance, (4) yields a simple event which can be paraphrased by “Luke’s car was modified”.

- (4) *Luke painted his car blue.*  
*John crashed it.*

Another simple case is that in which a singular predicate distributively describes several events as in (5).

- (5) *Anne ate two apples.*

If  $e_1$  and  $e_2$  are of form:

$$e_1 = \text{category } c(\text{agent } \alpha, \text{patient } \beta_1, \text{other participants})$$

$$e_2 = \text{category } c(\text{agent } \alpha, \text{patient } \beta_2, \text{other participants})$$

one can then have the singular sum:

$$e_1 \oplus e_2 = \text{category } c(\text{agent } \alpha, \text{patient } \beta_1 + \beta_2, \text{other participants})$$

We will use the case of the categories of distributive events to treat sequences of assertions.

**DELAYER CE QUI SUIT EN MATIERE DE PERTE D’INFO PRENDRE DES EXEMPLES A LA LAURENCE...**

**PERTE d’INFO PARTICIPANTS**

**PERTE d’INFO CATEGORIE de l’EVENEMENT** More generally, it seems that it is always possible to make a singular sum of events (i.e. to compute a topic). In some cases, however, computing that topic will imply a very general category and will lead to the loss of a great amount of information, notably on the participants of events when they are heterogeneous from one event to the other. This fact can have consequences on reference resolution in as much as, in SDRT, discourse referents present in the topic SDRS are accessible to pronouns.

### 2.3. Narration and reported speech

Chronological reported speeches such as (6) give rise to *Narration* because the events described, that is the production of the question and its answer in this case, are presented in discourse in the order in which they occurred.

- (6) *Paul asked John what color Mary's cat was.  
Then John answered that it was black.*

As indicated in §2.1, *Narration* imposes computing a topic, that is, a simple event which must be categorized and whose participants must be identified. In the present case, the simple event can *a priori* be paraphrased as *discussion between Paul and John*, yielding the SDRS tree in figure 2.

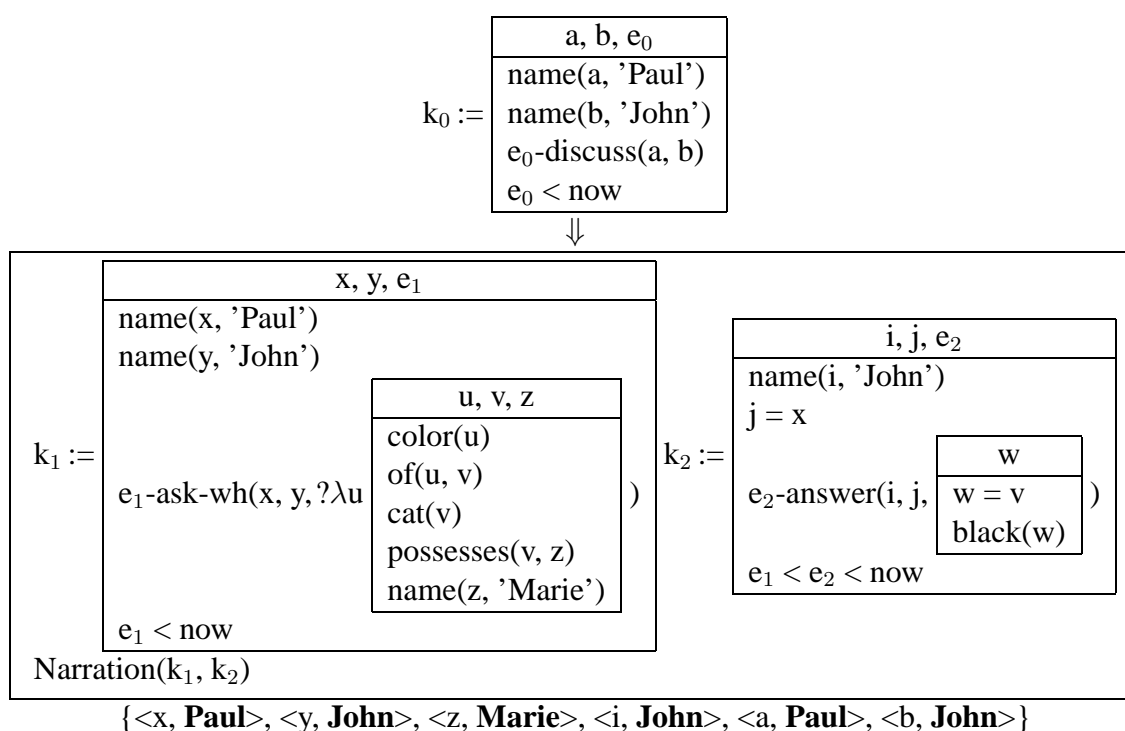


FIG. 2 – *Exemple (6)*

Yet the possibility of further pronoun reference to a discourse referent which only appears in the question shows that this is not satisfying. Indeed it is possible after a discourse such as (6) to refer by a pronoun to a discourse referent present in the question, but not in the answer. Thus one can refer back to Mary by *she*, as in (7).

- (7) *Paul asked John what color Mary's cat was.  
John answered that it was black.  
Then Paul asked whether she had other pets.*

As seen in §2.1, the accessibility of discourse referents after a *Narration* is determined by the right border of the SDRS tree. In our case, this right border includes the answer and the topic. The topic must thus contain the propositional content of the question for such pronoun references to be possible. Concerning (6), the simple event corresponding to the topic is thus rather something like *discussion between Paul and John concerning Mary's cat*, which yields the SDRS tree in figure 3, which is identical with that in figure 2, apart from the topic SDRS.

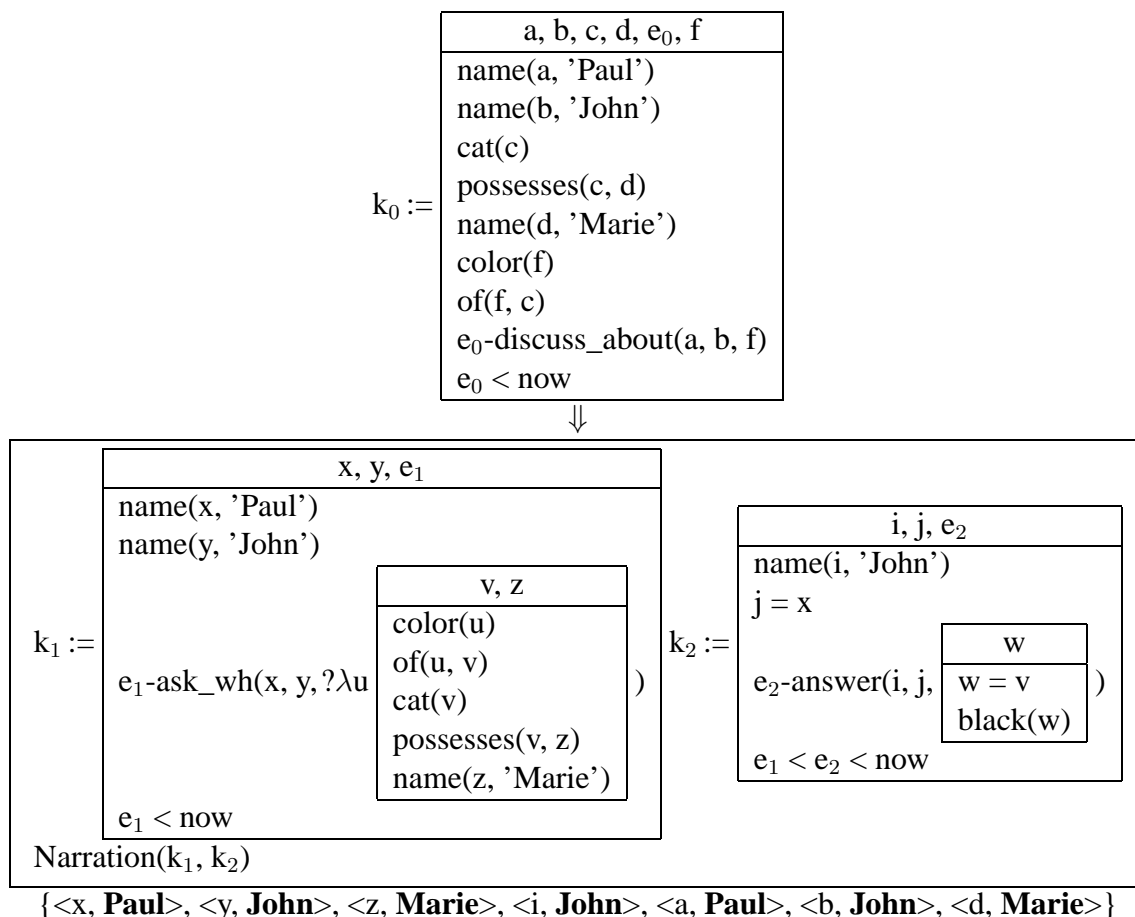


FIG. 3 – Exemple (6) (bis)

## 2.4. Question-Answer-Pairs in SDRT

In (Asher & Lascarides, 1998), the authors propose using SDRT to treat dialogue and target their paper at question-answer pairs such as (8):

- (8) *Paul to John:* "What is the color of Mary's cat?"  
*John to Paul:* "It's black."

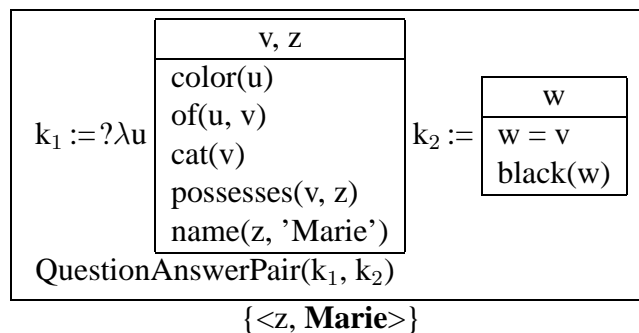
To treat such examples, Asher and Lascarides introduce a new discourse relation: *Question-Answer-Pair*. Constraints to label the relation between SDRSs representing the question and the answer *Question-Answer-Pair* indicate that the answer must be a direct answer to the question. Formally the question-answer pair is represented by the set of SDRSs in figure 4.

### donner contraintes sur QAP Asher Lascarides

On our example,  $k_2$  represents a direct answer to the question because the proposition in  $k_2$  entails that Mary's cat has a color.

Of course, *Question-Answer-Pair* is such that the discourse referents that appear in the question are accessible for pronoun resolution. In (9) which is the dialogue version of example (7), the pronoun *she* gets solved on a discourse referent that only appears into the question :

- (9) *Paul to John:* "What is the color of Mary's cat?"  
*John to Paul:* "It's black."  
*Paul to John:* "Has she other pets?"

FIG. 4 – *Example (8)*

What is not clear however is the discourse relation which has to be established between the SDRSs corresponding to the first and the second questions.

### 2.5. *Question-answer pairs and topic*

To treat a dialogue, there are thus two solutions:

- using new discourse relations such as *Question-Answer-Pair*;
- making a chronological discourse reporting this dialogue and defining the relations between utterances in the dialogue on the basis of the topics computed for the treatment of reported speech.

This imposes the community of some constraints for computing topic in a chronological discourse reporting a question-answer pair and the computing of the relation *Question-Answer-Pair* of the corresponding dialogue. Note that this community of constraints cannot be reduced to the choice of *Question-Answer-Pair* as a topic, in as much as *Question-Answer-Pair* cannot be a simple event. Yet, the possibility of pronoun reference is the same in a dialogue and in the corresponding reported speech as is shown by examples (6) and (8), though accessibility constraints for *Narration* and for *Question-Answer-Pair* will not yield the same set of accessible discourse referents (see figures (2), (3) and (4)). This raises a problem for SDRT and suggests that the introduction of new discourse relations may not be the best solution. We will now try to expand our proposition according to which the events of utterance production themselves should be represented.

## 3. Representing utterance production events

(Asher & Lascarides, 1998) present their proposition as a method for semantically combining sequences of utterances reduced to their propositional content (in the sense of speech act theory). Yet Asher and Lascarides mention in their paper the necessity of keeping track of who said what, that is of the speaker of each utterance. SDRSs corresponding to utterances are consequently decorated with the mention of the speaker having produced the utterance.

Our proposition means exploiting this idea to the core and, by analogy with what the discourse reporting the utterance represents, to represent completely the utterance production events. In doing that, we represent more than the simple semantics of the utterance (its propositional content) and we thus overstep the domain traditionally attributed to formal semantics. Yet it seems to us that the utterance production event is part of the context in which the utterance is



interpreted and must thus be taken into account in one way or another. We will first present our solution in a very general way. We will then show that this solution allows for the treatment of sequences of assertions produced by a single speaker in the frame of DRT and that it thus does not raise any specific difficulty. Finally, we will show some advantages of this solution, relative to the treatment of question-answer pairs on the one hand and the treatment of deictics on the other hand.

### 3.1. *Locutionary and illocutionary acts*

If it is admitted that an utterance is interpreted relative to a context, it seems legitimate to think that we add that utterance to the context. Austin used to distinguish in a utterance act the locutionary from the illocutionary act (Austin, 1962). We will only take into account at the semantic level the illocutionary act and we will adopt the quadripartite typology proposed by relevance theory (Sperber & Wilson, 1995):

- *saying that*, for assertions;
- *telling to*, for orders;
- *asking WH-* for open questions;
- *asking if* for closed questions.

We adopt the classical distinction between illocutionary force and propositional content of a speech act (Searle, 1969). A utterance is represented by  $IF(PC)$ ,  $IF$  corresponding to the illocutionary force and  $PC$  to the propositional content. Only  $PC$  is truth-conditional. We will propose the following interpretation process:

- adding to the context a locutionary event containing the uninterpreted message; in the case of an utterance such as “Open the door”, this can be paraphrased by the following event:  
 $e_1 = \text{saying}(\text{speaker}, \text{“Open the door”})$
- recategorizing this locutionary act as an illocutionary act (*telling to*, *saying that*, *asking WH-*, *asking if*) which imposes to consider the proposition associated to the message; in the preceding example, this yields:  
 $e_1 = \text{telling to}(\text{speaker}, \exists!x, e_2 \text{ door}(x) \wedge e_2 = \text{open}(\text{addressee}, x) \wedge e_2 > \text{now})$
- solve reference on the whole utterance; in our preceding example, this means identifying the door in the context.

Note however that once the order has been obeyed, the event corresponding to the execution or the order still has to be identified as identical with the event mentioned in the propositional content. What is more, it seems important to us to preserve the propositions of such formal semantics as DRT and SDRT for reference treatment. We will thus show that taking into account utterance production events is compatible with the usual treatment of discourse.

### 3.2. *Speech acts and discourse*

When a discourse is a monologue, the speaker and his addressees are the same all along. If, what is more, a discourse is a sequence of assertions (*saying that*), each sentence or utterance supposes a production event. Connecting the discourse can thus be reduced to grouping events in such a way that their propositional arguments are also grouped. With constant speaker and

addressee, a sequence of events of *saying that* can be treated as a distributive event in the way indicated in §2.2. Indeed, if  $A$  says to  $B$  that  $P_1$  and  $P_2$ , then  $A$  says to  $B$  that  $P_1$  and  $A$  says to  $B$  that  $P_2$ . Conversely, if  $A$  says to  $B$  that  $P_1$  and then  $A$  says to  $B$  that  $P_2$  then  $A$  says to  $B$  that  $P_1$  and  $P_2$ . The only difficult point in this combination of propositions is the linking of variables from  $P_2$  to  $P_1$  (typically pronouns). It is precisely on this point that formal semantics such as DRT and SDRT make important contributions. The general assembly schema would thus be:

$$\left. \begin{array}{l} e_1 = \textit{saying that}(A,B,P_1) \\ \textit{then} \\ e_2 = \textit{saying that}(A,B,P_2) \end{array} \right\} e_0 = \textit{saying that}(A,B,P_1 \oplus P_2)$$

$\oplus$  corresponds here to the *Update* operation in DRT and SDRT on the representation of  $P_1$  by the adjunction of the representation of  $P_2$ . Discourse semantics can thus stay isolated from the context in which the utterance is produced, given that utterance production events are part of this context. We will however show later on that reference computation, that is the grounding of discourse referents in context, can also operate on the representation we propose.

Given the distributional property of the *saying that* acts of a single speaker to a single addressee, discourse, as far as assembling speech acts is concerned, is a straightforward case. A passage to dialogue entails two additional difficulties:

- speaker and addressee exchange their roles;
- speech acts vary (there are not only *saying that*).

### 3.3. Sums of events and dialogue

Our proposal has two aspects:

- the representation of utterance production events in terms of speech acts;
- the connexion between dialogue constituents through a sum of the events examined.

Because of the necessity of linking variables and of preserving the contributions of dynamic semantics on accessibility constraints, we are confronted to a problem similar to that of the computation of the topic. Note however that our solution which entails giving the same representation to dialogue and to the corresponding reported speech avoids raising this problem twice:

- once for dialogue through the necessity of conceiving new discourse relations;
- once for reported speech in terms of conceptual rules relative to speech acts and dialogue.

On the reverse, SDRT does meet it twice (Asher & Lascarides, 1998) :

On our view, passing from a single utterance to a dialogue means considering sums of utterance production events as well as their participants. Let us examine again dialogue (8):

- (8) *Paul to John:* " What is the color of Mary's cat? "  
*John to Paul:* " It's black "

We have two utterance production events:

$$\begin{aligned} e_1 &= \textit{asking WH-}(\textit{Paul,John,the color of Mary's cat}) \\ e_2 &= \textit{saying that}(\textit{John,Paul,It's black}) \end{aligned}$$

Given these two events, one can consider:

- the plural sum of these two events, which alone allows the identification of  $e_2$  as an answer rather than as a simple *saying that*;
- the singular sum  $e_3$  of  $e_1$  and  $e_2$ , yielding a single event similar to that which forms the topic of the corresponding reported speech and which can be described by *discussion between Paul and John about Mary's cat*; in this simple event, the specificity of dialogue (a question and an answer) disappears.

Event  $e_3$  justifies assembling the propositional contents of the question and the answer (see §3.2) and the plural sum of events preserves the property of  $e_2$  to be an answer in the dialogue. It should be noted that the singular sum  $e_3$  combines properties which are characteristic of singular events – it resorts to a category and it has participants – and properties characteristic of groups of events – it gives access to its parts  $e_1$  and  $e_2$ . It is thus simultaneously a simple event, as required by SDRT for the computation of topic, and a group of events. This is not a specific characteristic of events and, in the same way, a car for instance both has properties as such (its color, its make, etc.) and is composed of parts (its steering wheel, its wheels, etc.)(Simons, 1987).

Thus, in the case of discourse (see §3.2), the global event which sums up the successive events of *saying that* is so to speak a speech act of the same category. In the case of dialogue this is not the case for two reasons. On the one hand exchanging speakers means that one gets co-agents in the singular sum, and on the other hand the category of a topic (discussing for instance) does not correspond to an illocutionary act and is thus not explicit relative to the assembled illocutionary acts. Indeed question-answer pairs can be described in this way just as can sequences of assertions. More specifically, the distinction between assertion and question is lost.

### 3.4. Computing sums of speech acts

As we mentioned in 2.5, the discourse relations that appear in dialogue share constraints with the computation of topics because a dialogue may be reported. In order to respect these constraints two approaches may be considered :

- one can consider that topics in the case of reported dialogue are built from the discourse relations that appear in direct dialogues. This would lead to consider *Question-Answer-Pair* as a possible topic. We rejected this approach, considering that *Question-Answer-Pair* is certainly not a simple event ;
- the other solution consists in using the topic computation mechanism to categorize sums of events. We will develop this idea here.

SDRT supposes a mechanism that computes topics. This assumes the existence of a function *Topic* that takes two propositions  $P_1$  and  $P_2$  and provides (if possible) a proposition  $P_3$ . As  $P_3$  is a topic (when it exists), it denotes a single main event.

In the case of reported dialogue, *Topic* is precisely used to compute the topic corresponding to *Narration*. In the case of dialogue, the function *Topic* can be used in the following way:

1. the first utterance is represented by an event  $e_1$  (in the context) whose category is  $cat_1$  one of the four proposed by relevance theory and whose participants are the speaker, the addressee and a propositional content  $\pi_1$ . From that representation we build the proposition

$P_1: \exists e_1 - cat_1(S_1, A_1, \pi_1)$

2. from the second utterance, we build a proposition  $P_2: \exists e_2 - cat_2(S_2, A_2, \pi_2)$
3. applying *Topic* to  $P_1$  and  $P_2$  either fails (in which case the dialogue is incoherent) or yields a proposition  $P_3 = \exists e_3 - cat_3(SA_3, \pi_3)$  where  $SA_3$  groups the speaker and the addressee ;
4. the representation of these two utterances is then obtained by inserting  $e_3$  in the context.

An important remark here is that  $\pi_3$  is not always a proposition. In particular when dealing with question-answer pairs, we observe such topics as *discussAbout* whose argument is not necessarily a proposition.

Applying our solution to our (8) leads to the following representation :

$e_{1\_askingWh}(Paul, John, ?\lambda u$	<table style="border-collapse: collapse; width: 100%;"> <tr><td style="text-align: center; border-bottom: 1px solid black;">v, z</td></tr> <tr><td>color(u)</td></tr> <tr><td>of(u, v)</td></tr> <tr><td>cat(v)</td></tr> <tr><td>possesses(v, z)</td></tr> <tr><td>name(z, 'Mary')</td></tr> </table>	v, z	color(u)	of(u, v)	cat(v)	possesses(v, z)	name(z, 'Mary')	)
v, z								
color(u)								
of(u, v)								
cat(v)								
possesses(v, z)								
name(z, 'Mary')								
$e_{2\_saying\_that}(John, Paul,$	<table style="border-collapse: collapse; width: 100%;"> <tr><td style="text-align: center; border-bottom: 1px solid black;">w</td></tr> <tr><td>w = v</td></tr> <tr><td>black(w)</td></tr> </table>	w	w = v	black(w)	)			
w								
w = v								
black(w)								

the sum  $e_1 \oplus e_2$  is then  $e_3$ :

$e_{3\_discussAbout}(John + Paul,$	<table style="border-collapse: collapse; width: 100%;"> <tr><td style="text-align: center; border-bottom: 1px solid black;">x, y, t</td></tr> <tr><td>color(x)</td></tr> <tr><td>of(x, y)</td></tr> <tr><td>cat(y)</td></tr> <tr><td>possesses(y, t)</td></tr> <tr><td>name(t, 'Mary')</td></tr> </table>	x, y, t	color(x)	of(x, y)	cat(y)	possesses(y, t)	name(t, 'Mary')	)
x, y, t								
color(x)								
of(x, y)								
cat(y)								
possesses(y, t)								
name(t, 'Mary')								

Of course, we face exactly the two difficulties Asher notes (see Asher's quotations **paragraphe 2.1**) :

1. computing topics is not always an easy task ;
2. topics may have to be constructed in the course of building an SDRS: in our example, solving the anaphora on  $w$  interferes with the computation of  $e_3$ .

### 3.5. *The computation of reference*

Thus, we propose integrating some elements of the context, and, specifically, utterance production events in the representation of dialogue. A purely semantic representation (in terms of propositional contents) would indeed stay isolated from context. Yet, in dialogue, speakers do actually solve reference. In the words of relevance theory (Sperber & Wilson, 1995), this means passing from the logical form to the enriched logical form (i.e. *propositional form* in relevance-theoretic terms). Solving reference can then correspond to the grounding of some discourse referents in the context. If one accepts that a referential expression is solved in a coreferential

way on accessible discourse referents (as defined by DRT or SDRT), two solutions are possible: either the discourse referent is grounded in the context or it is not.

Generally, deictics can only appear in the logical form as constants. Their reference is fixed relative to the utterance act. If it is *a priori* difficult or even impossible to give them a semantics in the logical form, they should however appear in the enriched logical form. Representing the speech act type event corresponding to each utterance, as we propose, allows a simple treatment of some of these deictics. Thus in simple cases which are those we are interested in, the referent of *now* is the speech act event itself and referents of *I* and *you* are respectively the speaker and the addressee. For instance, the logical form of an utterance such as (10) is as follows:

(10) *Mary to John:* " I'll see you "

$$e_1 = \textit{saying that}(\textit{Mary,John},\exists e_2 e_2 > e_1 \wedge e_2 = \textit{seeing}(\textit{Mary,John}))$$

Even if only a procedural treatment will lead to the referents of deictics, representation in terms of speech acts events at least allows for a representation of these referents.

## 4. Conclusion

In this paper, we have studied the way in which formal semantics such as DRT and SDRT accounts for dialogue. By its very nature, SDRT only models the propositional content of utterances. Asher and Lascarides thus introduce new discourse relations such as *Question-Answer-Pair* to treat sequences of utterances. Yet we have shown that SDRT already offered a mechanism to model dialogue, that is the discourse relation *Narration* applied to the discourse reporting that dialogue. Consequently the constraints associated to a relation such as *Question-Answer-Pair* should include those which allow the computation of the topic which is necessary to establish a *Narration* in the corresponding reported speech. This however is not the case in the present state of SDRT. Apart from the fact that having several means for modelling the same dialogue does not seem highly economical, this situation is problematic in as much as nothing guarantees that the constraints associated with the *Question-Answer-Pair* relation determine the same sets of accessible discourse referents for the following dialogue as do those associated with the computation of the topic for *Narration*.

We have thus proposed an alternative which consists in considering events of utterance production as such and in representing them in the same space as the other referents. We have justified our proposal by showing how this allows assembling the dialogue through sums of speech act events. Indeed, grouping such events allows assembling propositional contents as participants in sums of events and thus possibly preserves the constraints on the accessibility of referents proposed by formal semantics. But it also allows us to account for dialogue specificities, such as the fact that an answer can only be recognized as such in the frame of the plural sum of events corresponding respectively to the question and to the answer.

Our proposition rests on the constatation that dialogue, even from a purely truth-conditional perspective, cannot be treated without a reference to context. This means that logical forms associated with utterances are nearer to the enriched logical forms of relevance theory than to the pure logical forms of formal semantics. Thus discourse referents can be grounded in the context. We have briefly illustrated this point on the case of some deictics such as *now* or *I* whose

referents clearly appear if utterance production events are represented. Hence, the challenge is to determine whether reference domains gathering accessible discourse referents can be borrowed from formal semantics even though these discourse referents are linked to objects in the context.

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