1

An account of negated sentences in the DRT framework

Pascal Amsili and Anne Le Draoulec

1.1 Introduction

Among theories of formal semantics, Discourse Representation Theory (Kamp and Reyle 1993) has proved quite useful to represent time in natural language, because it implements and generalises Davidson’s (1967) proposal to handle events as objects in the language. Thus, in DRT, each simple sentence is supposed to introduce in the representation one discourse referent (sometimes more), either an event or a state, corresponding to the eventuality denoted by the VP (see Cooper 1996 for an interesting comparison of this approach (“Davidsonian events”) with the one taken in Situation Semantics (“Austinian propositions”), especially in the case of negation).

Negation makes this picture slightly more complex. A rather natural view would be that sentential negation should have wide scope over eventuality discourse referents. However, in some cases, linguistic evidence suggests that negative utterances may introduce a specific discourse referent. This has led linguists to wonder whether negated sentences should be seen as introducing “higher level” discourse referents, which would be defined in terms of the negation of eventualities, narrowing the scope of negation (for a recent proposal, see (de Swart and Molendijk 1994)).

We think that this latter approach is neither desirable nor neces-

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sary. On the contrary, we claim that negation must be compositionally thought of as having wide scope over eventuality discourse referents, as is advocated by (Kamp and Reyle 1993, Asher 1993). However, one cannot confine oneself to stating this, since this principle is not in itself sufficient to account for all phenomena involving negation and eventualities. The purpose of this paper is to show how this set of phenomena can be accounted for, either by means of Kamp & Reyle’s proposal, or through other relevant principles, inspired in particular from Asher’s treatment of abstract objects (Asher 1993).

Our proposal is grounded on French linguistic data, involving in particular temporal clauses. Moreover, we will study here only sentential negation, which is achieved in French via the locution ne... pas. It is worth noting that the behaviour of this French “canonical” construction is different from that of its English equivalent, aux + not. Some of the examples we give in this paper are not acceptable in French, whereas their translation into English are fine. It turns out that in such cases, the English sentences seem to allow a constituent negation reading, not possible in the French sentences. We say a few more words in the conclusion on this topic which we cannot develop further in the present paper.

We first study the case of negated event sentences, which are the most controversial cases (negated state sentences are less problematic): we first present Kamp and Reyle’s (1993) proposal (§ 1.2.1), then show how this accounts for the behaviour of negated event sentences with durative complements (§ 1.2.2). We then address the cases where negated event sentences are referred to by anaphoric pronouns, and show that these are instances of facts anaphors (§ 1.2.3). Then we make our proposal for negated stative sentences, namely, that in such sentences a complementary state is available, computed by means of a relative complementation operation (§ 1.3).

1.2 Negated event sentences

The first idea that might come to mind regarding negated event sentences would be to consider that they introduce some sort of negative event. However, this view is quite hard to defend. First, from the ontological point of view, the notion of negative event is as such quite questionable (Asher 1993, p. 214). Second, linguistic data provide many arguments against this view. Among the most conclusive ones is the fact that such negated event sentences do not behave in discourse (in
general) like event sentences. We have no space to elaborate further on this issue here, and refer the reader to (Amsili and Le Draoulec 1995).¹

Very much more widespread is the idea that negated event sentences are somehow stative sentences. Against this view, Kamp and Reyle provide a set of examples which have become "classical", where a negated event sentence obviously should not be seen as stative. We first review this example in the section 1.2.1. However, convincing as these considerations may be, they are not exactly sufficient to account for the whole set of phenomena related to the negation of event sentences, which has lead de Swart and Molendijk’s (1994) to defend a stative interpretation of negated event sentences, along with a more sophisticated system, which accounts for the "classical" example.² For instance, negated event sentences accept durative complements not accepted by their positive counterpart (section 1.2.2). Besides, some negated event sentences seem to introduce a discourse referent accessible to anaphors (section 1.2.3). We will see that it is possible to provide an account for these phenomena without any stative interpretation of these sentences.

1.2.1 Kamp and Reyle’s approach
To establish their proposal, Kamp and Reyle (1993) use the following set of examples.

(1) a. Mary looked at Bill. He smiled.
   b. Mary looked at Bill. He was smiling.
   c. Mary looked at Bill. He didn’t smile.
   d. Mary looked at Bill. He wasn’t smiling.

The pair of discourses (1a, 1b) exemplify the contrast between simple past and progressive past in narrative discourse. In the second sentence of (1a), the simple past introduces a new event, which is localised after the so-called reference point, which corresponds to the event introduced in the previous sentence.³ On the contrary, the progressive past has a stative import: the second sentence of (1b) introduces a state instead of an event, and this state overlaps with the event of the previous sentence, instead of following it. This analysis gives the correct prediction for the

¹This is not to say that there are no "negative events" in natural language ontology. Words like fail, refuse... surely denote negative events. Our claim is that, in French, sentential negation (with ne... pas) can almost never be used to denote such an event. This is probably an important difference with English.

²We can here only allude to de Swart & Molendijk’s (1994) proposal, which raises very interesting issues and gives interesting solutions. In particular, they offer a system of aspectual transformations, depending on aspectual and tensing operators, that sheds some light on the different phenomena observed in French and English.

³Of course this depends crucially on the discourse relation the two sentences stand in. Here, we have a classical continuation relation.
contrast: in (1a), Bill’s smiling is interpreted as a reaction to Mary’s looking at Bill, thus following it, whereas in (1b), Bill was already smiling when Mary looked at him.

The contrast in (1c-1d) is clearly parallel to that in (1a-1b). Since the second sentence of (1d) (*He wasn’t smiling*) can reasonably be thought of as introducing a state, introducing also a state for the second (negative) sentence of (1c) would lead us to lose the contrast, since this would imply for both sentences that Bill was not smiling when Mary looked at him.

Thus, to get the correct interpretation of negated sentences, one should refrain from seeing negation as a sort of aspectual operator. Instead, one should allow a representation along the lines of the following, given by Kamp and Reyle (1993, p. 548). Roughly, the interpretation of a negated sentence induces the following steps in the construction of a DRS:

- introduction of a location time \( t \);
- introduction of a condition relating \( t \) with the temporal perspective point \( TP^t \) (\( t \) can be before, equal to, or after \( TP^t \));\(^4\)
- introduction of a condition saying that there is no event or state of a certain type which stands in the relation ‘\( \subseteq \)’ or ‘\( \bigcirc \)’ to \( t \).\(^5\)

As an example, the discourse (1c) will receive the following representation:

\[
\begin{array}{|c|}
\hline
\text{sentence} \ t' \\
\hline
\text{Mary}(x) \\
\text{Bill}(y) \\
\text{t} < n \\
e \subseteq t \\
x \text{ look at } y \\
u = y \\
t' < n \\
\hline
\end{array}
\]

\[
\begin{array}{|c|}
\hline
\text{e} \subseteq \text{e}' \\
e < \text{e}' \\
e' : y \text{ smile} \\
\hline
\end{array}
\]

\(^4\)In Kamp and Reyle’s statement, \( t \) is to be related to the speech time \( n \). Since the Temporal Perspective point was not introduced yet in the book, we assume \( TP^t \) is an appropriate generalisation here (\( TP^t \) is very often equal to \( n \)).

\(^5\)For positive sentences, a location time \( t \) is also introduced, as well as a condition relating the event or the state with \( t \): events are considered as included in the location time \( (e \subseteq t) \); states are considered as overlapping with the location time \( (s \bigcirc t) \) (Kamp and Reyle 1993, pp. 664–679).
This representation, which states that there was no event of u smiling located after Mary’s looking at Bill, is faithful to the intuitions we’ve just given. We have now to have a look at these data which do not seem to fit in this picture.

1.2.2 Durative complements

In the following contrasts, it appears that event sentences, which do not accept for complements under their positive form (3a, 3c), clearly accept, when they are negated, such durative complements (3b, 3d).

(3) a. * Jane swam a mile for two days.
    b. Jane did not swim a mile for two days.
    c. * Someone died in the hospital for over two hours.
    d. No one died in the hospital for over two hours.\(^7\)

Since the ability of predicates to combine with for adverbials is a well-known criterion of their durativity, these tests may lead to the conclusion that negation transforms an event inside its scope into a state outside its scope. However, we do not think it is the case, since the alleged state should then be accessible for an anaphora, which is not the case, as the examples of the next subsection will show.

French data provide an interesting set of examples with respect to this durativity problem. There exists a durative temporal complement of the form de le N\textsubscript{time} which can only occur in negative sentences, and is usually preferred, as a paraphrastic alternative to pendant (for) complements (Dessaux-Berthonneau 1977).\(^8\)

(4) a. Lucas n’a pas travaillé pendant l’année.
    \(\sim\) Lucas n’a pas travaillé de l’année.
    \textit{Lucas didn’t work for the (whole) year}
    b. Camille n’est allée mille part pendant la journée.
    \(\sim\) Camille n’est allée mille part de la journée.
    \textit{Camille didn’t go anywhere for the (whole) day}

It is worth noting that \textit{de} (of) in French does not bear any durative import. Rather, a sentence like (4a) seems to suggest that no working event belongs to the set considered. We cannot go into more details about these data here, and we refer the reader to the study (Dessaux-Berthonneau 1977). However, we take these data as a further

\(^6\)Of course, there can be an event of Bill’s smiling at another moment, that’s why it is important.
\(^7\)Examples borrowed from (de Swart and Molendijk 1994), (Asher 1993, p. 217).
\(^8\)We use the symbol ‘\(\sim\)’ to mark a preferred paraphrase (more natural and/or frequent).
argument in favour of a non-equivalence between stative sentences and negated event sentences.

As we said earlier, we’ll see later that we don’t see such examples as durative. We still have to propose a representation for them. We are in a case where the temporal discourse referent t introduced by Kamp and Reyle plays an fundamental role.

With this introduction of a temporal discourse referent t, examples such as (3d) can be well taken into account, as (Asher 1993, p. 218) shows. On the one hand, the event discourse referent associated with died is under the scope of negation, and as such, is not available outside this negation. Roughly speaking, it need not have anything to do with the durative property introduced by the adverbial for over two hours. On the other hand, introducing a temporal discourse referent allows it to escape the scope of negation. Since the durative property needs to be supported, one is entitled to think that it is precisely supported by this temporal discourse referent. So for over two hours is a time predicate, and not an eventuality predicate.

Thus, we can propose the following representation for the sentence (3d):

\[
\begin{array}{c|c|c}
\hline
\text{t} & n & t < n \\
\text{for\_over\_two\_hours}(t) & \hline
\{\text{some}\} & \{\text{one}\} & \{x\} \\
\text{e} & \leq t & \text{in\_the\_hospital}\{e\} \\
\hline
\text{e} & \text{died} & \\
\end{array}
\]

In the same way as an adverbial may be in charge of locating a temporal interval, it may be in charge of locating a point of time. Consider examples such as:

(6) A 10 heures, le train n’arriva pas.\(^9\)

*At ten, the train did not arrive*

In this case again, if we introduce a temporal referent, it may support the (non-durative) temporal predicate à 10 heures (at ten).

A range of linguistic data comes in favour of the hypothesis that only the temporal discourse referent is accessible outside the scope of negation. These data are provided by the effect of negation in tempo-

\(^9\)It seems that the English translation is marked, whereas the French sentence is quite neutral: it can suggest that the train arrived later, or that something else happened at 10, or just that the expected arrival did not occur.
ral subordinate clauses. Unlike temporal adverbials, temporal clauses give a temporal frame only indirectly: one first has to locate temporally the event of the subordinate clause, in order to locate the event of the main clause (Chérit 1976), (Heinämaa 1974), (Hamann 1989), (de Swart 1991, p. 189). Sentences (7a) and (7c) exemplify this general behaviour, whereas in (7b) and (7d), negation does not allow any temporal localisation.

(7)  a. Après qu’il lui a répondu, elle est partie.
    After he replied to her, she left
  b. *Après qu’il ne lui a pas répondu, elle est partie.
    After he didn’t reply to her, she left
  c. Quand il a perdu ses clés, il a appelé un taxi.
    When he lost his keys, he called a taxi
  d. *Quand il n’a pas perdu ses clés, il a appelé un taxi.
    When he didn’t lose his keys, he called a taxi

We can explain the difference of behaviour between (7a), (7c) on the one hand, and (7b), (7d) on the other hand, if we assume that a temporal discourse referent needs an event (or state) discourse referent in order to operate. The effect of negation, in (7b) and (7d), is to make such an event discourse referent inaccessible, and thus to prevent the connective from operating in normal conditions. However, things are perhaps not that simple. As Hamann (1989) notes, it is possible to make temporal clauses admit negation:

(8)  a. After John didn’t arrive on the ten o’clock train either, Eva finally left the station.
  b. After John didn’t come to the party, Eva got really angry.
  c. After John didn’t come on time, Eva phoned him.

Her immediate comment is very interesting: “In all these sentences we are dealing with events that do not take place, but — and this is the important point — they are interpretable because they involve a schedule and so a definite and even contextually specified reference time for the event.” She concludes that when the event is missing, a clear reference time for the temporal clause has at least to be given. It would mean for us that when the event discourse referent is not accessible, an indefinite location time (t) may not be, but a definite reference time may very well be, a sufficient anchor for the connective to work with. In French, for which our intuitions are more reliable, it seems to be an even more crucial point to explicitly give the reference time as such, by means of a temporal adverbial. In (9a), even if à la fête (to the party) refers to a schedule, it does not seem to be explicit enough. With something like à minuit (at midnight), the temporal localisation requirement is satisfied.
(9)  a. Après que John ne fut pas venu à la fête, Eva se mit en colère.  
    *After John didn’t come to the party, Eva got really angry*  
    b. Après que, à minuit, John ne fut (toujours) pas venu à la fête, 
    Eva se mit en colère.  
    *After (that), at midnight, John (still) didn’t come to the party,  
    Eva got really angry*

Moreover, the French sentences are quite improved when the temporal  
adverbial is separated from the rest of the proposition:

(10)  a. Après que John ne fut pas arrivé par le train de 10 heures, Eva  
    quitta la gare.  
    *After John hadn’t arrived by the ten o’clock train, Eva left the  
    station*  
    ∼ Après que, à 10 heures, le train de John ne fut pas arrivé,  
    Eva quitta la gare.  
    *After (that), at ten, John’s train hadn’t arrived, Eva left the  
    station*  
    b. Après que John ne fut pas venu à 10 heures, Eva lui téléphona  
    *After John did not arrive at ten, Eva phoned him*  
    ∼ Après que, à 10 heures, John ne fut pas venu, Eva lui  
    téléphona.  
    *After (that), at ten, John did not arrive, Eva phoned him*

A possible explanation is that the “indirect” locating that we  
associated to temporal clauses is, with the introduction of a negation,  
deeply modified: since it gives place to a more “direct” one, directly  
depending on the temporal indication (necessarily) given in the clause,  
the behaviour of the connective gets closer to that of a preposition. The  
fact that the temporal connective is directly linked to that temporal  
indication has somehow to be emphasised.

1.2.3 Anaphora  
According to (de Swart and Molendijk 1994), the introduction of a state  
discourse referent is necessary to account for the possibility of anaphoric  
reference which is exemplified by (11): in each case, after a negated  
event sentence, a discourse referent is accessible to the pronoun cela (it  
or this).

(11)  a. Jean n’invita pas Marie à danser à la fête. Cela la mit en colère.  
    *John didn’t ask Mary to dance at the party. It made her angry*  
    b. Le train n’arriva pas. Cela m’inquiéta beaucoup. 
    *The train didn’t arrive. It worried me very much*  
    c. Il ne trouva pas la réponse. Cela la déçut.  
    *He didn’t find the answer. This disappointed her*
If, as is postulated in DRT, there must exist discourse referents to bind the pronouns this or it, then one may be tempted to conclude that such discourse referents must be introduced by negative sentences. But there are other examples with achievement verbs (i.e., of the same type as inviter à danser (ask to dance) in (11a)), where anaphoric binding is not possible:

(12) a. * No one died in the hospital. This lasted for several days.
    b. ?* No one laughed. This lasted for a few seconds, however.
       * The candidates didn’t find the answer. This went on for several days
    d. ?* Jean n’invita pas Marie à danser à la fête. Cela dura toute la nuit.
       * John did not ask Mary to dance at the party. It lasted for the whole night

Thus, this possibility of anaphora, with negated event sentences, seems to be possible only in a limited number of cases. It is therefore not possible to invoke a general principle, stating that negated event sentences always provide an accessible discourse referent. Let us have now a more detailed look at the circumstances in which such an anaphora is possible.

It is worth noting that the pronoun cela (it) of the anaphora cannot be replaced with this state; no stative verb (e.g., last, see (12)) can be associated with the anaphora either. This confirms our claim that no stative referent is at stake. If there is anaphora, it cannot be a state anaphora (neither is it an event anaphora: it cannot be replaced with this event either, even if the verb that follows belongs to the class of “event verbs”).

As a matter of fact, it seems that all these examples involve a certain kind of relation between the sentences. More precisely, we think that such anaphoric bindings become possible only when the two sentences stand in a relation of reaction. This relation is quite close to Sandström’s (1993) response relation. She defines it as “the relation between an event e₁ and an action [that is, given our ontology, an event] e₂ which it evokes in a sentient agent”. This definition seems to imply that both sentences, when they stand in a response relation, must introduce an event, which is in contradiction with our claim about negated event sentences. However, she notes herself (1993, p. 81) that the entities at stake in such a relation are not necessarily events. Considering the example (13), she notes that the pronoun that does not refer to an event but to the fact expressed
by the first sentence: it is the fact that Bob moved, not the event of his moving, that surprised everyone.

(13) Bob moved to Canada. That surprised everyone.

Actually, we think that the response relation between two sentences always involves a fact introduced by one sentence, and an event introduced by the other. To summarize, we claim that the anaphora cases are instances of a response relation, and the anaphoric pronoun then refers to a fact introduced by the first sentence.

This hypothesis is confirmed by the following observation about when-sentences. We have seen that temporal clauses usually do not accept event negation. But as Sandström (1993) shows, in when-sentences, the when-clause and the head clause can stand in a response relation. It appears that only such constructions admit event negation when-clauses. For instance, the main clause and the temporal clause can also stand in a relation of enablement (see Sandström 1993), and in such cases, the negation of the sentence is not possible:

(14) a. When he had posted the letter, he went away.
   b. *When he hadn’t posted the letter, he went away.

Incidentally, we can note that propositional attitude verbs (in the main clause) are much favoured in these constructions. For instance:

(15) When John did not ask Mary to dance at the party, she got angry.

The temporal dimension fades in favour of a subjective relation. This is possible with when (especially in English, not very easily in French), but much less easily with connectives such as after or before, whose first role remains a temporal ordering of events.

This proposal (introduction of a fact) is very close to the solution to the problem of negated events Asher (1993) develops about nominals. He shows that any negated event sentence makes a fact available, which potentially serves for anaphoric reference. We suggest that this principle can be generalised: any sentence, whether negated or not, makes such a potential fact available.

Thus, negation does not introduce by itself a discourse referent. Even in the cases we have considered in this section, the available discourse referent comes from an other general principle.

We give here as an example a possible representation of the sentence (11c). As it is often the case when abstract objects are involved, this leads to a quite heavy notation (see Asher 1993, p. 179), but it should be understandable in this simple case.
1.2.4 Temporal clauses

If negated event sentences were to be considered as stative sentences, their behaviour in temporal clauses would be the same as that of actual stative sentences. Whereas negated stative sentences basically do so (17a), this is not the case for negated event sentences (17b, c).

(17) a. Pendant que Marie n’était pas là, Jean a nettoyé la maison
   While Mary wasn’t at home, John cleaned up the house
b. *? Pendant que Marie ne mangeait pas le gateau, Jean a fait la vaisselle.
   While Mary didn’t eat the cake, John washed the dishes
c. * Pendant que Jean n’a pas invité Marie à danser, les autres se sont bien amusés.
   While Jean didn’t ask Mary to dance, the others had much fun

The temporal connective pendant (while) needs a stative predicate, which negated events here obviously fail to provide.

1.3 Negated stative sentences

There is much less debate about negated stative sentences, which are usually seen as stative. Thus, in the following discourses, the negated stative sentence seems to stand in the same relation with the other sentence of the discourse, as would its positive counterpart (as far as temporal/discourse relations are concerned).

(18) a. On n’entendait pas de bruit. Jean entra avec précaution.
   One couldn’t hear a noise. Jean came in cautiously
b. Personne ne connaissait la réponse. Jean se mit au travail.
   Nobody knew the answer. Jean set to work
c. Jean et Marie entrèrent. Ils ne parlaient pas.
   *Jean and Mary came in. They were not talking*

d. Paul se sentit satisfait. Il n’était pas amoureux.
   *Paul felt satisfied. He wasn’t in love*

Besides, negated stative sentences are generally considered to have the same distribution as their positive counterparts, in temporal clauses (Asher 1993, p. 53).

(19) a. While Mary wasn’t at home, John washed the dishes.
   *When he wasn’t living with us, everything was simpler*

   However, the identity of distribution is not that general. For the following examples, at least in French, the negative sentence is clearly not acceptable, whereas the corresponding positive one is very natural.\(^\text{10}\)

(20) a. Les gens ont bavardé jusqu’à ce que le soliste soit sur scène.
   *People have chatted until the soloist was on stage*

   b. * Le public est resté silencieux jusqu’à ce que le soliste ne soit pas sur scène.
   *The audience stayed silent until the soloist wasn’t on stage*

   c. Depuis qu’il l’aime, on ne le voit plus.
   *Since he is in love with her, we don’t see him any more*

   d. * Depuis qu’il ne l’aime pas, on le voit tous les jours.
   *Since he is not in love with her, we see him everyday*

   e. La maison est propre depuis que Jean est là.
   *The house is clean since Jean is here*

   f. * La maison est propre depuis que Jean n’est pas là.
   *The house is clean since Jean is not here*

   These data show that even if the stative character of negated stative sentence is often attested, it is not entirely systematic. This prevents from considering that negated stative sentences introduce a state discourse referent, proposal that would also be ontologically not very satisfying. Thus, our proposal is to consider that negation also has a wide scope over states, as is advocated by (Kamp and Reyle 1993, Asher 1993). According to this view, negation basically states of a state that is does not occur (just like it does with events).

   Thus, as an example, the discourse (18c) would be represented by the following DRS.

   \(^{10}\) Although we have no space to elaborate on this in this paper, we want to note that a crucial property of these examples is that they become perfectly acceptable when the negation ne... pas is replaced with the prepositional form ne... plus (no/any more). Cf (Amsili 1994). This provides a clue to explain this unacceptable: it could rely on presuppositional/pragmatic properties.
(21)

<table>
<thead>
<tr>
<th>j m n t e Z Y t'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jean(j)</td>
</tr>
<tr>
<td>Marie(m)</td>
</tr>
<tr>
<td>Z = j ⊕ m</td>
</tr>
<tr>
<td>t &lt; n</td>
</tr>
<tr>
<td>e ∈ t</td>
</tr>
<tr>
<td>e: Z estre</td>
</tr>
<tr>
<td>Y = z</td>
</tr>
<tr>
<td>t' &lt; n</td>
</tr>
<tr>
<td>¬ (s ⊕ t')</td>
</tr>
<tr>
<td>s: Y parle</td>
</tr>
</tbody>
</table>

But this does not account for the stative behaviour of some negated stative sentences, such as the examples (18, 19). Besides, in some cases, a state discourse referent seems to be available, like in (22).

(22) John didn’t know, the answer to the problem. This lasted until the teacher gave the solution.

In those cases, we argue, as (Asher 1993, p. 53) does, that a state is indeed available, but this state is somehow computed, thanks to one of the properties of the states domain. As a matter of fact, states are closed under relative complementation. More precisely, states are not closed under complementation like propositions are, in the sense that if \( \psi \) is a proposition, then \( \neg \psi \) is also a proposition, but they are closed under (argument) relative complementation, which can be stated this way: let \( x \) range over states, and suppose \( \varphi \) is a state of objects of type \( O \); let the notation \( \varphi(s, u) \) mean that \( s \) is the instance of the (abstract) state \( \varphi \) for some object \( u \). Then (Asher 1993, p. 53):

\[(S1') \forall u \in O \ (\neg \exists x \varphi(x, u) \rightarrow \exists s \neg \varphi(s, u))\]

In words, this principle says that, whenever an object (actor) \( u \) of a possible state \( \varphi \) exists, but \( \varphi \) fails to happen, then \( u \) is in the state \( \neg \varphi \).

Thus, negation does not in itself introduce a negative state; rather, the ontological properties of states themselves allow the accessibility of a complementary state when necessary. Of course, this principle does not explain why this complementary state seems to be unaccessible in some cases (20). We won’t try to address this question here, although we suggest that the answer belongs more to the pragmatic field than to the semantic one (see note 10); our purpose was to show that it is not necessary to change the compositional semantics of negation (e.g., to make it an aspectual operator) to account for the set of phenomena involving negation and states.
The application of the principle advocated here will lead to the following alternative representations for the sentence (23).

(23) Marie ne parlait pas. Jean entra silencieusement.  

Mary was not talking. John silently came in

\[
\begin{array}{c|c|c}
\text{t} & \text{t} & \text{t}
\end{array}
\]\n
\[
\begin{array}{c|c|c}
\text{m} & \text{n} & \text{t}
\end{array}
\]\n
\[
\begin{array}{c|c|c}
\text{e} & \text{e} & \text{e}
\end{array}
\]\n
\[
\begin{array}{c|c|c}
\text{ silenced (e)} & \text{ silenced (e)} & \text{ silenced (e)}
\end{array}
\]

1.4 Conclusion

We make in this paper a general proposal to account for the problem of the representation of negative sentences, based on a study of sentential negation in French. This proposal is structured into two parts. First, we defend Kamp & Reyle’s (1993) representation of negation. This representation is itself composed of two principles: (1) negation is an operator taking inside its scope eventuality discourse referents, (2) a temporal localisation discourse referent (t) is introduced in DRSes. In support of this, we comment upon classical examples found in the literature, and provide also new data, mainly from temporal clauses. We also provide an account of other data relating to the time/negation problem, which have been used to suggest that negation introduces a specific discourse referent. This account generalises ideas from (Asher 1993) and (Kamp and Reyle 1993), and shows that such a specific discourse referent is never necessary.

We have left apart in this work several interesting issues. In particular, since we have focused only on sentential negation, we haven’t studied what happens with semantically negative predicates (fail, forget...). Of course, these introduce “negative events”, but these events are handled like positive ones at the language level. This is probably also the case with constituent negation in English, especially in the examples where the English form is acceptable and not the French one.
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