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A Pragmatic Approach to Tense in Functional Grammar  
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## 0. Introduction

In this paper I will first discuss the way in which tense may be represented in the underlying predications. Then I will examine some of the morphological and semantic properties of the tense system of French and the way in which they may be dealt with in the framework of Functional Grammar, and finally I will propose a treatment of tense in texts which is able to account for the analogy between deictic and anaphoric pronouns and tenses. For this part of the grammar a pragmatic solution will be adopted: the grammar will be provided with a kind of memory in the form of a discourse domain (cf. Kamp, 1981).

### 1. The representation of tense in the framework of FG.

In natural languages we have two kinds of referring expressions. First we have terms, which refer to individuals in some world. Second we have sentences, which refer to states of affairs. These take place in some time-space region. In my view it will lead to a generalization if, in Functional Grammar, we could treat these two kinds of expressions in the same way. For the terms FG has the following schema (Dik, 1978: 16):

- (1) a.  $\omega x_i : \varphi_1(x_i) : \dots : \varphi_n(x_i)$   
 b.  $dx_i : \text{woman}_N(x_i) : \text{old}_A(x_i) : \text{wise}_A(x_i)$
- |          |      |  |  |  |             |
|----------|------|--|--|--|-------------|
| term     | head |  |  |  | restrictors |
| operator |      |  |  |  |             |

The term operator contains pragmatic as well as semantic information which is essential for the interpretation of the term as a whole. The operator introduces a term variable  $x$  and the predicates which follow the operator give information about the individual indicated by the term variable.

In sentences, the pragmatic and semantic information comparable with

that of the term operator is in many languages carried by the morphological category of tense and aspect. For example, in (2) tense and aspect is expressed by the verb ending, which is that of the 'Passé Simple':

- (2) Pierre arriva à huit heures  
'Pierre arrived at eight o'clock'

If we follow the same schema as for terms, the underlying predication for (2) may be as in (3):

- (3)  $PSe_i: [arriver_V (dlx_i: Pierre_{Np/m} (x_i))_{Proc}] (e_i) :$   
 $[à 8 heures] (e_i)$

where PS is Passé Simple,  $e_i$  is a space-time region, Np is proper noun, m is maculine; the predications between [...] give information about the time-space region  $e_i$ .

The nuclear predication between the first pair of square brackets is comparable with the head of the term, the adverbial (à 8 heures) functions as a restrictor. The term operator can be interpreted as in (4):

- (4)  $PSe_i$ : interpretation:  $e_i < e_o$  (where  $e_o$  is the time of utterance and '<' stands for 'anterior to').

The general schema for a tensed predication is now as in (5):

- (5)  $T-OPe_\mu: PREDICATION (e_\mu) (: ADVERBIAL (e_\mu))$

The interpretation of the whole structure of (3) is given in (6):

- (6) a.  $e_i < e_o$  : YES  
 b.  $x_i = Pierre$  : YES  
 c.  $(arriver (x_i)) (e_i)$  : YES  
 d.  $à 8 heures (e_i)$  : YES

Note that we are able now to describe correctly the difference between (2) and (7):

- (7) Pierre n'arriva pas à huit heures  
'Pierre did not arrive at eight o'clock'

This sentence has the underlying predication of (8):

- (8)  $PSe_i$ : [ arriver<sub>V</sub> (dlx<sub>i</sub>: Pierre<sub>Np/m</sub> (x<sub>i</sub>))<sub>Proc</sub> ] (e<sub>i</sub>) :  
NEG [ à 8 heures ] (e<sub>i</sub>)

The correct interpretation of (8) is that Pierre arrived, but not at eight o'clock:

- (9) a.  $e_i < e_o$  : YES  
b.  $x_i = \text{Pierre}$  : YES  
c. (arriver (x<sub>i</sub>)) (e<sub>i</sub>) : YES  
d. à 8 heures (e<sub>i</sub>) : NO

The negation of the adverbial in (7) is analogous with the Dutch example of (10), in which the restrictor (niet onintelligente, 'not unintelligent') is also negated:

- (10) de niet onintelligente jongeman  
'the not unintelligent young man'  
dlx<sub>i</sub> : (jongeman<sub>N</sub> (x<sub>i</sub>)) : NEG (onintelligent<sub>A</sub> (x<sub>i</sub>))

In the rest of this paper I will deal with tense only. The problem of the negation will be disregarded.

## 2. The tense system of French

I will have a look now at the tense system of French, which will be taken as an illustration for the treatment of tense proposed in the next section of this paper. The main tenses of French are listed in (11):

(11) Tenses of French

PRESENT: il boit (he drinks)	IMPARFAIT: il buvait
---	PASSÉ SIMPLE: il but
PRES.PERFECT: il a bu	PLUPERFECT: il avait bu
---	PASSÉ ANTÉRIEUR: il eut bu
FUTURE: il boira	FUTURE OF THE PAST: il boirait
NEAR FUTURE: il va boire	NEAR FUTURE OF THE PAST: il allait boire

There are regular correspondances between the tenses of the left-hand column and those of the right-hand column. This is shown in (12) and by the examples of direct and indirect speech in (12'):

(12) PRESENT	:	PRESENT PERFECT	=	IMPARFAIT	:	PLUPERFECT
PRESENT	:	FUTURE	=	IMPARFAIT	:	FUTURE OF THE PAST
PRESENT	:	NEAR FUTURE	=	IMPARFAIT	:	NEAR FUTURE OF THE PAST
??	:	??	=	PASSÉ SIMPLE	:	PASSÉ ANTÉRIEUR

(12') Il disait: "Je bois du vin" (PRESENT)

'He said: "I am drinking wine"'

Il disait qu'il buvait du vin (IMPARFAIT)

'He said that he was drinking wine'

Il disait: "J'ai bu du vin" (PRESENT PERFECT)

'He said: "I have drunk wine"'

Il disait qu'il avait bu du vin (PLUPERFECT)

'He said that he had drunk wine'

Il disait: "Je vais boire du vin" (NEAR FUTURE)

'He said: "I am going to drink wine"'

Il disait qu'il allait boire du vin (NEAR FUTURE OF THE PAST)

'He said that he was going to drink wine'

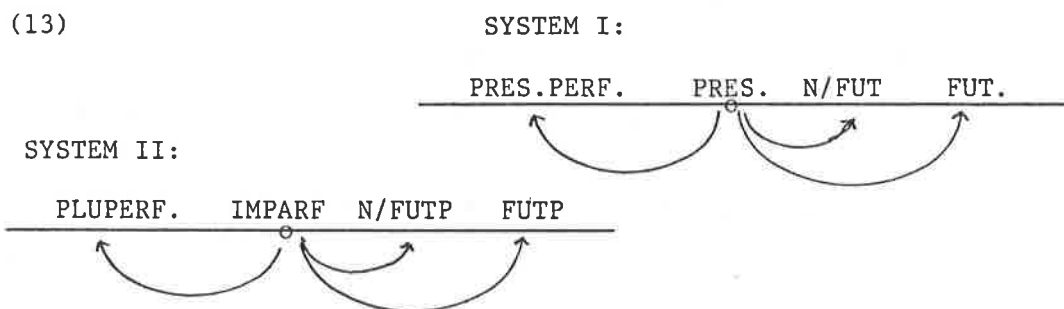
Il disait: "Je boirai du vin (FUTURE)

'He said: "I will drink wine"'

Il disait qu'il boirait du vin (FUTURE OF THE PAST)

'He said that he would drink wine'

The tenses of French belong to two subsystems, which are represented in (13). The only difference between them is that in the first system it is the speech point with respect to which the temporal relations hold, whereas in the second subsystem the central reference point is some time-point which lies before the speech-point.



It may be concluded from this schema that in the tense markers we need for French there has to be some 'superoperator', PRESENT or PAST, which indicates whether the relationship expressed by the tense holds between the state of affairs and the speech act (system I) or whether it holds between the state of affairs and some already known point or interval which lies before the speech point (system II). A proposal is formulated in (14) (' $e_{\mu}$ ' is a sentence variable):

(14) PRESENT: PRES $\emptyset$ $e_{\mu}$	IMPARFAIT: PAST $\emptyset$ $e_{\mu}$
PRESENT PERFECT: PRES PERF $e_{\mu}$	PLUPERFECT: PAST PERF $e_{\mu}$
FUTURE: PRES FUT $e_{\mu}$	FUTURE OF THE PAST: PAST FUT $e_{\mu}$
NEAR FUTURE: PRES NF $e_{\mu}$	NEAR FUTURE OF THE PAST: PAST NF $e_{\mu}$

Note that this correctly predicts the form of the Near Future, which is expressed by the auxiliary aller ('go') followed by the infinitive and which appears only in two forms, as is shown by (15):



- (15) a. Je vais avoir trente ans (PRES NF)  
 I go have thirty years  
 'I am going to be thirty'
- b. J'allais avoir trente ans (PAST NF)  
 I went have thirty years  
 'I was going to be thirty'
- c. \*Je suis allé avoir trente ans (PRES PERF NF)
- d. \*J'irai avoir trente ans (PRES FUT NF)
- e. \*J'étais allé avoir trente ans (PAST PERF NF)
- f. \*J'irais avoir trente ans (PAST FUT NF)

These examples show that the operator NF has the same possibilities as the operators  $\emptyset$ , PERF and FUT: it combines only with one of the two 'superoperators' (PRESENT and PAST); that is why the Near Futures of French have to be regarded as real tenses.

### 3. Tenses as 'temporal pronouns'

In (12) I have mentioned two tenses which do not fit very well in the system: they do not have corresponding tenses in the left column. This may be the reason why the 'Passé Simple' and the 'Passé Antérieur' have always been a problem in French linguistics. The difference between 'Imparfait' and 'Passé Simple' and that between Pluperfect and 'Passé Antérieur' is very hard to grasp semantically. This is particularly true for the sentence level.

Recently new insights into the pragmatics and semantics of tense have been formulated by Kamp (1981), Partee (1984) and others, which makes it possible to give a more satisfying account of the discourse functions of these tenses. I will restrict myself here to the 'Imparfait' and the 'Passé Simple'.

The main idea is that there exists a striking analogy between at least some tenses and anaphoric and deictic pronouns. This was already shown in an article by Partee (1973). She gives, among others,

the examples of (16) and (17):

(16) Sheila had a party last night and Sam got drunk

(17) Sheila took the car yesterday and Sam took it today

In (16) the past tense of the second clause refers back to the time of the state of affairs denoted by the first clause. There is a striking analogy with (17), in which the pronoun it refers back to the object denoted by the car in the first clause. In the same way there is an analogy between the pronoun I and the present tense.

In what follows I will examine some of the discourse functions of the 'Passé Simple' and the 'Imparfait' in light of these ideas. A French example that corresponds with (16) and (17) is that of (18):

(18) J'aperçus (PS) Paul. Il se promenait (IMP) dans le jardin.

'I saw Paul. He was walking in the garden.'

In (18) the 'Imparfait' refers back to the time of the first clause (the time at which 'I' sees Paul), which is the antecedent for the 'Imparfait' of the second clause.

In order to account for the use of the tenses we have to examine first how we can handle anaphoric and deictic pronouns in the framework of Functional Grammar.

### 3.1. Anaphoric and deictic pronouns

In order to be able to deal with anaphoric and deictic pronouns in FG I will propose here to provide the grammar with a domain of discourse representing the knowledge shared by the speaker and the hearer. This information is crucial for the interpretation of the utterances of the conversation (text) in which they occur. The domain of discourse has to be dynamic: every utterance made during the conversation gives new information which has to be introduced into the domain of discourse, and this new information plays an important

role in the interpretation of the following utterances. It also has to contain information which is independent of the conversation; this type of knowledge represents the more general knowledge of the world. In general a domain of discourse has to contain three kinds of knowledge:

- a. general knowledge about referents existing in the world: the sun, the moon, Margaret Thatcher, etc.
- b. specific knowledge about the speech situation: the location, the identity of the speaker, the hearer, the time of utterance.
- c. specific knowledge based on information given by the preceding conversation (text).

I will restrict myself in this paper mainly to the information of b. and c. For the interpretation (or the production) of a fragment like that of (18), the hearer and the speaker have to know Paul, they have to know the garden the speaker is referring to and they have to know who is speaking and who is the addressee. The domain of discourse for (18) is given in (19):

(19) Domain of discourse

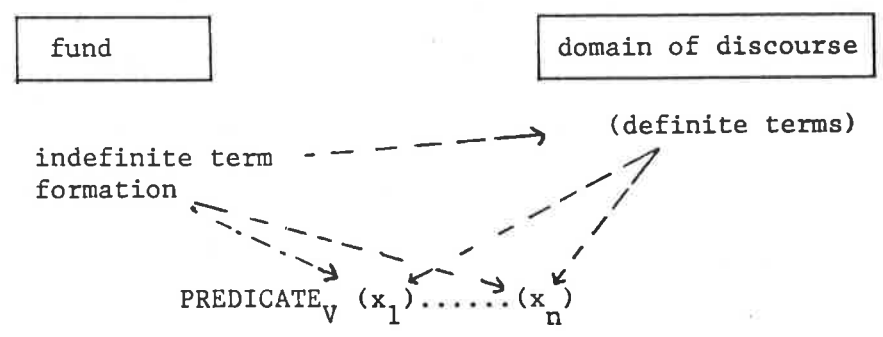
$e_o$
$dlx_o: P1 (x_o) \text{ (speaker)}$
$dlx'_o: P2 (x'_o) \text{ (addressee)}$
$dlx_i: \text{Paul}_{Np/m} (x_i)$
$dlx_j: \text{jardin}_{N/m} (x_j)$

where  $e_o$  is the time-space region at which the speech act takes place, P1 = first person, P2 = second person, Np = proper noun, m = masculine.

The domain of discourse is important for the use and interpretation of anaphoric and deictic pronouns. Normally a pronoun refers back to individuals which are known by the speaker and the addressee from the speech situation and/or the preceding discourse. That is why

the domain only contains definite terms. If the speaker wants to introduce a new term into the domain of discourse, he/she has to form an indefinite term. Once this indefinite term has been used in an utterance it is introduced, but now in the form of a definite term, into the domain of discourse. Only then can it be used as an antecedent for an anaphoric pronoun. In my view the terms needed during the formation of predications can be taken from two sources: from the fund, by (indefinite) term formation, or from the domain of discourse (definite terms which come from the discourse into which they had been introduced in the form of indefinite terms). Schematically represented the procedure is as in (20):

(20)



The instruction for the formation of pronouns is now as follows:

(21) Pronoun insertion into a text T for sentence P<sub>j</sub>:

Applicable to terms which in the domain D do not contain one of the grammatical predicates P1, P2, P3.

If a term of domain D with the term variable x<sub>μ</sub> has been used in sentence P<sub>i</sub> of text T, then a derived term can be used in a sentence P<sub>j</sub> (i<j), denoting the same individual.

This derived term is formed as follows: copy the term operator of the term of D as well as its gender marker, use instead of the predicate(s) which the term has in D the grammatical predicate P3. Its schematic form is:

$$dNx_{\mu} : P3/g (x_{\mu}) \quad \text{where N is 1 (singular) or}$$

p (plural) and g indicates the gender of the term (m or f).

The underlying predication of (18) is now as follows:

(22)  $PSe_i: [ \text{apercevoir}_V (\text{dlx}_o: P1 (x_o))_{Exp} (\text{dlx}_i: \text{Paul}_{Np/m} (x_i))_{Go} ] (e_i)$   
 $PAST \emptyset e_j: [ \text{se-promener}_V (\text{dlx}_i: P3/m (x_i))_{Ag} ] (e_j) : [ \text{dlx}_j: \text{jardin}_{N/m} (x_j) ]_{Loc} ] (e_j)$

The instructions of (21) pertain to the domain of discourse. They are, of course, too simple: for example, the distance between the antecedent and the pronoun plays an important role in discourse. However, the general description given here will suffice for present purposes.

I will now explicate the way in which the speaker can introduce a new referent into the domain of discourse. This was already indicated in the schema of (20); the instructions are as in (23):

(23) Introduction of a new term into the domain of discourse D:

- i. Form an indefinite term from a predicate-frame in the fund in the usual way (see Dik, 1978: 55f.);
- ii. this indefinite term is placed into the argument position (one of the argument positions) of a verbal predicate-frame;
- iii. finally introduce the term into the domain of discourse D and change the marker i (indefinite) into d (definite).

These instructions are illustrated by the following fragment:

(24) Paul a acheté un âne.  $\left[ \begin{array}{l} \text{Or } \underline{\text{cet}} \text{ âne a quelque chose de spécial} \\ \text{Il } \underline{\text{le}} \text{ bat} \end{array} \right.$

'Paul has bought a donkey. Well, this donkey has something special/ He beats it'

The indefinite term un âne of the first sentence has been introduced into the domain and has become a definite term. This enables the

speaker to use it in a definite form in the second sentence (I disregard here the fact that the demonstrative form is preferred in such cases; finer rules have to be formulated for this). It also enables the speaker to use it as the antecedent of an anaphoric pronoun.

### 3.2. Tense

After this sketch of the way in which anaphoric and deictic pronouns may be handled in the framework of FG, I will now indicate how the domain of discourse proposed for this purpose can also be used for the tenses. I take as an example the utterance of (26), for which the domain of (25) serves as the informational background:

(25) Domain of discourse D (partially represented here):

$e_o$  (the space-time region of the utterance)  
 $dx_o : Pl(x_o)$  (the speaker of (26))

(26) Je suis malade

'I am ill'

$PRES\emptyset e_i : [malade_A(dx_o : Pl(x_o))\emptyset] (e_i)$

Interpretation of  $PRES\emptyset e_i : e_i$  overlaps  $e_o$  ( $e_i \cap e_o$ )

The predication between [...] gives information about the time-space region  $e_o$ .

The deictic pronoun je refers back to the individual  $x_o$  of the domain of (25); the present tense ( $PRES\emptyset$ ) of (26) refers back to the  $e_o$ , the interval (time-space region) of the utterance, which was also included in the domain as belonging to the knowledge shared by the speaker and the addressee. We may conclude that the sentence operator  $PRES\emptyset$  gives the instruction that the state of affairs referred to by the utterance has to be interpreted as overlapping with the speech situation.

It follows from this observation that the present tense does not introduce a new time into the domain of discourse, but refers back to the time of utterance which was already present in the domain ( $e_0$ ).

As I suggested in connection with example (18) the main difference between the 'Passé Simple' and the 'Imparfait' may be also of a pragmatic nature. Let us first examine the example of (27):

(27) La chienne s'empara (PS) de l'os. Elle s'aperçut (PS) qu'il était (IMP) en caoutchouc. Elle le rejeta (PS). (from de Both & Molendijk, 1980)

'The dog seized the bone. She noticed that it was made of of rubber. She threw it away.'

For (27) the correct interpretation is that the states of affairs referred to by the predications with s'empara, s'aperçut and rejeta follow each other in time. Thus, the PS sentences introduce events which take place in a new, not already known, space-time region. This resembles the function I have adopted for the indefinite terms: in (24) we found that their main function was to introduce a new referent into the domain of discourse. In the same way the 'Passé Simple' indicates that a state of affairs takes place at a time which has not been spoken about in the discourse. Note that (27) would become unacceptable if we were to change the 'Imparfait' into a 'Passé Simple', as in (28):

(28) La chienne s'empara (PS) de l'os. Elle s'aperçut (PS) qu'il \*fut (PS) en caoutchouc.

The reason for the non-acceptability of the 'Passé Simple' seems to be straightforward. In fact the perception of a state of affairs has to be simultaneous with the occurrence of that state of affairs. In (28) the 'Passé Simple' of il fut en caoutchouc suggests that

the fact that the bone is made of rubber is a new fact which is posterior to the perception of that fact, and this gives rise to an unacceptable reading.

If in (27) the 'Passé Simple' of the second and third clause are replaced by an 'Imparfait', the result is quite strange too:

(29) La chienne s'empara (PS) de l'os. Elle s'apercevait (IMP)  
qu'il était (IMP) en caoutchouc. Elle le rejetait (IMP).

'The dog seized the bone. She was noticing that it was made  
of rubber. She was throwing it away.'

Here all the states of affairs of the utterances in the 'Imparfait' take as their temporal antecedent the state of affairs denoted by the first utterance (La chienne s'empara de l'os). All the other states of affairs are presented as being simultaneous with that first one, which gives a rather surprising result: the dog is seizing the bone and throwing it away at the same time, noticing en passant that it is made of rubber.

These examples show that the 'Imparfait' needs a temporal antecedent in the domain of discourse, in the same way as anaphoric pronouns. For the 'Passé Simple' this does not hold since, as we have seen, this tense introduces a new interval into the domain of discourse.

I will now consider the possibilities we have for accounting for these facts in the framework sketched above. For simplicity of presentation I take here as an example the fragment in (30):

(30) Marie entra (PS) dans la cuisine. Paul faisait (IMP) la  
vaisselle.

'Marie entered the kitchen. Paul was washing up'

The domain of discourse which would enable us to correctly interpret this little fragment has to contain the individuals Marie, Paul and



la cuisine. I will regard faire la vaisselle ('wash up') as an idiomatic expression. We also have to know the speaker, the addressee, and the moment of utterance. The domain of discourse which contains this information is as in (31):

(31) Domain of discourse D

$e_0$	(utterance)
$dlx_0$	: P1 ( $x_0$ ) (speaker)
$dlx'_0$	: P2 ( $x'_0$ ) (addressee)
$dlx_i$	: Marie <sub>Np/f</sub> ( $x_i$ )
$dlx_j$	: Paul <sub>Np/m</sub> ( $x_j$ )
$dlx_k$	: cuisine <sub>N/f</sub> ( $x_k$ )

The general instructions for the way a 'Passé Simple' sentence introduces a discourse event ( $e_\mu$ ) into the domain of discourse are analogous to that I have formulated for indefinite terms (see (23)):

(32) Introduction of new discourse events into the domain of discourse

If we have in a text T a predication of the form

$$PSe_\mu : \$ (e_\mu) \quad (\text{where } \$ \text{ is a nuclear predication})$$

then introduce it into the domain of discourse in the following form:

$$de_\mu : \$ (e_\mu) / e_\mu < e_0 \quad ('<' \text{ stands for 'anterior to'})$$

If we have such a definite  $e_\mu$  in the domain, it can function as an antecedent for a state of affairs reported in a sentence in the 'Imparfait'. In other words we can use an 'Imparfait' sentence in a discourse if we have a temporal antecedent anterior to the speech event ( $e_0$ ). There is an analogy between the present tense and the 'Imparfait' on the one hand and deictic and anaphoric pronouns on the other hand in that they refer back to information or refer back to referents which are

already familiar to the speaker and the addressee and consequently are included in the domain of discourse. The procedure for the sequence in (30) is summarized in (33):

(33)  $PSe_i: [ \text{entrer}_V (\text{dlx}_i: \text{Marie}_{\text{Np/f}}(x_i))_{\text{Ag}} (\text{dlx}_k: \text{cuisine}_{\text{N/f}}(x_k))_{\text{Loc}} ] (e_i)$

In Domain D:

$de_i: [ \text{entrer}_V (x_i)_{\text{Ag}} (x_k)_{\text{Loc}} ] (e_i) : e_i < e_o$

This information enables the speaker to use the 'Imparfait' in the following sentence:

$\text{PAST}\emptyset e_j: [ \text{faire}_V\text{-la-vaisselle} (\text{dlx}_j: \text{Paul}_{\text{Np/m}}(x_j))_{\text{Ag}} ] (e_j)$

In D:

$e_j: [ \text{faire}_V\text{-la-vaisselle} (x_j)_{\text{Ag}} ] (e_j) : e_j \text{ O } e_i$  ('O' stands for 'overlaps')

First the predication with the PS is formed in the usual way and the information it contains is introduced into the domain of discourse. It is now possible to form a predication with the 'Imparfait', with the temporal operator PAST $\emptyset$ . The new predication is also introduced into the domain of discourse and temporally related to the first one ( $e_i$ ) by the overlap relation.

As far as the other tenses of French are concerned, we may state here that the present perfect, the pluperfect and the near futures also introduce new events into the domain of discourse. The futures can have the same function if there is no temporal antecedent in the domain of discourse which is posterior to the speech moment. If there is such an antecedent it can have the same function as the 'Imparfait' (see Vet, 1985), but here the 'Aktionsart' of the sentence plays an important role too. The present perfect, the pluperfect and the near futures express, moreover, a relationship with a situation which is respectively posterior or anterior to the state of affairs referred to by the sentence. It would lead too far to describe these functions

in detail here.

#### 4. Conclusion

The advantage of the approach I have proposed here is that it is able to account for the use and interpretation of deictic and anaphoric pronouns and for deictic and anaphoric tenses in a unified way in the framework of Functional Grammar. In fact I have provided here a syntactic base for the Discourse Representation Structures proposed by Kamp (1981). In this way I think a pragmatic approach to the syntax and interpretation of pronouns and tenses has become possible. It has, moreover, the great advantage that it is able to go beyond sentence boundaries. The impossibility of doing so in the Government and Binding approach is, in my view, one of the weakest points in this theory.

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#### Notes

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1. The sentence operator could also be used to represent yes and no, which can be regarded as anaphoric sentence adverbs. For example:

(i) Est-ce que Pierre fut attaqué par un mouton?

'Was Peter attacked by a sheep?'

PS?e<sub>i</sub>: [attaquer<sub>V</sub> (ilx<sub>i</sub>: mouton<sub>N/m</sub> (x<sub>i</sub>))<sub>Ag</sub> (dlx<sub>j</sub>: Pierre<sub>Np/m</sub> (x<sub>j</sub>))<sub>Go</sub>] (e<sub>i</sub>)

-AFF (e<sub>i</sub>) (Oui 'Yes')

-NEG (e<sub>i</sub>) (Non 'No')

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