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On Non-Transformational Accounts of Passive

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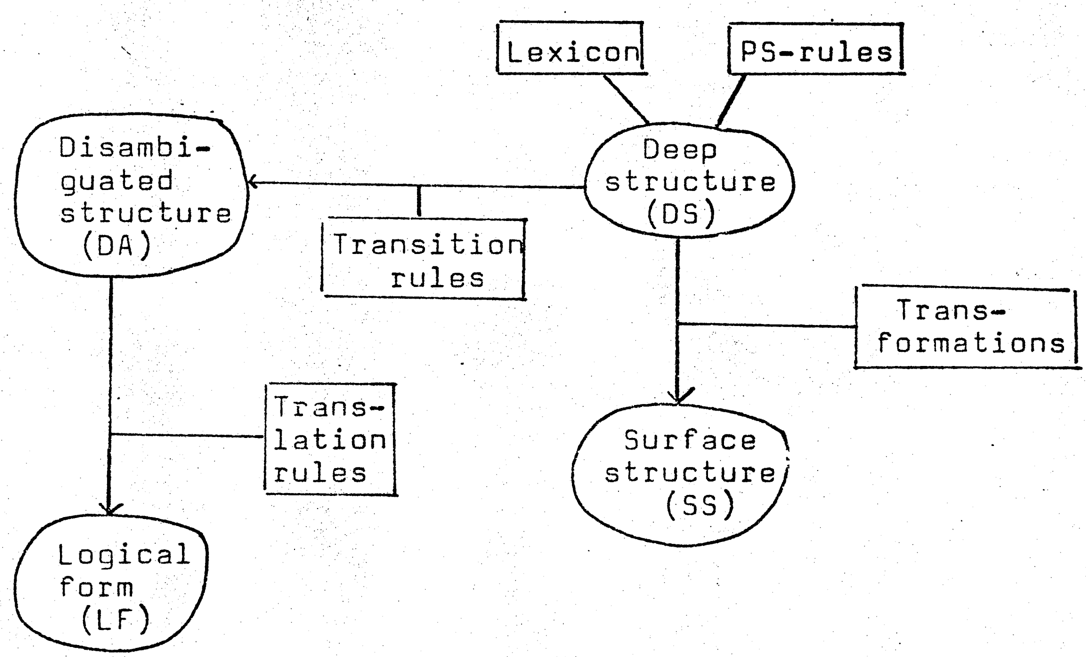
1. Taking semantics into account, how do grammars deriving passive sentences without a passive transformation compare in total complexity to those which use such a transformation? Attempting to provide a partial answer, I first, in section 2, outline a grammar which derives passives exclusively by means of lexical rules, called an L-model; its semantic part is an extension of the system proposed in Montague 1974, while its syntax is held within the Extended Standard Theory. It is demonstrated (sections 3 - 8) that in its application to simplex sentences, this model turns out as formally more complex, by reasonable criteria of complexity, than an alternative model set up (section 8), called a T-model; this model includes a passive transformation, and is within the same framework as the L-model. I then, in sections 9 - 13, discuss the import of this demonstration to the non-transformational accounts of passives actually proposed in Bresnan 1978, Bach 1978, forthcoming, and Dowty 1978.

The general framework for both the L-model and the T-model is as indicated in (1):

(1)

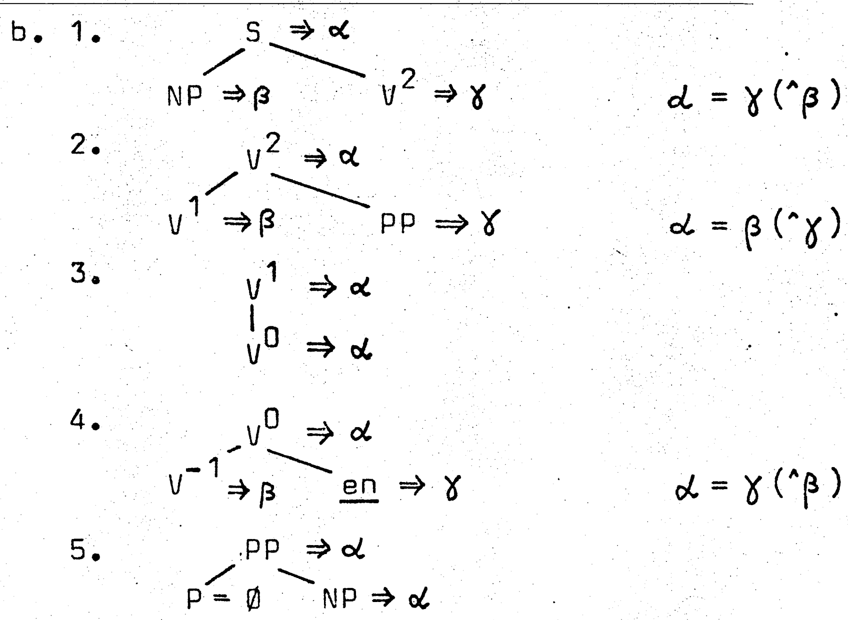


LF is kept within Montague's formalism (and will of course receive a model-theoretic interpretation in turn), while DA will resemble a DS.[1] (A connection will also obtain between DA and SS, but is irrelevant to the present discussion.[2])

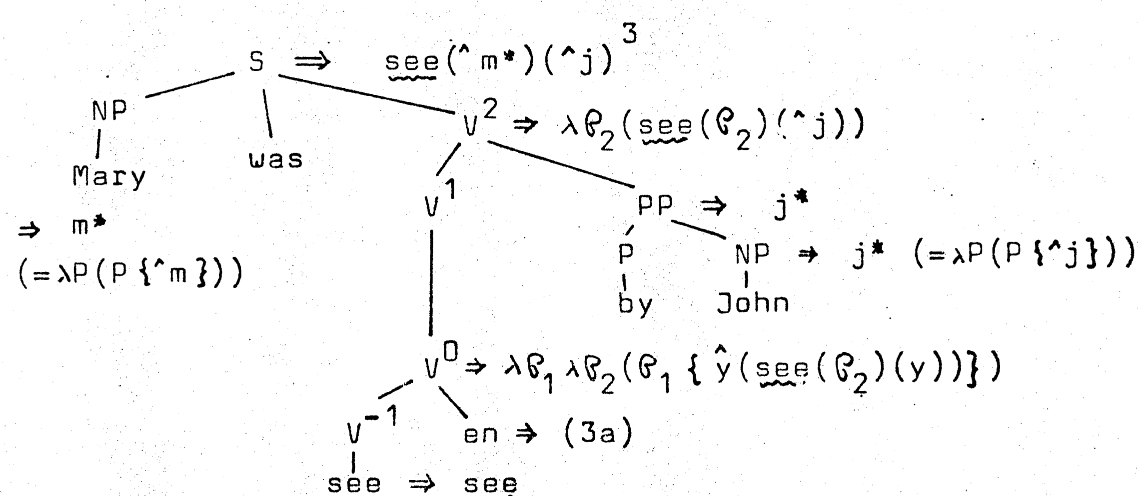
2. In the L-model, the deep structure of a passive sentence is like its surface form (at least with regard to word-order), so that even in DS, its <u>syntactic</u> subject is not its <u>logical</u> subject. Assuming that the status of logical subject is to be represented in LF, it is reasonable to assign this 'functional reversion' to that part of the translation system which uniquely represents a passive construction, namely the translation of the passive voice inflection -<u>en</u> attached to the main verb. Given that translation rules work their way 'from bottom up' through the syntactic (or DA-) tree (cf. section 12), the translation of a sentence like (2) will be obtained through the translation mechanism (3), as illustrated in (4):

(2) Mary was seen by John.

(3) a. $-\underline{en} \Rightarrow \lambda R\, \lambda \mathcal{P}_1\, \lambda \mathcal{P}_2 (\mathcal{P}_1 \{ \hat{y} ({}^\wedge R(\mathcal{P}_2)(y)) \})$



(4)



The notation 'V^2','V^1' etc. is an adaption of the $\bar{X}$-notation, 'V^{-1}' being verb-stem; when 'level-number' is irrelevant, we use simply '-P'. The use of variables is as in Montague 1974; x,y range over individual concepts (whose logical type is represented as $\langle s,e \rangle$),P over properties of individual concepts (type $\langle s,\langle\langle s,e\rangle,t\rangle\rangle$,abbreviated $\langle s,V\rangle$), $\mathcal{P}$ over properties of properties of individual concepts (type $\langle s,\langle\langle s,V\rangle,t\rangle\rangle$,abbreviated T),R over relations between individual concepts and type T-entities. The intensional 'inflation' of this system is not really necessary for our present purposes,but it is convenient to keep the logical system as close to its original formulation as possible; conventions governing intension-marks,braces etc. are then as in Montague op. cit.,and also 'extensionalizing' rules (we do not formulate such rules for constructions not covered by Montague; this is for brevity only).

In (3a),the closest argument to R is the direct object, while y,and also $\mathcal{P}_1$,represent logical subject; for convenience,we always associate the subscript '1' on $\mathcal{P}$ with logical subject,and '2' with logical direct object; in section 4, we furthermore use '3' for indirect object and '4' and '5' for prepositional object. In the translation of en repeated below,call the part in front of the first dotted line the initial part of the translation,the part behind the second dotted line the core part of the translation,and the part in between the middle part:

$$\lambda R\, \lambda \mathcal{P}_1\, \lambda \mathcal{P}_2 \vdots (\mathcal{P}_1 \{ \hat{y}(\vdots {}^{\vee}R(\mathcal{P}_2)(y))\})$$

Generalizing these notions to other formulas below,the middle part will always stay the same.

We assume that (5) has the reading (6):

(5) Mary was seen.

(6) $\bigvee x\,[\underset{\sim}{see}(\hat{}\, m^{*})(x)]$

The presence of the existential quantifier may be seen as due to the lack of a by-phrase,once the verb has passive form. Assuming a morphological feature like +/-Passive to be projected up the 'verb-chain' along with syntactic features,as formalized in the $\bar{X}$-notation,this intuition can be captured through the translation rule (7) which,together with (3),will assign (6) to (5):

(7)
$$\begin{array}{l} V^2\,[+\text{Passive}] \Rightarrow \alpha \\ \quad | \\ V^1\,[+\text{Passive}] \Rightarrow \beta \qquad\qquad \alpha = \beta(\,\hat{P}(\bigvee x[P\{x\}]))\end{array}$$ [4]

As this account reduces the translational difference between passives with an agent and agent-less passives to a minimum, we will say no more about this difference in the following.

3. We will assume that direct objects, indirect objects and prepositional objects, and also object predicatives, all (when occurring behind the verb) are inside $V^{'}$ (=VP). Their logical representation may be as exemplified in (9), translating the sentences (8):

(8) a. John gave Susan a book.
    b. John gave a book to Susan.
    c. John talked about Dave.
    d. John talked with Fred about Dave.
    e. John told Susan about Dave.
    f. John told a story about Dave.[5]
    g. John told Susan a story about Dave.
    h. John told a story to Susan about Dave.
    i. John found Mary walking around.
    j. John regards Mary as intelligent.
    k. John got Mary out of the house.
    l. John shook Mary awake.
    m. John ran Mary out of the team.
    n. John persuaded Mary to go.

(9) a. to_1(^s*)(^give)(^tl(a book))(^j)
    b. = a
    c. $about_1$(^talk)(^d*)(^j)
    d. $about_2$(^d*)(^with(^talk)(^f*))(^j)
    e. $about_2$(^d*)(^to_2(^s*)(^tell))(^j)
    f. $about_2$(^d*)(^tell(^tl(a story)))(^j)
    g. $about_2$(^d*)(to_1(^s*)(^tell)(^tl(a story)))(^j)
    h. = g
    i. as (^walk-around(^m))(^find(^m*))(^j)
    j. regard (^intelligent(^m))(^j)
    k. cause(^ out-of-the-house(^m))(^j)
    l. so-that(^awake(^m))(^shake(^m*))(^j)
    m. so-that(^out-of-the-team(^m))(^run)(^j)
    n. to_3(^go(^m))(^persuade (^m*))(^j)

To_1, with type $\langle T,\langle\langle s,TV\rangle,TV\rangle\rangle$ (TV=$\langle T,V\rangle$), and to_2, with type $\langle T,\langle\langle s,V\rangle,V\rangle\rangle$, precede indirect objects; with and $about_1$, with type $\langle\langle s,V\rangle,TV\rangle$, apply to intransitive verbs yielding transitive expressions (i.e. TV-expressions) with prepositional objects as first argument; $about_2$ has type $\langle T,\langle\langle s,V\rangle, V\rangle\rangle$ and applies to a prepositional object not adjacent to the verb, yielding a predicate modifier. As in (i) has type $\langle\langle s,t\rangle,\langle\langle s,V\rangle,V\rangle\rangle$, marking that what is expressed by the sentence following it takes place simultaneously with the act expressed by the predicate following the sentence. So-that, with the same type, expresses consequence, and to_3, again with the same type, expresses 'direction' of persuasion.[6]

These particular choices of representation are not crucial to the present argument, except in two respects: different kinds of objects have different logical markings, and the functions of object predicatives are clearly spelled out. Order of arguments is used only for distinguishing logical subject from (logical) direct object; since the various kinds of objects can occur in virtually any combination (cf. (8a-h)), using this device further may easily lead to more inperspicuous moves to avoid ambiguity of representation, so for the other kinds of objects we use preposition-like items as 'markers'. As to (i)-(n), the assignment of these forms is to some extent dependent upon lexical information not easily incorporable into the translations of the verbs, and so a possibility is to spell these forms out by means of meaning postulates; if so, the output of the structurally defined translation rules applying to (8i-n) will not be (9i-n), but rather some more 'amorphous' kind of representation, to be cleaned up by the meaning postulates. As I see no particular merit to such a strategy, I will assume that (9i-n) are produced by translation rules operating on (8i-n) directly. (To our present argument this choice need again not be too significant, since it is only a choice <u>where</u> to locate a certain complexity, not to get rid of one.)

4. (9) will also be translations of the passive counterparts to (8), namely (10):

(10) a.1. A book was given Susan/her by John.[7]
  2. Susan was given a book by John.
 b. A book was given to Susan by John.
 c. Dave was talked about by John.
 d. Fred was talked with about Dave (?by John)
 e. Susan was told about Dave (by John)
 f. A story was told about Dave (by John)
 g.1. Susan was told a story about Dave (by John).
  2. A story was told Susan/her about Dave (by John).
 h. A story was told to Susan about Dave (by John).
 i. Mary was found walking around (by John).
 j. Mary is regarded as intelligent by John.
 k. Mary was gotten out of the house by John.
 l. Mary was shaken awake by John.
 m. Mary was run out of the team by John.
 n. Mary was persuaded to go by John.

Using the strategy outlined in section 2, the assignment of (9) to (10) will require that -<u>en</u> have (11) as translations for the respective cases, given (12) as structural translations supplementing (3b) and (7):

(11) a.1. $\lambda R \lambda \wp_3 \lambda \wp_1 \lambda \wp_2 (\wp_1 \{\hat{y}(\text{to}_1(\wp_3)(R)(\wp_2)(y))\})$

2. $\lambda R \lambda \wp_2 \lambda \wp_1 \lambda \wp_3 (\wp_1 \{\hat{y}(\text{to}_1(\wp_3)(R)(\wp_2)(y))\})$

b. = a.1

c. $\lambda P \lambda \wp_1 \lambda \wp_4 (\wp_1 \{\hat{y}(\text{about}_1 (P)(\wp_4)(y))\})$

d. $\lambda P \lambda \wp_4 \lambda \wp_1 \lambda \wp_5 (\wp_1 \{\hat{y}(\text{about}_2(\wp_4)(^\wedge \text{with}(P)(\wp_5))(y))\})$

e. $\lambda P \lambda \wp_4 \lambda \wp_1 \lambda \wp_3 (\wp_1 \{\hat{y}(\text{about}_2(\wp_4)(^\wedge \text{to}_2(\wp_3)(P))(y))\})$

f. $\lambda R \lambda \wp_4 \lambda \wp_1 \lambda \wp_2 (\wp_1 \{\hat{y}(\text{about}_2(\wp_4)(^{\wedge\vee} R(\wp_2))(y))\})$[8]

g.1. $\lambda R \lambda \wp_2 \lambda \wp_4 \lambda \wp_1 \lambda \wp_3 (\wp_1 \{\hat{y}(\text{about}_2(\wp_4)(^\wedge \text{to}_1(\wp_3)(R)(\wp_2)(y)))\})$

2. $\lambda R \lambda \wp_3 \lambda \wp_4 \lambda \wp_1 \lambda \wp_2 ($ ..as (g.1)..)

h. = g.2

i. $\lambda R \lambda P \lambda \wp_1 \lambda \wp_2 (\wp_1 \{\hat{y}(\text{as}(^\wedge \wp_2\{P\})(^{\wedge\vee} R(\wp_2))(y))\})$

j. $\lambda S \lambda P \lambda \wp_1 \lambda \wp_2 (\wp_1 \{\hat{y}(S(^\wedge \wp_2\{P\}))(y))\})$

k. = j

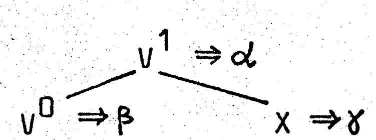
l. $\lambda R \lambda P \lambda \wp_1 \lambda \wp_2 (\wp_1 \{\hat{y}(\text{so-that}(^\wedge \wp_2\{P\})(^{\wedge\vee} R(\wp_2))(y))\})$

m. $\lambda P_1 \lambda P_2 \lambda \wp_1 \lambda \wp_2 (\wp_1 \{\hat{y}(\text{so-that}(^\wedge \wp_2\{P_2\})(P_1)(y))\})$

n. $\lambda R \lambda \mathbb{P} \lambda \wp_1 \lambda \wp_2 (\wp_1 \{\hat{y}(\text{to}_3(^\wedge \mathbb{P}\{\wp_2\})(^{\wedge\vee} R(\wp_2))(y))\})$

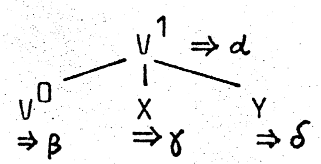
(S has type $\langle\langle s,t\rangle,V\rangle$ and $\mathbb{P}$ has type $\langle\langle s,T\rangle,t\rangle$.)

(12) a.



$\alpha = \beta(^\wedge\gamma)$

b.



$\alpha = \beta(^\wedge\gamma)(^\wedge\delta)$

X and Y can here be any category whatsoever - NP, PP, AP, V^2,..

A list like (11) of translation-'variants' of one and the same morpheme is of course not very satisfactory, at least if the list is given as primitive; we will consider ways of avoiding that situation.

5. But first, how should the active constructions (8) get their translation? The rule-schemata (12) will clearly not produce (9), at least if the words in (8) have approximately homophonous translations, as we have assumed up to now (with (11) as only exception). What we will need is rather a new set of structural translation rules, defined for active structures exclusively; call this set of rules simply A. The rules (3b) and (12) will be restricted to passive

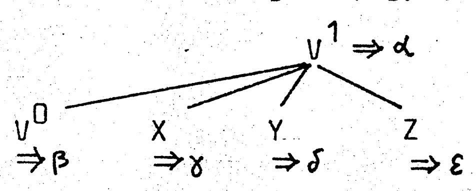
structures, so that in present respects, a model emerges having two sets of structural translation rules, the expected list of primitive translations for lexical items, but also the list (3a)+(11) of translation-variants for the morpheme -en.

We now consider a way of improving this situation somewhat.

6. Suppose that there is a phonologically non-realized morpheme for the active voice, analogous to -en; call it Ø. Through a simple derivational process, we can replace the list of translations (3a)+(11) by a corresponding list of translations for Ø, with the immediate gain of dispensing with the set A of structural translations. Alternatively, we will see, we can retain A, but dispense with the list of translations for Ø (without reintroducing (3a)+(11)).

In either case, we will need the translation rule (13) for accomodating (8g,h):

(13)



$\alpha = \beta(\hat{}\gamma)(\hat{}\delta)(\hat{}\varepsilon)$

The derivation of (3a)+(11) from the translations of Ø will go as follows:

(i) Each translation of Ø is really part of a lexical entry for a variant $Ø_n$ of Ø, with the following form:

(14) a. $Ø_n$; active voice inflection

b. Syntactic frame: $[_{V^1} [_{V^0} \; V^{-1} \; \_\_] \ldots NP_j \ldots]$

c. Translation: $\ldots \lambda \mathcal{P}_j \ldots \lambda \mathcal{P}_1 (\mathcal{P}_1 \{ \hat{y} (\ldots \mathcal{P}_j \ldots) \})$

NP_j is some kind of object, represented in translation by $\mathcal{P}_j$. Verb stems also have syntactic frames (but homophonous translations), and we rule that $Ø_n$ is attacheable to a verb-stem only if their frames are matching (i.e. the verb-stem having '__ ... NP_j ...').

(ii) From each $Ø_n$ of the form in (14), we form a passive morpheme $-en_m$ of the following form (dotted lines stand for the same as in (14)):

(15) a. $-\underline{en}_m$;passive voice morpheme

b. Syntactic frame: $[_{V^1}[_{V^0}\ V^{-1}\ \_\_\ ]\ldots\quad\ldots]$

c. Translation: $\ldots\quad\ldots\lambda\wp_1\lambda\wp_j(\wp_1\{\hat{y}(\ldots\ \wp_j\ \ldots)\})$

This 'derived' inflection $-\underline{en}_m$ can be attached to a verb-stem only if the inflection $\emptyset_n$ from which it is derived can be attached to it.

This derivation of passive morphemes is seen to involve two steps: 1. removing NP_j[9] from the syntactic frame of $\emptyset_n$, by a process we may call <u>NP-removal</u>; 2. transporting $\lambda\wp_j$ to the rightmost position in the initial part of the translation; call this process <u>λ-postposing</u>.

The L-model now resulting has only <u>one</u> set of structural translation rules, and otherwise the expected list of primitive (and basically homophonous) translations of lexical items, together with the list of translations for the variants of $\emptyset$, which is like (3a)+(11) except that $\lambda\wp_1$ always occurs in the rightmost position in the initial part, i.e. as in (16):

(16) a. $\lambda R\,\lambda\wp_2\,\lambda\wp_1($ ...like (3a))

b. $\lambda R\,\lambda\wp_3\,\lambda\wp_2\,\lambda\wp_1($...like (11a))

c. $\lambda R\,\lambda\wp_2\,\lambda\wp_1\,\lambda\wp_3($...like (11a))

d. $\lambda P\,\lambda\wp_4\,\lambda\wp_1($...like (11c))

⋮

$\lambda R\,\lambda\wp_2\,\lambda P\,\lambda\wp_1($...like (11h))

A primitive list of this complexity is still not quite satisfactory, so one may search for possible ways of characterizing it recursively. First, it will be noted that the initial parts of these formulas can in each case be predicted from the accompanying syntactic frame: in addition to the subject-item, there will be as many λ-items as there are constituents in the frame (assuming that all constituents in VP are entered in the syntactic frame of a verb occurring there), the type of the variable being predictable from syntactic category, and the order of the λ-operators reflecting the syntactic distance of the constituents they represent from the verb (or $\emptyset$, more precisely). Is there then any recursive principle by which the <u>core</u> part of the $\emptyset$-translations is generable from the accompanying syntactic frame?

There obviously is one: translate each NP in the syntactic frame as '$^\vee Q_i$', i reflecting the functional status of the NP; translate object predicatives (including predicative NPs) as '$^\vee P$' (except as '$^\vee \mathbb{P}$' when they are infinitives - this is necessary by a strategy involving (16)), and verbs as '$^\vee P$' or 'R', depending on transitivity; finally interpolate an item in subject position with the translation '$\lambda P(P\{y\})$': then the <u>core</u> parts of the formulas in (16) are generable from the syntactic frames simply by the rule-set <u>A</u>.

7. The last version of the L-model, by which we avoid any listing of primitive translations of the complexity in (16) or (11), is probably the best, and can be summarized as in (17), supplementing (1):

(17) <u>The L-model</u>

Lexicon:

Entry-construction component:	Entries:
1. Construction of Ø-entries, using syntactic frames and the set of (mostly structural) translation-rules <u>A</u>	1. Entries for verbs, nouns etc., with syntactic frames and homophonous translations, given by list
2. Derivation of -<u>en</u>-entries from Ø-entries, using <u>NP-removal</u> and <u>λ-conversion</u> →	2. Entries for voice-inflections:

Transformations for passive: none

Structural translation rules: (3b), (7), (12) and (13) - call these <u>P</u>.

8. As one may suspect, the doubling of translational effort seen in (17) - use of both <u>A</u> and <u>P</u> - can be avoided within a model using a passive transformation. Our example of such a model - a T-model - is summarized in (18):

(18) <u>The T-model</u>

Lexicon: only the entry-component 1 in (17), supplemented with entries for <u>to</u>, <u>about</u>, <u>by</u> etc., some of which occur in <u>A</u>; cf. (21) below.

Transformations for passive: the rule <u>NP-preposing</u> in (19) below.

Transition-rules (cf.(1) and note 1): the rule E-insertion in (20) below.

Structural translation rules: A, plus (21c).

(19) is the passive transformation:

(19) NP-preposing:

$$\underset{1}{[\Delta]_{NP}} \quad \underset{2}{\underbrace{(\text{Aux}) \quad {}_{V^1}[V^0 \ (\left\{\begin{matrix}P\\NP\end{matrix}\right\})}} \quad \underset{3}{NP} \quad \underset{4}{\underbrace{W_1]\ W_2}} \Rightarrow$$

$$3 \qquad 2 \qquad \emptyset \qquad 4$$

The transition-rule (20) introduces an existential quantifier in the translation of passives; the quantifier is here represented as E, and translates by rules in (21):

(20) E-insertion:

$$\underbrace{[_S \ \underset{[-\text{Anaphoric}]}{[\Delta]_{NP_i}} \quad \underset{[+\text{Passive}]}{\text{Aux}} \quad \ldots]}_{1} \quad \overset{10}{\Rightarrow} \quad E_i \# 1$$

Translation rules particular to passive constructions are (21):

(21) a. by $\Rightarrow \lambda\wp\, \lambda P \lambda y(\wp\{\hat{x}(P\{y\} \wedge x=y)\})$

b. $E_i \Rightarrow \lambda p \vee x_i [{}^{\vee}p]$

c.

$$\begin{matrix} & S \Rightarrow \alpha & \\ E_i \Rightarrow \beta & & S \Rightarrow \gamma \end{matrix} \qquad \alpha = \beta({}^{\wedge}\gamma)$$

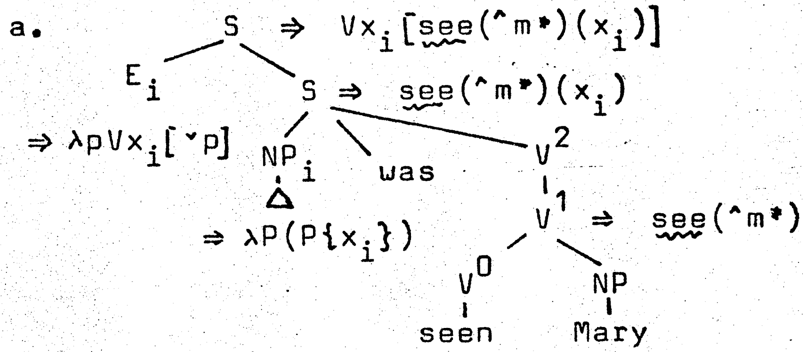
(Already included in A is (21d), the normal rule for PPs:

(21d)

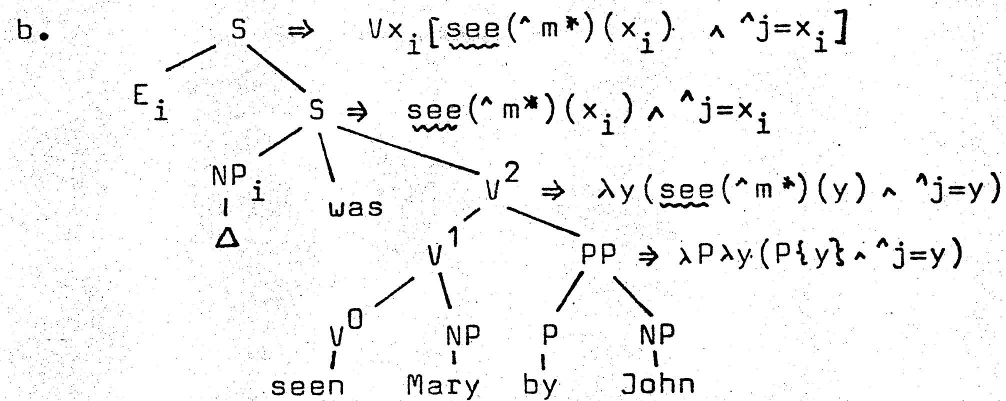
$$\begin{matrix} & PP \Rightarrow \alpha & \\ P \Rightarrow \beta & & NP \Rightarrow \gamma \end{matrix} \qquad \alpha = \beta({}^{\wedge}\gamma)$$)

(22) exemplify these translation rules, and at the same time (apart from the E_i) show the syntactic analysis at deep structure level of passives within the T-model; (22a) represents Mary was seen (cf. (5)/(6)) and (22b) represents Mary was seen by John (cf. (4)):

(22) a.

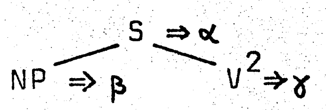


b.



(= (21a))

(Notice in particular that A will include the rule



$\alpha = \beta(^\wedge\gamma)$; -en has a zero-translation, and we still ignore tense.)

Comparing now the models (17) and (18), the only elements particular to the latter are the Δ-subject and the rules accompanying E; although by has a zero-translation in the L-model, as against (21a) in the T-model, this by itself should give no greater 'cost' to the T-model, since there is no reason to count zero-translations as less costly than others, once the lexical items are given.

Particular to the L-model, on the other hand, is the entire set of structural translation-rules P. By this, it will seem reasonable to count the L-model as, totally, more complex than the T-model (unless extra principles of 'weighting' can be brought in - cf. section 13). (As a further complication to the L-model, giving adverbs like slowly the type ⟨⟨s,V⟩,V⟩ (for predicate modifiers) can be done only at the cost of extra meaning-postulates, since a V^1 in the L-model corresponds to the type ⟨T,⟨T,V⟩⟩, not V (as it does in the T-model and in Montague 1974).) I.e., on the basis of what has been considered so far, the T-model appears to be an over-all better model than the L-model.[11]

Nobody has so far proposed the L-model in its present form. In the next two sections, however, we show that it shares crucial features with the analyses proposed in Bresnan 1978, Bach 1978, forthcoming, and Dowty 1978, the latter three in turn building on Thomason 1976.

One obvious reason why such a demonstration can not amount to a refutation of these theories - if the argumentation is otherwise sound - is that we have to leave out of consideration infinitival expressions and phenomena of 'control'. For the analysis Bach applies to these, the L-model is in fact not representative, and even for a comparison with Bresnan's analysis, which does seem reflected in the L-model, a parallel extension of both the T- and the L-models from their present stages would lead too far. Another reason, especially connected to Bresnan's model, is that evaluation principles are conceivable which may perhaps favor the L-model over the T-model even in their present form; we comment on this in section 13.

9. In Bresnan's framework, a lexical entry contains a syntactic frame and a 'functional structure' as represented in (23) for the verb _eat_:

(23) _eat_;

Syntactic frame: __ NP

Functional structure: NP_1 EAT NP_2

The position of NP_1 in the functional structure is the position of _logical_ subject, the position of NP_2 represents (logical) direct object; the index 1 signifies _syntactic_ subject and the index 2 syntactic direct object; expressed in the functional structure is thus that what is understood as logical subject of the verb-form _eat_ (in active) is its syntactic subject, the 'logical' object being its syntactic object.

For the passive form _eaten_ we have the entry (24):

(24) _eaten_;

Syntactic frame: __

Functional structure: $\vee x[x$ EAT NP_1 (& $x=NP_{by}$)]

This functional structure says that the logical subject of _eaten_ is expressed in the _by_-phrase, if any, and that its 'logical' object is expressed by the syntactic subject.

The entry (24) is obtained from (23) in a way quite analogous to the derivation of -_en_-entries from Ø-entries shown in section 6: to obtain the syntactic frame in (24), we remove the NP from the frame in (23), paralleling _NP-removal_, and to obtain the functional structure in (24), we erase the original occurrence of NP_1 in (23) and substitute NP_1 for the occurrence of NP_2 in (23), which is a move quite analogous to <u>λ-postposing</u> in the L-model, since there the order of the initial lambdas expresses exactly what the indexing of the NPs does presently.

Also in the treatment of infinitival complements, the L-model can be seen to do the same tasks as Bresnan's model is devised for: as the reader can verify, with entries like (25) and with the use of the structural translation rules (12), desired translations can be assigned to (26) by operation on the same structures as those corresponding to the surface word-order in (26):

(25) tend: __ V^2 ; $\lambda \mathbb{P} \lambda \wp (\underset{\sim}{tend}(\hat{}\mathbb{P}\{\wp\}))$

try: __ V^2 ; $\lambda \mathbb{P} \lambda \wp (\wp\{\hat{y}(\underset{\sim}{try}(\hat{}\mathbb{P}\{\wp\})(y)\})$

believe: __ NP V^2 ; $\lambda \wp_2 \lambda \mathbb{P} \lambda \wp_1 (\wp_1\{\hat{y}(\underset{\sim}{believe}(\hat{}\mathbb{P}\{\wp_2\})(y))$

$\left.\begin{matrix}\text{annoy}\\ \text{know}\end{matrix}\right\}$: __ NP ; $\lambda \wp_2 \lambda \wp_1 (\wp_1\{\hat{y}(\left\{\begin{matrix}\underset{\sim}{annoy}\\ \underset{\sim}{know}\end{matrix}\right\}(\wp_2)(y))\})$

(26) John tends to annoy Mary.
Mary tends to be annoyed by John.
John tries to annoy Mary.
Mary tries to be annoyed by John.
John believes Mary to know Bill.
Mary is believed by John to know Bill.
John believes Bill to be known by Mary.
Bill is believed by John to be known by Mary.

We may thus expect that the fate of Bresnan's model will be close to the fate of the L-model. Deciding <u>it</u>, however, will require a longer discussion than space permits here; see also the remarks in section 13.

10. To a certain extent, the L-model seems to give a correct reconstrual also of the models of Bach and Dowty mentioned above. Common to their approaches is that whatever kind of NP (in terms of functional status) which is the subject of a passive construction, is the NP - within their 'combinatorial' framework - which is combined <u>second last</u> (among NPs) with the verbal expression in the corresponding active construction (the last NP being the active subject). If we provide verb-stems with translations like (16) (with the initial λP or λR removed), the translation of a passive construction is obtained by a rule like (27), translating the combination of (<u>be</u>-)-<u>en</u> with V^1:

(27)
$$[_{V^1 \Rightarrow \alpha}\ (\text{be})\ \text{en}\quad V^1 \Rightarrow \beta\,] \qquad \alpha = \lambda \wp_1 \lambda \wp_j (\beta(\wp_j)(\hat{\wp}_1))$$

β here has the form '$\lambda \wp_j \lambda \wp_1 (\ldots)$', with $\wp_j$ representing the 'passivizable' object, since in a passive V^1, this NP will not yet have been processed by the translation rules; since in a passive construction, they will process the logical subject (by a counterpart to (3b.2) or (7)) before this NP, (27) simply reverses the lambda-order.

As our logical representations are set up, there is only one type of construction which will not require a verbal translation with a 'core' of the kind in (16), namely those with a direct object only: in Mary was seen (by John), the only item under V^1 is see, so for this case we could translate see simply as see_{TV} and use (27') rather than (27):

(27')

$V^1 \Rightarrow \alpha$

(be)en $\quad V^1 \Rightarrow \beta \qquad \alpha = \lambda \wp_1 \lambda \wp_j (\wp_1 \{\hat{y}(\beta(\wp_j)(y))\})$

(With a sentence-translating rule like $S \Rightarrow \beta(^\wedge\gamma)$, with $NP \Rightarrow \beta$, $V^2 \Rightarrow \gamma$;
furthermore, we could rather in this case use the translation '$\lambda \wp \lambda x(\wp \{\hat{y}(\beta(\hat{P}(P\{x\}))(y))\})$'; if finally, with the same S-translating rule, we could at this stage also decide whether an agent-phrase is present or not, the case where it is absent could be represented by the rule actually used by Bach in op.cit., namely '$\lambda x \vee y[\beta(\hat{P}(P\{x\}))(x)]$'.)

If indirect objects had also been (logically) represented purely by means of order of arguments (e.g. as 'innermost' argument to the verb), then passives of three-place verbs with direct object preposed would also render lexical translations of the form in (16) unnecessary (and hence allow (27') once more), since a simple functional application rule like (12a) gives the right 'start' for a formula expanded around e.g. give. As noted in Dowty op.cit., however, as soon as the indirect object is preposed, then we immediately need a verbal translation of a form like (16c) (omitting 'λR'). Moving then to the various uses of prepositional objects and object predicatives, it is impossible, in the absence of the object 'preposed', to build up a formula properly representing the other constituents, without having already constructed a 'skeleton' like the core parts in (16). The only alternative is to appeal to later meaning-postulates, which seems to be merely to postpone the problems.

We may thus conclude that for the rule (27) to operate properly, it is necessary that the verbs in their active form have a translation principally of the form found in (16); part 1 of the 'entry-constructing' component in the lexicon of the L-model (cf.(17)) hence seems necessary also here (although now constructing verb-entries rather than voice-morpheme entries), while part 2 is transferred to the structural semantics, in the form (27), or to one single entry (or two, as in Dowty op. cit.).

11. The main point where the L-model fails to represent the Bach/Dowty-model, as particularly clear from Bach's papers, is perhaps the following: By representing the 'passivizable' object as the next highest NP in active constructions, correlations between the passivizability of an NP and its 'control'-properties in both voices are accounted for in a simple fashion. Briefly, an NP can 'control' anaphora and the like when the items controlled are inside a (possibly discontinuous) constituent with which the NP uniquely combines. Thus, I regard John as fond of himself and John is regarded as fond of himself are both possible because in the active case, John (by assumption) combines uniquely with the discontinuous regard - as fond of himself; on the other hand, *I strike John as fond of himself and *John is struck as fond of animals are bad because, by assumtion, the immediate constituents are here strike John and as fond of himself/animals. This precludes the first sentence because John is not uniquely combined with as fond of himself, and the second because, passive being its base form, we would have to combine strike alone with as fond of animals to construct it; but strike being 'programmed' to combine (alone) only with an NP, strike/be struck as fond of animals is an impossible constituent.

It is essential to this account that passives be 'directly' generated; still, by its use of discontinuous constituents possible within the framework of a categorial grammar, the more transformationally oriented L-model is not analogous to it. The relationship of the present model to the T-model is thus less clarified by extending the L-model than in the preceding case.

12. Crucial in the present semantics is the so-called 'principle of compositionality'(PC), by which the 'meaning', here translation, of a complex expression is required to be a function of the 'meanings' of its parts and the way these parts are combined. This is what yields the 'bottom-up' application of translation rules, and hence lexical translations of the complexity in (16), and so a more radical way of defending the non-transformational approach to passives might be to question the validity of PC itself.

There are presumably aspects of meaning not covered by PC, such as 'conversational implicature' as governed by stress etc. With regard to 'propositional content', to which PC is mainly addressed, there are clear cases of items with wider semantic scope than indicated by their syntactic position: 'wide scope' quantified NPs, adjectives like alleged, derivational affixes like un- and -able are examples. These show that what determines the meaning of a given expression need not be all of its immediate constituents, and that not all meaning-determinant constituents have to be syntactically immediate; still,cases where a constituent has its meaning assigned only via inspection of a much 'higher' syntactic level are difficult to find (aside from transformationally 'moved' items),so that no weakening of PC to accomodate base-generated passives without rule-systems like (16) resulting seems justifiable.

Positively in favor of PC we notice that it specifies a 'functional' reason why there is a syntax in natural languages at all,namely that 'complex' meanings be constructible from 'simple' meanings in ways which are not only manageable to the individual speaker,but also 'natural' enough that they can be shared by a whole linguistic community without too much difficulty in 'synchronizing' interpretation. PC embodies the most straightforward principle conceivable for this 'construction' of complex meanings.

13. From the position represented by Bresnan 1978,another line of defending the non-transformational approach is conceivable. Assuming that,in her terms (p.14),"...the syntactic and semantic components of the grammar should correspond psychologically to an active,automatic processing system that makes use of a very limited short-term memory." and that "...it is easier for us to look something up than it is to compute it.",one might propose an evaluation-measure of grammars by which,for our particular case,locating NP-removal and $\underline{A}$ in the lexicon (as in (17)) is so much 'cheaper' than having NP-preposing and $\underline{A}$ in the syntax and structural semantics,respectively (as in (18)),that the L-model after all gets a lower total 'cost' than the T-model.

Here we only state this possibility. Whether 'realistic' grammars,conceived as some kind of (presumably very indirect) schemata of psychological events consisting of the construction of 'understandings' from actual utterances (or the construction of utterances from 'intentions'), really make sense,is an interesting question: if these 'mental' entities exist at all,what takes place between them may be so different from the phenomena addressed in the L- and T-models that no evaluation-principles applicable to the latter may be deducible. So this matter is open,calling for both empirical research and a priori consideration.

NOTES

1. The difference being only that DA, as the name suggests, is unambiguous while a DS may be ambiguous, and also that DA may have some enrichments to facilitate the translation rules - the item E introduced in (20) is an example.
2. In trace-theoretic terms, this means we are only concerned about features reflecting DS.
3. We will consistently ignore translation of tense.
4. As will be noticed, this analysis differs from the more common approach of Thomason 1976 and Dowty 1978.
5. Cf. Bach and Horn 1976:280ff for motivation for the analysis NP V NP PP assumed here of such sentences.
6. Furthermore, 's', 'd' etc. translate Susan, Dave etc., and 'tl(...)' and 'walk-around' etc. are merely names of translations, whatever they may be.
7. I assume that only her is possible in English. In Norwegian, which otherwise behaves like English in present respects, one may (preferably with verbs like overlate (leave over to)) also use a full NP.
8. Read '$^{\wedge\vee}R(\mathcal{P}_2)$' as '$^{\wedge}(^{\vee}R(\mathcal{P}_2))$'
9. The choice of NP is of course restricted; an approximate set of conditions are indicated in (19).
10. The condition about [-Anaphoric] will provide for the desired 'binding' in cases like John was attempted murdered; details can not be entered presently.
11. We have reached this conclusion without offering the rule-system A itself, which is also unnecessary. An unpublished version of a system doing the required tasks is given in Hellan 1978; providing it here will require too much space.

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