

Anaphoric temporal locators and discourse structure

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0 Abstract

Several authors (cf., e.g., Asher 1993) have used discourse structure to constrain anaphora resolution, that is, to prevent cases where the anaphor is not identified with the right antecedent. Others — cf. Alves & Txurruka (1999, 2001); Bras et al. (2001a,b); Alves (2003) — have studied the interaction between temporal adverbials and discourse structure, showing that not only does discourse structure have impact on temporal relations (cf., e.g., Lascarides & Asher 1993 and Kamp & Reyle 1993) but also that temporal explicit adverbials might have impact on discourse structure. This paper is about adverbial temporal anaphora and discourse structure. In particular, I shall focus on ambiguity involving a group of anaphoric temporal locators (henceforth, ATLs) that I will call anaphoric temporal locators without predicative content. These locators underspecify their antecedents. Because of this, some of these ATLs can relate both to antecedents provided by time-denoting expressions and to antecedents representing the running time of an eventuality, giving rise to ambiguity cases in sequences where both kinds of antecedents are available. In most cases, however, ambiguity does not arise, due, that is my claim, to constraints related to world-knowledge and discourse structure, which leads to disambiguation. A proposal to account for anaphora involving these locators is made within Segmented Discourse Representation Theory (henceforth, SDRT) (cf., e.g., Asher 1993). I will concentrate on anaphoric temporal locators both in English and in Portuguese.

1 ATLs and under-specified ATLs

Anaphoric temporal locators are expressions as those in bold type in the following examples:

- (1) O João nasceu em 1980. A Maria nasceu **no mesmo ano**.
John was born in 1980. Mary was born **the same year**.
- (2) O João deu uma festa no passado fim-de-semana. Conheceu **então** a Maria.
John gave a party last weekend. He met Mary **then**.
- (3) A Maria chegou a Lisboa no dia 12 de Maio. O João chegou no **dia anterior**.
Mary arrived in Lisbon on May 12th. John arrived **the previous day**.

These expressions temporally locate the eventuality described by the sentence in which they occur, and they are anaphoric because the definition of the time interval they represent depends on the linguistic context that precedes them.

- (4) *????* A Maria nasceu **no mesmo ano**.
???? Mary was born **the same year**.
- (5) *????* O João conheceu **então** a Maria.
???? He met Mary **then**.
- (6) *????* O João chegou **no dia anterior**.
???? John arrived **the previous day**.

In Discourse Representation Theory (henceforth, DRT) terms (cf. Kamp & Reyle 1993), they introduce in the respective Discourse Representation Structure (henceforth, DRS) the following elements: (i) a new discourse referent t ; (ii) an identity condition of the type $[t = ?]$; (iii) depending on the type of locator, predicative conditions such as $[\text{year}(t)]$ or $[\text{day}(t)]$; (iv) other conditions, depending on the existence of relational expressions such as, for instance, *mesmo* ‘same’ and *seguinte* ‘following’. Antecedents of anaphoric temporal locators are discourse referents of type t already present in the DRS under construction. They are introduced in the DRS directly by time-denoting expressions — cf. the expressions underlined in (7–9) — indirectly, via, for instance, several types of functions that account for the possibility of inferring time from eventuality descriptions, like in (10–13).

- (7) O João visitou Paris em 1980. A Maria visitou Londres **nesse ano**.
John visited Paris in 1980. Mary visited London **that year**.
- (8) O João teve um acidente de viação na passada segunda-feira. Chegou tarde à escola **nesse dia**.
John had a car accident last Monday. He arrived late to school **that day**.
- (9) A Maria licenciou-se em Junho de 1987. O João licenciou-se **no mesmo mês**.
Mary graduated in June 1987. John graduated **the same month**.
- (10) A Maria foi a Paris. Ficou **então** no Hilton.
Mary went to Paris. She stayed at the Hilton **then**.
- (11) A noite passada o João fez o jantar. **Entretanto** a Maria leu o jornal.
Last evening John cooked dinner. **Meanwhile** Mary read the newspaper.
- (12) A Maria escreveu uma carta ao João. Ele respondeu-lhe **na mesma semana**.
Mary wrote John a letter. He answered her **the same week**.
- (13) A escola só contratará um novo professor em 2008. **Enquanto isso**, a Maria dá as aulas à turma A.
The school will only hire a new teacher in 2008. **In the meantime** Mary will be teaching group A.

(7–9) are cases of anaphora with explicit antecedents whereas (10–13) are cases of anaphora with inferred antecedents: in (10–11), function **loc**, which assigns to an eventuality the interval of time it occupies (cf. Kamp & Reyle 1993: 608), introduces in the DRS the necessary anaphoric antecedents of *então* ‘then’ and *entretanto* ‘meanwhile’. In (12) the anaphoric antecedent is introduced by function **s-loc** (cf. Alves 2003). This function assigns to an eventuality the week in which it occurred. In (13) *enquanto isso* ‘in the meantime’ refers back to a time interval whose left boundary is the TP_{pt} (here the speech time) and whose right boundary is defined by the eventuality described in the first clause. Our mentioning of a situation that will occur in a future time allows us to infer a time interval stretching from the current time to the beginning of that future situation.

In what concerns the question under study here, a relevant distinction is that between locators with predicative content such as *nesse mês* ‘that month’, *no mesmo ano* ‘the same year’, *no dia antes* ‘the day before’ and locators without predicative content like, for instance, *então* ‘then’, *depois disso* ‘after that’, *na altura* ‘at the time’, *três semanas depois disso* ‘three weeks after that’, *depois* ‘afterwards’. The former introduce DRS

conditions like those mentioned in (iii) above, whereas the latter do not. The former constrain the expression providing their antecedents to describe a certain calendar unit (day, month, year, etc.), whereas the latter somehow underspecify their antecedents. Because of this, some locators without predicative content might pick up both discourse referents introduced by time-denoting expressions and discourse referents introduced via the above mentioned loc function.

2 Underspecified ATLS, ambiguity and the role of discourse interpretation

Lascarides & Asher (1993) and Asher & Lascarides (2003) have provided a formal framework to account for the effects of discourse structure on temporal interpretation. These authors have mainly focused on discourse sequences without explicit temporal adverbials, showing that, in the absence of such expressions, we assign a correct temporal interpretation to discourse. Alves (2003); Alves & Txurruka (1999, 2001); Bras et al. (2001a,b) concentrated on the effects produced on discourse structure by the presence of an explicit temporal adverbial. In this paper, however, I will concentrate on the constraints imposed by discourse structure and by temporal relations between eventualities on the interpretation of ATLS.

Consider the following examples:

- (14) [A Maria chegou a casa]_i [cerca da meia-noite]_i. O João chegou [depois disso]_i.
 [Mary arrived home]_i [around midnight]_i. John arrived [after that]_i.
- (15) [O João visitou Paris]_i em [1980]_i. A Maria visitou [então]_i Londres.
 [John visited Paris]_i in [1980]_i. Mary visited London [then]_i.
- (16) [O João deixou Lisboa]_i [no dia 12 de Maio]_i. Chegou a Paris [dois dias depois]_i.
 [John left Lisbon]_i on [May 12th]_i. He arrived in Paris [two days later]_i.

These examples are ambiguous in what regards the anaphoric antecedent of the temporal locators. In (14), *after that* might refer back to the discourse referent introduced by *cerca da meia-noite* ‘around midnight’ or to the discourse referent supplied (via function **loc**) by the eventuality of Mary’s arriving home. Similarly, in (15) *então* ‘then’ might refer back to the discourse referent introduced by *1980* or to the discourse referent representing the running time of the eventuality described in the first sentence. In other words, what (15) communicates is that Mary visited London while John visited Paris or else that Mary visited London in the same year that John visited Paris. As for (16), *dois dias depois* ‘two days later’ might relate to John’s departure or to May 12th. For the sake of illustration, see below the DRSs corresponding to the two possible interpretations of (15), where the conditions regarding the anaphor and the anaphoric antecedent are underlined:

DRS's of (15)

<p>a.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">$n \ x \ y \ t_c \ t \ e \ t' \ w \ z \ t^a \ t_c^a \ e_1$</td> </tr> <tr> <td style="padding: 5px;"> John(x) Paris(y) 1980(t_c) <hr style="width: 100%;"/> $t = t_c$ $e \subseteq t$ $e < n$ $e : \boxed{x \text{ visit } y}$ $\mathbf{loc}(e) = t'$ Mary(w) London(z) $t^a = t_c^a$ $e_1 \subseteq t^a$ $e_1 < n$ $e_1 : \boxed{w \text{ visit } z}$ <hr style="width: 100%;"/> $t_c^a = t_c$ </td> </tr> </table>	$n \ x \ y \ t_c \ t \ e \ t' \ w \ z \ t^a \ t_c^a \ e_1$	John(x) Paris(y) 1980(t_c) <hr style="width: 100%;"/> $t = t_c$ $e \subseteq t$ $e < n$ $e : \boxed{x \text{ visit } y}$ $\mathbf{loc}(e) = t'$ Mary(w) London(z) $t^a = t_c^a$ $e_1 \subseteq t^a$ $e_1 < n$ $e_1 : \boxed{w \text{ visit } z}$ <hr style="width: 100%;"/> $t_c^a = t_c$	<p>b.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">$n \ x \ y \ t_c \ t \ e \ t' \ w \ z \ t^a \ t_c^a \ e_1$</td> </tr> <tr> <td style="padding: 5px;"> John(x) Paris(y) 1980(t_c) <hr style="width: 100%;"/> $t = t_c$ $e \subseteq t$ $e < n$ $e : \boxed{x \text{ visit } y}$ $\mathbf{loc}(e) = t'$ <hr style="width: 100%;"/> Mary(w) London(z) $t^a = t_c^a$ $e_1 \subseteq t^a$ $e_1 < n$ $e_1 : \boxed{w \text{ visit } z}$ <hr style="width: 100%;"/> $t_c^a = t'$ </td> </tr> </table>	$n \ x \ y \ t_c \ t \ e \ t' \ w \ z \ t^a \ t_c^a \ e_1$	John(x) Paris(y) 1980(t_c) <hr style="width: 100%;"/> $t = t_c$ $e \subseteq t$ $e < n$ $e : \boxed{x \text{ visit } y}$ $\mathbf{loc}(e) = t'$ <hr style="width: 100%;"/> Mary(w) London(z) $t^a = t_c^a$ $e_1 \subseteq t^a$ $e_1 < n$ $e_1 : \boxed{w \text{ visit } z}$ <hr style="width: 100%;"/> $t_c^a = t'$
$n \ x \ y \ t_c \ t \ e \ t' \ w \ z \ t^a \ t_c^a \ e_1$					
John(x) Paris(y) 1980(t_c) <hr style="width: 100%;"/> $t = t_c$ $e \subseteq t$ $e < n$ $e : \boxed{x \text{ visit } y}$ $\mathbf{loc}(e) = t'$ Mary(w) London(z) $t^a = t_c^a$ $e_1 \subseteq t^a$ $e_1 < n$ $e_1 : \boxed{w \text{ visit } z}$ <hr style="width: 100%;"/> $t_c^a = t_c$					
$n \ x \ y \ t_c \ t \ e \ t' \ w \ z \ t^a \ t_c^a \ e_1$					
John(x) Paris(y) 1980(t_c) <hr style="width: 100%;"/> $t = t_c$ $e \subseteq t$ $e < n$ $e : \boxed{x \text{ visit } y}$ $\mathbf{loc}(e) = t'$ <hr style="width: 100%;"/> Mary(w) London(z) $t^a = t_c^a$ $e_1 \subseteq t^a$ $e_1 < n$ $e_1 : \boxed{w \text{ visit } z}$ <hr style="width: 100%;"/> $t_c^a = t'$					

Even though some locators without predicative content might pick up different types of antecedents, in most cases ambiguity does not arise. Consider the following examples, involving the discourse relations (henceforth, DRs) of Elaboration and Background (cf. Lascarides & Asher 1993 and Asher & Lascarides 2003 for a definition of these DRs):

- (17) [O João visitou Paris]_{*i*} em 1980. Viu [então]_{*i*} a Mona Lisa.
 [John visited Paris]_{*i*} in 1980. He saw the Mona Lisa [then]_{*i*}.
- (18) [O João visitou Paris]_{*i*} em 1980. Tinha vinte anos [na altura]_{*i*}.
 [John visited Paris]_{*i*} in 1980. He was 20 years old [at the time]_{*i*}.

In these sequences, the anaphoric locators — *então* ‘then’ and *na altura* ‘at the time’ — refer back to the time interval corresponding to the running time of the eventuality described in the first sentence of each sequence. The other readings — according to which they would refer back to the time interval denoted by 1980 — are not available because they are incompatible with the discourse relations that hold between the two segments in each sequence — Elaboration in (17), Background in (18). These discourse relations have impact on the temporal relations holding between the two relevant eventualities: in the first case, the second eventuality is temporally included in the first; in the second case, the second eventuality includes the first. Lascarides and Asher formulate the temporal axioms associated with these DRs as follows:

Temporal axiom: $\Box(\text{Background}(\alpha, \beta) \rightarrow \text{overlap}(\text{me}(\alpha), \text{me}(\beta)))$

Temporal axiom: $\Box(\text{Elaboration}(\alpha, \beta) \rightarrow \neg[\text{me}(\alpha) < \text{me}(\beta)])$

Accordingly, — that is my claim — it is the inference of the above-mentioned DRs and of the associated temporal information that constrains anaphoric locators to be interpreted as relating to the running time of the eventualities and not to 1980. For the sake of the illustration, see the representations of (17) and (18):

DRS's of (17) and (18)

17:

$n \ x \ y \ t_c \ t \ e \ t' \ w \ z \ t^a \ t_c^a \ e_1$
John(x) Paris(y) 1980(t_c) $t = t_c$ $e \subseteq t$ $e < n$ $e : \boxed{x \text{ visit } y}$ $\mathbf{loc}(e) = t'$ $w = x$ Mona Lisa(z) $t^a = t_c^a$ $e_1 \subseteq t^a$ $e_1 < n$ $e_1 : \boxed{w \text{ see } z}$ <u>$t_c^a = t'$</u>

18:

$n \ x \ y \ t_c \ t \ s \ t' \ w \ t^a \ t_c^a \ e_1$
John(x) Paris(y) 1980(t_c) $t = t_c$ $e \subseteq t$ $e < n$ $e : \boxed{x \text{ visit } y}$ $\mathbf{loc}(e) = t'$ $w = x$ $t^a = t_c^a$ $s \circ t^a$ $s < n$ $s : \boxed{w \text{ be 20 years old}}$ <u>$t_c^a = t'$</u>

Let us consider now two sequences involving the DR of Result (cf. Lascarides & Asher 1993 and Asher & Lascarides 2003), which according to Lascarides & Asher (1993) has the following temporal axiom:

Temporal axiom: $\Box(\text{Result}(\alpha, \beta) \rightarrow \text{me}(\alpha) < \text{me}(\beta))$.

- (19) [A Ana teve um acidente de automóvel]_{*i*} [em 1980]_{*i*}. Deixou de guiar [depois disso]_{*i*}.
[Ana had a car accident]_{*i*} in [1980]_{*i*}. She quit driving [after that]_{*i*}.
- (20) [O João assaltou um banco]_{*i*} em [1980]_{*i*}. Foi preso [depois disso]_{*i*}.
[John robbed a bank]_{*i*} in [1980]_{*i*}. He was arrested [after that]_{*i*}.

These two sequences can be interpreted in two different ways. Either as conveying that the second eventuality is a result of the first (which corresponds to the DR of Result), or as conveying that the second situation occurred after the first but has no other relation with it (Continuation). In both sequences, in the Result interpretations, *depois disso* ‘after that’ represents a time interval whose left boundary is defined by the eventuality described in the first clause (and not by 1980) and whose right boundary is given by the *TPpt* (here the speech time).

Consider next an example involving Narration (cf. (21)), and a case that I will dub a narrative flashback (cf. (22)):

- (21) [A Ana foi ao banco]_{*i*} [ontem de manhã]_{*i*}. Foi ao supermercado [depois]_{*i*}.
[Ana went to the bank]_{*i*} [yesterday morning]_{*i*}. She went to the supermarket [afterwards]_{*i*}.
- (22) [A Ana foi para a cama]_{*i*} [cerca das 11 horas]_{*i*}. Escovou o cabelo [antes (disso)]_{*i*}.
[Ana went to bed]_{*i*} at [around 11pm]_{*i*}. She brushed her hair [beforehand]_{*i*}.

The constraints imposed on the ATL interpretation by the inference of Narration can be informally described as follows: if the two discourse segments in each sequence are

linked by Narration and Narrative Flashback, then *depois* ‘afterwards’ and *antes (disso)* ‘beforehand’ relates to the running time of the main eventuality in the first segment (and not to *ontem de manhã* ‘yesterday morning’ or to *cerca das 11 horas* ‘around 11 o’clock’).

Let us consider now examples involving other types of discourse relations, namely Contrast (signalled here by ‘but’), denial of expectation (marked here by ‘but’), and Parallel (marked by ‘also’). For a definition of Parallel and Contrast, see Asher (1993) and Asher & Lascarides (2003); for a distinction between Contrast and Denial of Expectation see, for instance, Blakemore (1989). See the following examples:

- (23) [A Maria chegou a casa]*_i [por volta da meia-noite]_i, mas o João chegou depois disso.
 [Mary arrived home]*_i [around midnight]_i, but John arrived after that.
- (24) [O João visitou Paris]*_i em [1980]_i, mas a Maria foi então a Londres.
 [John visited Paris]*_i in [1980]_i, but Mary visited London then.

Both sequences can be interpreted as cases of Contrast. In the first case, the speaker conveys a contrast between the time at which Mary arrived home and the time at which John arrived home. In the second case, the contrast holds between the capitals visited by John and Mary in 1980. In these cases, and in what regards the interpretation of *depois disso* ‘after that’ and *então* ‘then’, the only possible interpretations seem to be those where the anaphoric locators refer back to around midnight and 1980, respectively. It is the inference of Contrast that blocks the reading according to which the anaphors relate to the running times of the previously described eventualities.

Imagine now that we know that Mary always travels together with John, that they have always travelled together, and also that they always arrive home together. If this were the case, we would expect them to have travelled together to Paris and we would expect them to have arrived home at the same time. If we re-read the sequences above now, we have now problem in relating then to the running time of the previously described eventuality. In other words, both anaphoric links are possible, although world-knowledge might in some cases favour one of them and exclude the other. See, for instance, the following examples, where the only acceptable anaphoric antecedent is identified:

- (25) [O João visitou Paris]_i em 1980, mas não viu [então]_i a Mona Lisa.
 [John visited Paris]_i in 1980, but he did not see the Mona Lisa [then]_i.
- (26) [A Maria foi a Londres]_i em 2000, mas o João não a acompanhou [então]_i.
 [Mary went to London]_i in 2000, but John did not accompany her [then]_i.

In the Parallel cases, the only available readings seem to be those in which the occurrences of then refer to 1980 and to 2000.

- (27) O João visitou Paris em [1980]_i. A Maria também visitou Paris [então]_i.
 John visited Paris in [1980]_i. Mary also visited Paris [then]_i.
- (28) # A Maria visitou Londres em [2000]_i. Também visitou o British Museum [então]_i.
 Mary visited London in [2000]_i. She also visited the British Museum [then]_i.

The sequence given in (28) sounds particularly odd. There seems to be a conflict between our world knowledge, which tells us that going to the British Museum is part of a typical visit to London, and the presence of *também* ‘also’, indicating that the second eventuality cannot be interpreted as being part of the first. The explicit marker *também* ‘also’ blocks the Elaboration reading and the resulting discourse is hard to interpret, unless we introduce new linguistic material in the context as in (29a–29b) below:

- (29) a. Mary visited London in 1999.
 b. She visited the British Museum.
 c. She visited London (again) in 2000.
 d. She also visited the British Museum.

However, here, what licenses ‘also’ is not sentence (29c). but sentence (29b). Regarding Parallel and Contrast, what seems to be the case is that these discourse relations appear to be incompatible with temporal inclusion of eventualities, this being the reason why one of the two available antecedents is excluded.

To illustrate the representation in SDRT of the sequences presented above, let us consider again the discourse sequence in (21). Let us consider that the representations of its two segments are, respectively, π_1 and π_2 . In case we have Narration (π_1, π_2), the representation is as follows:

π_1	$n \ x \ y \ t_c \ t \ e \ t'$ <hr/> Ana(x) the bank(y) yesterday morning(t_c) $t = t_c$ $e \subseteq t$ $e < n$ $e : \boxed{x \text{ go to } y}$ $\text{loc}(e) = t'$	π_2	$n \ z \ w \ t_1^a \ t_{1c}^a \ t_{cc}^a \ e_1$ <hr/> $z = x$ supermarket(w) $t_1^a = t_{1c}^a$ $e_1 \subseteq t_1^a$ $e_1 < n$ $e_1 : \boxed{z \text{ go to } w}$ $t_{cc}^a \supseteq t_{1c}^a$ $t_{cc}^a = t'$
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We may, now, conclude the following:

- (i) Narration(π_1, π_2) (Maxim of Manner)
- (ii) $e \supseteq (\text{post}(e) \cap \text{pre}(e_1)) \supseteq e_1$ ((i), Temporal axiom associated with Narration)
- (iii) $e \subseteq t$ (cf. π_1)
- (iv) $e_1 \subseteq t_1^a$ (cf. π_2)
- (v) $t_1^a = t_{1c}^a$ (cf. π_2)
- (vi) $t_{cc}^a \supseteq t_{1c}^a$ (cf. π_2)
- (vii) $t_{cc}^a = t'$ (cf. π_2)

3 Under-specified ATLS and cases of non-ambiguity

The ATLS presented in the examples given before contrast with ATLS occurring in the examples given before. In spite of not having predicative content either, they do not give rise to ambiguity cases. That is the case of the Portuguese adverbials *a seguir* ‘next’, *entretanto* ‘in the meantime’ and *enquanto isso* ‘meanwhile’.

- (30) A Ana foi ao banco ontem de manhã. Foi ao supermercado a seguir.
 Ana went to the bank yesterday morning. Next she went to the supermarket.

- (31) A Ana foi ao cinema ontem à noite. Entretanto o João acabou o artigo.
Ana went to the cinema last evening. In the meantime John finished his paper.
- (32) A Ana deixou Paris em Maio e regressou em Julho. Entretanto roubaram-lhe o carro.
Ana left Paris in May and returned in June. In the meantime, her car was robbed.

In (30) and in (31) the linguistic context provides with more than one possible antecedent: on the one hand, the temporal referents introduced by the explicit adverbials *ontem de manhã* ‘yesterday morning’ and *ontem à noite* ‘yesterday evening’. On the other hand, the temporal referents inferred from the eventuality descriptions *a Ana foi ao banco* ‘Ana went to the bank’ and *a Ana foi ao cinema* ‘Ana went to the cinema’. But here the ATLS *a seguir* ‘next’ and *entretanto* ‘in the meantime’ can only be linked to the eventuality description previously described. The example in (32) is different from those presented before. Here the anaphor refers back to a time interval whose boundaries are provided by the linguistic context: the initial boundary is inferred from the first eventuality description (and not by ‘May’) and the final boundary is inferred from the second eventuality description (and not by ‘July’). What seems to be the case with these locators is that they have a specific discourse function, which can be described as signalling a temporal parallel.

4 Conclusions

As was shown above, some anaphoric temporal locators might relate to more than one antecedent, giving rise to ambiguity cases. Discourse structure helps to disambiguate those cases. The choice of an antecedent is related to the discourse relation that holds between the discourse segment where the anaphor occurs and the segment providing possible antecedents. This is true not only about discourse relations that have been described in the literature as having temporal impact (Background, Elaboration, and Result), but also about others as Parallel and Contrast. To account for such locators and for the anaphoric relation they express, a framework involving the computation of discourse structure, as for instance SDRT, is therefore needed.

REFERENCES

- Alves, Ana Teresa. 2003. Sobre a Localização Temporal Adverbial Anafórica em Português. Ph.D. thesis. Universidade dos Açores, Ponte Delgada.
- Alves, Ana Teresa and Isabel Gómez Txurruka. 1999. Blocking discourse relations: *Same* in anaphoric temporal adverbials. In: Actes de l’Atelier Thématique Théories Sémantiques et Pragmatiques : le Temps, L’espace et le Mouvement, du Léxique, du Discours et au Dialogue, 6ème Conférence Annuelle sur le Traitement Automatique des Langues Naturelles. Corse, 5–16. Laure Vieu and Myriam Bras, orgs.
- Alves, Ana Teresa and Isabel Gómez Txurruka. 2001. The meaning of *same* in anaphoric temporal adverbials. In: M. Bras and L. Vieu (eds.). Semantic and Pragmatic Issues in Discourse and Dialogue: Experimenting with Current Dynamic Theories. Oxford: Elsevier. 147–181.
- Asher, Nicholas. 1993. Reference to Abstract Objects in Discourse. Dordrecht: Kluwer Academic Publishers.
- Asher, Nicholas and Alex Lascarides. 2003. Logics of Conversation. Cambridge: Cambridge University Press.
- Blakemore, Diane. 1989. Denial and contrast: A relevance analysis of *but*. Linguistics and Philosophy 12: 15–37.
- Bras, Myriam, Anne Le Draoulec and Laure Vieu. 2001a. French adverbial *puis*: Between temporal structure and discourse structure. In: M. Bras and L. Vieu (eds.). Semantic and Pragmatic Issues

- in *Discourse and Dialogue: Experimenting with Current Dynamic Theories*. Oxford: Elsevier. 109–145.
- Bras, Myriam, Anne Le Draoulec and Laure Vieu. 2001b. Temporal information and discourse relations in narratives: The role of french connectives *puis* and *un peu plus tard*. In: *Temporal and Spatial Information Processing, 39th Annual Meeting and 10th Conference of the European Chapter of Association for Computational Linguistics*. Toulouse, 49–56.
- Kamp, Hans and Uwe Reyle. 1993. *From Discourse to Logic. Introduction to Modeltheoretic Semantics of Natural Language, Formal Logic and Discourse Representation Theory*. Dordrecht: Kluwer.
- Lascarides, Alex and Nicholas Asher. 1993. Temporal interpretation, discourse relations and common sense entailment. *Linguistics and Philosophy* 16: 437–493.