NyS

The Extended Standard Theory

A presentation with reference to topicalization in Danish

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0. Introductory remarks

The aim of this paper is to present the so-called Extended Standard Theory (EST) and to illustrate its empirical content through an application to some grammatical problems in Danish related to the fronting of verb phrases. Section 1 is devoted to a general presentation of EST. The reader who is familiar with this framework and who is interested only in the discussion of Danish might proceed directly to section 2, where the Danish examples are discussed in relation to some of the notions introduced in section 1.

EST was developed in the 1970s through the contributions of many linguists working on several languages, a development which so far has reached a culmination in the theory discussed in Chomsky 1981. This work contains the most recent and complete account of the structure of a grammatical theory within the general framework of transformational generative grammar. To some extent, it even contains a wholesale rethinking of many aspects of such a theory. Most of what I am going to say will therefore also be found in this work of Chomsky.

In my presentation of EST, I have tried to presuppose only minimal knowledge of both general assumptions (section 1), and of more specific hypothesis (section 2). In this way, I hope to lend a hand to the reader who wishes to go into the details of the current debate within transformational generative grammar. As for the application of EST to Danish, I have tried to select grammatical problems which both illustrate central parts of the theory and which also gives a global idea of the structure of the Danish sentence from the generative transformational point of view. Through this selection, I hope to give most readers sufficient background to evaluate the articles following my own contribution to this volume.

As for my own practice of reference, I have found it useful to give few references in the text, and to present a list of 'further readings' at the end of each section.

1. General assumptions

1.1 The structure of a grammar

EST takes its object of analysis to be the sentence, and a grammar is conceived of as a set of statements which characterizes the sentences of a particular language such as Danish. The general linguistic theory is thought of as a theory of grammars of particular languages. This theory is often called Universal Grammar because it is supposed to contain a set of universal hypotheses which explains the facts of particular languages. It is this general linguistic theory which is the central object of research within generative grammar in general, and thus also within the framework of transformational generative grammar.

The analysis of a sentence is supposed to consist of formal properties which can be attributed to one of a set of specific linguistic levels such as the level of phonetics, phonology, words, higher level syntax, and meaning. Each linguistic level is supposed to be related to the others in a principled and rule-governed way determined by the theory. This claim of an interesting relation between the different linguistic levels constitutes one of the distinctive features of generative grammar compared to other views of grammar.

The sets of properties which are supposed to be related by a grammar include at least those which can be attributed to its outer form or to its meaning. The outer form is represented at the level of phonetic form (PF). PF is a complex structure which is composed of a phonetic representation of morphemes (or words) organized in ordered and hierarchized phrases. The meaning of a sentence is represented at the level of logical form (LF). At LF the sentence is assigned such properties as the scope of quantifiers, the organization of noun phrases in co-referring chains, subject-predicate relations, and much more.

Given these assumptions, the theory should somehow state a relation between PG and LF. Within EST, this relation is expressed indirectly in the following way. A finite set of syntactic rules generates (enumerates or derives) an infinite set of abstract syntactic structures called S-structures (S = shallow). Each such S-structure is then converted into a LF and a PF by two different sets of rules. These two sets of rules constitute: the LF-component and the PF-component respectively of a grammar.

The S-structures generated by the syntactic rules are not derived directly by a single set of rules. Each S-structure is derived from a corresponding D-structure (D = deep) by the rule called 'Move-α' (henceforth: Alpha). Alpha may move any phrase anywhere, and it constitutes the transformational component of a grammar. The main function of a D-structure is to

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determine the grammatical functions of a sentence, the complement structure of each of its phrases and the assignment of thematic roles such as Agent to the phrases in the sentence which function as arguments.

What about the function of S-structures? From the point of view of PF, the S-structures are supposed to contain the information which is necessary to derive the phonetic form of a sentence. There are two major differences between a S-structure of a sentence and its corresponding phonetic form. Firstly, all 'empty' phrases, which arise in part as a consequence of the applications of Alpha, are represented at the level of S-structure, but not at the level of PF. Secondly, most inflectional information will be present in S-structures in the form of grammatical features, but at the level of PF, they will only be present as phonological entities. S-structures and phonetic forms are thus different types of structures both with respect to the number and the kind of information they contain. From the point of view of LF, S-structures are supposed to contain the necessary information to derive the corresponding logical forms, but only by taking into account the information given at the level of D-structure (see the preceding paragraph). D-structures and S-structures are different only with respect to the structural changes which can be introduced by Alpha. S-structures and logical forms are quite different types of representation. The logical form of a sentence represents directly the formal aspects of its meaning, while this is not the case at the level of S-structure. Notice that EST claims that the logical forms are derived from S-structures and that this derivation is claimed to work only if the information of D-structures is taken into account. This role of D-structures and S-structures are one of the distinctive features of EST compared to other generative apporaches to the theory of grammar.

So far, I have said nothing about the derivation of D-structures. They arise through the joint operations of the base component of a grammar, which consist of two subcomponents: the lexicon and the categorial component. The lexicon consists of a list of the language in question, for example the morphemes of Danish. The categorial component derives phrase structures with some kind of indication of the positions where the morphemes of the lexicon can be inserted, and a general insertion principle feed these positions with the right morphemes. It is the phrase structures containing inserted morphemes which are called D-structures.

The outline of the theory of grammar just presented claims that there are at least four linguistic levels which contribute to the representation of a sentence and that these levels are derivationally related as illustrated in (1):

(1)

$$\text{D-structure}$$
$$\downarrow$$
$$\text{S-structure}$$

Phonetic Form   Logical Form
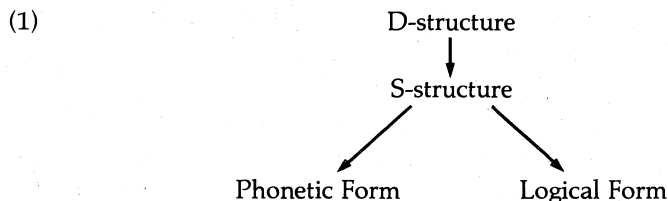
The relation between the outer form of a sentence and its meaning is thus stated by the rules which have been applied in order to obtain its different levels of representation, and the relation is expressed through the mediation of both the level of D-structure and the level of S-structure. The general theory of grammar, which determine the form of a grammar and its derivational power, is thus testable both in relation to particular forms or meanings, and in relation to pairing of forms and meanings.

The different rule types postulated in order to relate the outer form of a sentence and its meaning are organized in components as illustrated in (2):

(2)
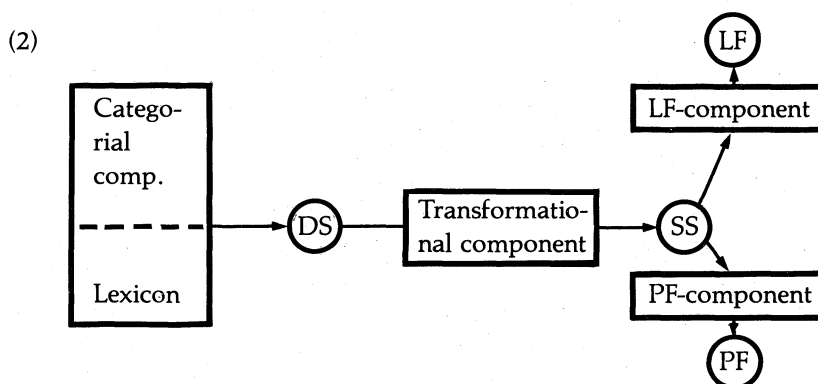
The structure of a grammar illustrated in (2) is determined by the theory of grammar through the principles stated in the presupposed sub-theories, and through the principles which govern their interaction. Besides the type of rules and the properties of each level of representation already mentioned, the theory of grammar contains the following sub-theories:

(3)   a.   *Government theory;* the central notion of this theory is the relation between the head of a construction and phrases which are dependent on it, for example the relation between the verb and its complements.

b. *Theta theory;* this theory is concerned with the assignment of thematic (or semantic) roles such as *Agent, Theme* and *Location.*

c. *Case theory;* this theory assigns abstract syntactic cases and explicate their morphological realization.

d. *Control theory;* this theory determines the potential for reference of the abstract pronominal element called PRO.

e. *Bounding theory;* this theory determines among other things the domain within which some of the rules of grammar might relate two items.

f. *Binding theory;* this theory is concerned with the relation between different items such as pronouns and their possible antecedents.

The sub-theories mentioned in (3) and those presupposed in (2) constitute an essential part of the theory which has been developed within the framework of EST in the 1970s. Before turning to details, I would like to make a few comments on the status of this theory in relation to its model or its object.

Further readings: The general structure of grammar is presented and discussed in Chomsky 1981, 1982. A first version of this theory was presented in Chomsky and Lasnik 1977. An alternative theory within the framework of EST was proposed in Riemsdijk and Williams 1980. References to works on the different sub-theories is given in section 2. The idea of a generative grammar is developed in Chomsky 1955, 1957 and in many introductions to formal grammar, for example in Kimball 1973 and in Maegaard, Prebensen and Vikner 1975. Last but not least, I would also like to mention two introductions to EST: Radford 1981 and Platzack 1982.

1.2 The object of inquiry

The theory I have just sketched is said to be an idealized theory of language acquisition which has as its object the knowledge that a human being has about his language. This knowledge is often called grammatical or linguistic competence.

To say that grammatical competence is the object of the theory implies that it is a relatively independent system among other systems of our world, and especially among the cognitive systems which are attributed to the mind of human beings. Such a realistic position does not preclude the possibility of interaction between the different systems. To the contrary,

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it seems rather natural to ask whether there are such interactions and how they work. To take just one example, it would not be surprising if grammatical competence and knowledge of the world interact at the level of the lexicon (semantic properties of words) or at the level of logical form (referential properties). Whether there exists such a relation or not is an empirical question which can not be decided without an empirical theory. And that theory does not yet exist. Let us therefore just conclude that EST takes grammatical competence to be represented in the mind, and that this statement both implies a simplification and points to some possible interactions between different systems.

The simplification just mentioned is an application of the idealization strategy adopted within EST. It is this strategy which is responsible for the expression 'idealized theory'. The strategy simply recommends the linguist to abstract from some of the factors which seem to interfere or which interfere in fact with the object to be studied in order to concentrate the research on a particular problem or set of problems, i.e. the problem of characterizing grammatical competence and its emerging in human beings. The most discussed idealization adopted within EST is perhaps the one which is based on the competence-performance distinction. Performance factors have to do with the use of language in concrete situations, and those factors are not part of the object which is dealt with in the theories proposed within the framework of EST. There is, however, no reason to drop this idealization in the context of the problems dealt with within EST because there has not yet been proposed an explanatory performance theory which can take over the role attributed to the competence theory proposed within EST.

The more interesting part of the assertion presented in the first paragraph of this subsection states that the theory of grammar is a theory of both grammatical competence and its acquisition. What does this mean? Stated rather simply, this position can be explained in the following way. An adult speaker of a language knows his language in a way that is determined by his grammatical competence. This competence is represented by a grammar of the language in question including the principles of its functioning. Idealizing a little, we may say that this system of knowledge is in a stable state, and that it arises out of an initial state as a product of the acquisition process. What is the initial state, i.e. the system of knowledge which allows for the development of the stable state through the acquisition process? The answer to this question is: that grammatical or linguistic knowledge which is represented by the general theory of grammar. Thus, it is postulated that human beings have or reach a common general linguistic competence, which is represented by the theory, and that gram-
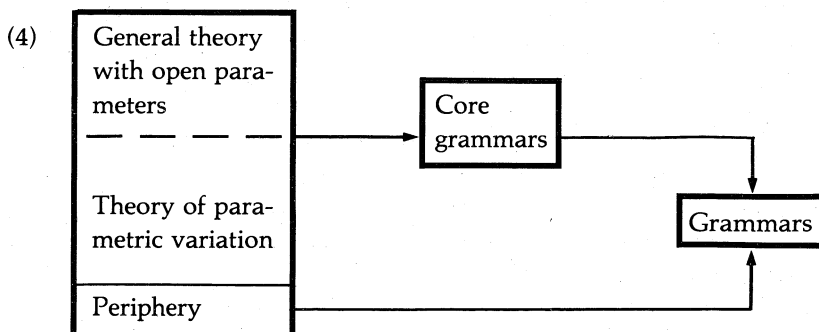
matical competence of a particular language, which is represented by a grammar, is a realization of the potentialities determined on the more general level. This postulated relation between general linguistic competence and its particular realizations permits the linguist to discuss at least some of the problems related to acquisition without going into the complex details of the acquisition process itself.

So far, I have talked about the theory as if all its parts functioned in the same way in relation to the acquisition problem and as if experience did not play any role in the triggering of the process. The position of EST is however more complex. The theory has a stable part which corresponds to that part of the linguistic knowledge which is common to all languages and which becomes operative under all conditions of exposure to linguistic experience. This hypothesis implies that even if exposure to experience is a necessary condition to make the system operative, there will be no direct relation between the experience and the triggered competence. In this domain, it is to be expected that the properties of language postulated by the theory are underdetermined by the available experience and that they are true of the linguistic competence attained by all speakers of particular languages (perhaps vacuously in some cases).

If the theory had only a stable part, we would expect that all speakers had the same competence. It must therefore allow for some variation, given the fact that we do not all speak Danish. This part of the acquisition problem is attributed to the theory of parametric variation. A parameter is a constant which under different conditions can take different values within some limits. The ordering of constituents in a sentence is a typical problem which is supposed to be accounted for by the theory of parametric variation. The basic assumption of EST is that the theory in some cases allows for the choice of a particular value of a parameter within limits determined by the theory. Each permitted choice of parameters determines a grammar. Such a grammar is called a core grammar. Fixing of parameters requires direct exposure to relevant experience. Notice, however, that a given choice of parameters extends far beyond this experience. All speakers of a given language will therefore have the same grammar even if their linguistic experience differs to some extent.

EST also makes a distinction between the core and the periphery. Each core grammar can be extended with a periphery of marked elements (single items, constructions, and marginal rules) which account for borrowings, historical residues, inventions, and so on. All peripherical phenomena are supposed to be learned one by one through direct exposure to linguistic experience, and the attained competence does not extend to other cases.

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Given the distinctions just mentioned, we obtain the following picture of the theory:

(4)

General theory with open parameters		
Theory of parametric variation		
Periphery		

General theory with open parameters / Theory of parametric variation — → Core grammars — → Grammars ← Periphery

Each core grammar is organized as illustrated in (2), and each grammar contains a core grammar and a periphery. All parts of the theory have not reached the same degree of explanatory force. I think it is fair to say that some of the most recent studies within EST show that the picture given in (4) has something to it. But neither the theory of parametric variation nor the hypothesis of a periphery has been formulated in a satisfactory way.

Further readings: The psychological interpretation of the theory is discussed in Chomsky 1975, 1980. The organization of the different subparts of the theory is discussed in Chomsky 1981, 1981a, 1982. See also Lightfoot 1982 and Huybregts and Riemsdijk 1982. For a discussion of Chomsky's position, see Piattelli-Palmarini 1980, Matthews 1979 and Katz 1981.

2. EST and Danish Syntax

2.1 Introduction

The aim of this second section of my paper is to present some of the hypotheses which have been proposed within the framework sketched in section 1, and to illustrate their content by reference to Danish. This part of my presentation will be structured around a few general problems in Danish syntax. I will suggest that the structure of Danish sentences is hierarchized as shown is (5)

(5) $[_{S''} \ldots [_{S'} \ldots V'' \ldots] \ldots]$

and that one of the positions to the left of S' in (5) can be filled only with maximally projected phrases, i.e. a phrase with a head and all the cate-

gories which is related to it. In accordance with the terminology of Diderichsen 1964 I will call the position just referred to the fundamental field (FF), cf. Diderichsen 1966:382. The structure of a sentence with an element placed in FF is as indicated in (6):

(6) $[_{S''} \ldots X'' [_{S'} \ldots]]$

My reasons to discuss (5)-(6) are the following. First of all, the problems raised by (5)-(6) interfere with nearly all parts of the theory to be presented. A discussion of these two rather simple structures allows me to run through the whole theory. Secondly, the structures in (5)-(6) seem to be crucial to the projection of V (verb). The main verb of the sentence is sometimes said to be the head of the clause, i.e. the head of S' in both (5) and (6). This position is taken in Jackendoff 1977. In Chomsky 1981, it is proposed that the project of V is V'' and that the constituent S does not have anything to do with the projection of V. If Danish has the structures shown in (5)-(6), these structures allow to refute in part the theory proposed in Jackendoff 1977. This discussion should illustrate how simple facts of a particular language such as Danish can be used to evaluate even tiny differences between relatively complex and abstract theories. Finally, there seems to be one clear difference between the theory presupposed by (5)-(6) and the field theory of Diderichsen, which has dominated the discussion of Danish (and other Scandinavian languages). (5)-(6) presupposes a theory of syntactic phrase structures in which the intuitive notion 'is part of' is explicated in terms of the domination relation. This later notion is not part of the field theory, which operates only with semantic notions such as subordination, cf. Diderichsen 1966:383, and ordered positions arranged in fields, cf. Diderichsen 1966:382. Through a discussion of (5)-(6) from this point of view I will show that the transformational generative grammar in its actual form has empirical consequences which show its superiority to the field theory. It is hoped that such a discussion will help the reader familiar with the field theory to grasp the presented theory.

I recall that the field theory, stated in a slightly generalized form, assumes the following approach to languages. The constituents of a sentence function as terms in a network of semantic relations, and each constituent is built up of a more or less complex set of morphemes or words. At this level of analysis the constituents of the sentence are unordered. Each language is then supposed to have a fixed set of positional schemes which consist of positions grouped in fields. A set of position rules places the constituents in the field positions in terms of their function, their semantic and syntactic type, and they may operate differently depending on the type of

the clause. The theory makes no claim which restricts the referential or operational domain of the rules: all types of clauses might have a different word order and a complex constituent could be placed either in terms of its parts, or as a unit. Whether it is one way or another in a particular language is a matter of accidental fact.

Further readings: The field theory is sketched in Diderichsen 1936, and elaborated in 1943, 1946, 1964. See also Hansen 1970, 1977.

2.2 Phrase structures

One of the central notions in EST is the notion of a phrase structure. Each level of representation has as its central part a phrase structure, but the relevant information, and to some extent also the available information, changes from level to level. I will therefore first present this notion without referring to the different levels to any great extent.

A phrase structure consists of ordered words grouped in types of phrases, which are arranged in a hierarchy. To see what this means, let us look at the structures in (7) and (8):

(7) $[_A \ldots [_B \ldots] \ldots [_C \ldots] \ldots]$

(8)   A

       ...   B   C   ...

          ...   .

The structure in (7) is called a labelled bracketing, and (8) is called a labelled tree. They give the same information, if they are used to represent the phrase structure of a sentence. Therefore, I will talk about them as if they were identical, and use them both depending on what I would like to illustrate.

The dots indicate that the structure might contain more phrases. A is said to dominate (or contain) B and C, and all phrases dominated by A is said to be a phrase of type A (or category A). Symbols such as A, B and C are called labels. All nodes in a tree have a label, and the lines between the nodes of the tree are called branches. The domination relation just referred to orients the tree from the top towards the bottom (from A towards B and C). The highest node is called the root of the tree, and the lowest nodes, which are labelled with morphemes, are sometimes called the leaves of the tree. If a particular node dominates more than one phrase as

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(9) $[_A \dots [_B \dots] [_C \dots] \dots]$

in (9) then they are strictly ordered, i.e. each of the dominated phrases except one is placed immediately to the left of one and only one of the others. B is thus placed to the left of C (note: A is not placed to the left of B. Two nodes can never satisfy the domination as well as the ordering relation. Notice also that the ordering of phrases easily could and perhaps should be changed to a partial ordering at some levels of representation), see section 2.4.

The symbols used as labels in (7)-(9) are taken from a set of categories in terms of which the theory is formulated. As labels they indicate types of phrases. EST is formulated in such categories as N″ (noun phrase (NP)) V″ (verb phrase (VP)), A″ (adjective phrase (AP)), P″ (prepositional phrase (PP)), ADV″ (adverbial phrase (ADVP)), Q″ (quantifier phrase (QP)), and so on. (The use of VP for V″ etc. has its origin in earlier theories). Examples of these categories are given in (10):

(10)   a. $[_{N''}$ Huset] er rødt
               The house is red

        b. $[_{V''}$ Givet ham bogen] har jeg ikke
               Given him the book have I not

        c. $[_{A''}$Rødt] er huset ikke
               Red is the house not

        d. $[_{P''}$ Til Per] har jeg ikke givet noget
               To Peter have I not given anything

        e.   Vi tager $[_{Q''}$ alle] til Paris

        f. $[_{ADV''}$ Uheldigvis] så jeg ham ikke
               Unfortunately saw I him not

(The examples are glossed rather than translated. Sometimes, as in (10), the glosses will be stated with the same word as in Danish. Notice also that I only give that part of the phrase structure which is relevant to the point I would like to make, here examples of types of phrases).

All the grammatical categories cited in (10) are lexical categories in the sense that they reflect directly the word class of the head of the phrase. The relation between 'head' and 'type' is expressed in the following way. The

theory contains a list of grammatical features in terms of which all grammatical categories such as N (noun), A (adjective) etc. are defined. For examples, see (20). Each grammar (or language) makes only use of some of these categories, but all categories can be 'projected' or combined with 0, 1 or 2 bars as illustrated in (11):

(11) a. N, N', N''
      b. A, A', A''
          etc.

The category with the highest number of bars is called the maximal (or major) projection of the category in question (N'' is thus the maximal projection of N). When these categories are used as labels on nodes, they must be distributed in accordance with:

(12) $X^n \rightarrow X^{n-1}$ ...

(12) means that an arbitrary category of degree n always dominates the same category of degree n-1. Thus, a maximally projected phrase always has the structure given in (13):

(13) $[_{X''}$ ... $[_{X'}$ ... $[_X$ ...] ...] ...]

In the unmarked case, it is also assumed that complements are introduced as constituents at the level X', and that all major categories have in part the same complement structure as stated in (14):

(14) $X' \rightarrow$ ... X ...

where X = N, V, A or P and where the dots are fixed. Structures generated by (12) and (14) are illustrated in (15)-(18):

(15) $[_{N''} [_{N'} [_N$ Ødelæggelsen] $[_{P''}$ af byen]]]
      The destruction of the town

(16) $[_{V''} [_{V'} [_V$ bage] $[_{N''}$ kage]]]
      bake cake

(17) $[_{A''} [_{A'} [_A$ glad] $[_{P''}$ for Karen]]]
      pleased with Karen

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(18) $[_{P''} [_{P'} [_{P} \text{ til}] [_{N''} \text{London}]]]$

While (12) and (14) are supposed to be part of the theory, the ordering of the head in relation to its complement is not. For Danish, this relation can be stated as in (19):

(19) $X' \rightarrow X \ Y''$

(19) is assumed to account for the order < head, complement > in normal and unmarked cases as those in (15)-(18).

    Thus, the assumptions made in the theory by (12), (14) and (19) are that the internal structure of phrases is identical across major lexical categories, and that ordering is introduced in particular grammars. The cross categorial identity concerns only the imposed levels and the complement structures. (As for Danish, the order is as postulated in (19) and illustrated in (15)-(18). The interesting point made within this theory is that it separates out plausible general features of languages in order to arrive at satisfactory explanations. If the analysis of (15)-(18) is acceptable, then Danish corroborates the theory to some degree.

    So far, I have said nothing about the internal structure of sentences, nor about the feature system which is supposed to underly the different lexical categories. The major lexical categories are defined as shown in (20), see Chomsky 1970, 1981:

(20) a. $N = [+ N, - V]$
     b. $A = [+ N, + V]$
     c. $V = [- N, + V]$
     d. $P = [- N, - V]$

The main function of this feature system is to impose a more detailed classification on lexical items, and thus also on phrases, in order to determine more precisely the domain of particular grammatical rules which are formulated in terms of sets of features. (20) allows for the formulation of rules in terms of: $[+ N]$, $[+ V]$, $[- N]$, $[- V]$, and the sets given in (20). I will not justify this feature system in relation to Danish.

    With respect to the internal structure of sentences, there does not exist the same degree of agreement. I will assume the following hypothesis. The S-system is a projection of the feature $[\alpha \text{ Tense}]$, which will be abbreviated as S. $[+ \text{Tense}]$ stands for finit and $[- \text{Tense}]$ for infinitival. The projection of $[\alpha \text{ Tense}]$, and thus of S, is given in (21a) and (21b) respectively.

(21) a. [αTense], [αTense]', [αTense]"
     b. S, S', S"

This system corresponds to INFL, S and S' in the theory proposed in Chomsky 1981. Notice that (21) is a projection system of the same nature as those given in (11), which are based on the categories presented in (20). (21) differs only from (11) because the selected features in (21) are grammatical, but not lexical, and because the defining features in (21) are allowed to be the same features with different values. I thus make a sharp distinction between the S-system and the V-system which is a projection of (20c). The V-system is illustrated in (16).

The projections of S are also related in a hierarchy as shown in (13). But how is this system related to other grammatical categories including projections of lexical categories? I will suppose that S (= [αTense]) is the direct or indirect orgin of tense morphemes and infinitival markers depending on the choice of [+ Tense] and [— Tense] respectively. Main clauses must be [+ Tense], embedded clauses may be either [+ Tense] or [— Tense]. If a clause is [— Tense], then S" dominates only S'. Assuming that the absence of [— Tense] in main clauses can be explained in terms of LF, the distribution of the feature [+ Tense] can be used to introduce the category called COMP or CP (complementizer) as illustrated in (22):

(22) [+ Tense]" ⇸ CP S'

The intended application of CP to Danish sentences is illustrated in (23):

(23) a. [_CP Hvis] han kommer, slår jeg ham
        If he comes, hit I him

     b. Jeg sagde [_CP at] han var gået
        I said *that* he had gone

     c. Manden [_CP som] jeg så var fed
        The man *whom* I saw was fat

     d. [_CP Hvem] er det?
        Who is it?

     e. Per ved ikke [_CP hvem] det er
        Peter does not know *who* it is?

CP dominates conjunctions in embedded clauses and wh-words (hv-ord) in both main and embedded clauses. Note that the generalization cap-

tured by (22) is that CP only occurs in tensed sentences. The group of words referred to in (23) are thus excluded in infinitival clauses, a fact which is natural given (22), and which is corroborated by examples such as (24):

(24) a.   *Hvis (han) komme, slår jeg ham
      b.   *Jeg sagde at (han) være gået
      c.   *Manden som (jeg) se var fed
      d.   *Hvem være (det)?
      e.   *Per ved ikke hvem (det) være

What is the internal structure of S'? Following Chomsky 1981:19, I consider S' to contain the constituents which contribute to the propositional content, i.e. subject and predicate. S' has thus the structure indicated in (25):

(25)   S' → S N'' V''

The effect of this rule can be illustrated with clauses containing the word *mon* (= I wonder if).

(26) a.   Mon [$_{N''}$ han] [$_{V''}$ kommer]
      b.   Mon [$_{N''}$ han] snart [$_{V''}$ kommer]

(27) a.   Mon [$_{N''}$ han] [$_{V''}$ er kommet]
      b.   Mon [$_{N''}$ han] lige [$_{V''}$ er kommet]

The same internal structure of S' is found in almost all embedded clauses as it is illustrated in the following sentences:

(28) a.   Per tror at [$_{N''}$ Poul] [$_{\hat{V}''}$ kommer]
      b.   Per tror at [$_{N''}$ Poul] snart [$_{V''}$ kommer]

(29) a.   Per tror at [$_{N''}$ Poul] [$_{V''}$ er kommet]
      b.   Per tror at [$_{N''}$ Poul] lige [$_{V''}$ er kommet]

The structure of main clauses is more complex. If the subject is placed as the first phrase of the sentence, the order is still < subject, verb >, but adverbs as *lige* (*just*) and *snart* (*soon*) are now inserted after the auxiliary and before the main verb as shown in (30)-(31):

(30) a. *Han snart kommer
      b. Han kommer snart

(31) a. *Han lige er kommet
      b. Han er lige kommet

In order to account for these differences, I assume the following hypotheses:

(32) a. The head of S″ is generated to the left of N″ so that the internal structure of S′ is $[_{S'} \text{S N}'' \text{ V}'']$.

      b. A rule which applies only in main clauses moves the tensed verb in V″ to the left and places it in the position S.

      c. The lexical elements which function as subject are generated either to the left of S′ or between S and V″.

      d. Between N″ and V″, it is possible to generate a set of adverbials under S′.

The crucial point made by (32 a, b) is that the tensed verb, which is of the form $[_V \ldots]$, ends up to the left of all other constituents of S′. As such a movement can be stated easily by the use of S, I have preferred this solution. Notice that this formulation implies that a tensed verb and the following V″ is not a constituent and that there is always both a N″ and a V″ in S′.

   (32c) allows the subject to precede the tensed verb as in (30b) and (31b) or to occur to the right of it as in (33)-(34):

(33) Kommer han snart?

(34) Er han lige kommet?

(30b) has the structure indicated in (35):

(35) $[_{S''} [_{N''} \text{Han}] [_{S'} [_V \text{kommer}] [_{N''} e] [_{ADV''} \text{snart}] [_{V''}]]]$

The element *e* is a particular combination of grammatical features such as Person, Gender, Number. It does not have any morphological realization. If the tensed verb is an auxiliary as in (31b), the main verb *kommet* is dominated by V″ in (35).

   (33) has the following structure

(36) $[_{S''} [_{S'} [_V \text{ kommer}] [_{N''} \text{han}] [_{ADV} \text{snart}] [_{V''}]]]$

The node labelled V″ dominates lexical material if the main verb is not tensed, for example as in (34), where the tensed verb is *er* and the main verb is *kommet*.

So far, I have presented the following general statements:

(37) a.   The theory has a list of categories defined in terms of features, containing at least S, V, A, P, ADV, Q, e and CP.

   b.   These categories are used as labels on the nodes of a tree in accordance with such rules as (12), (14), (19), (22) and (25).

   c.   These rules state how labelled nodes are ordered linearly and how they are arranged in a hierarchy.

As for the analysis of Danish, I have illustrated how (37) applies to the types of phrases in (10), to some phrases containing complements, cf. (15)-(18), and to the internal structure of sentences, cf. (22), (25) and (32). This analysis leaves open a lot of questions such as those mentioned in (38).

(38) a.   How is the lexical material introduced in phrase structures?

   b.   Why postulate both $[_{V''} \text{e}]$ and a V″ in Danish?

   c.   Are there reasons to believe in a unified three level projection?

   d.   How are labels introduced in trees?

These questions will be answered in part in the next sections.

Further readings: The basic work on phrase structures is Chomsky 1955. For adaptions to the X bar theory, see Chomsky 1970, Emonds 1976, Jackendoff 1977, and Lasnik and Kupin 1977. For different approaches to the S-system, and the V-system see Chomsky 1981 and Jackendoff 1977.

2.3 A derivation

Before answering (38), I would like to give an example of a derivation involving all levels of representation. Consider the sentence (39):

(39)   Vi er i samme båd.
    We are in the same boat.

At D-structure, (39) is represented as illustrated in (40):

(40)

```
                    S''
          ┌──────────┴──────────┐
         N''                    S'
          │              ┌───────┼─────────┐
         N'              S      N''        V''
          │                     │          │
          N                    N'          V'
          │                     │      ┌────┴────┐
          │                     N      V        P''
          │                     │      │         │
          │                     │      │        P'
          │                     │      │     ┌───┴────┐
          │                     │      │     P       N''
          │                     │      │     │        │
          │                     │      │     │       N'
          │                     │      │     │    ┌───┴──┐
          │                     │      │     │   A''     N
          │                     │      │     │    │      │
          │                     │      │     │   A'      │
          │                     │      │     │    │      │
          │                     │      │     │    A      │
          │                     │      │     │    │      │
          vi                    e      er    i  samme   båd
```
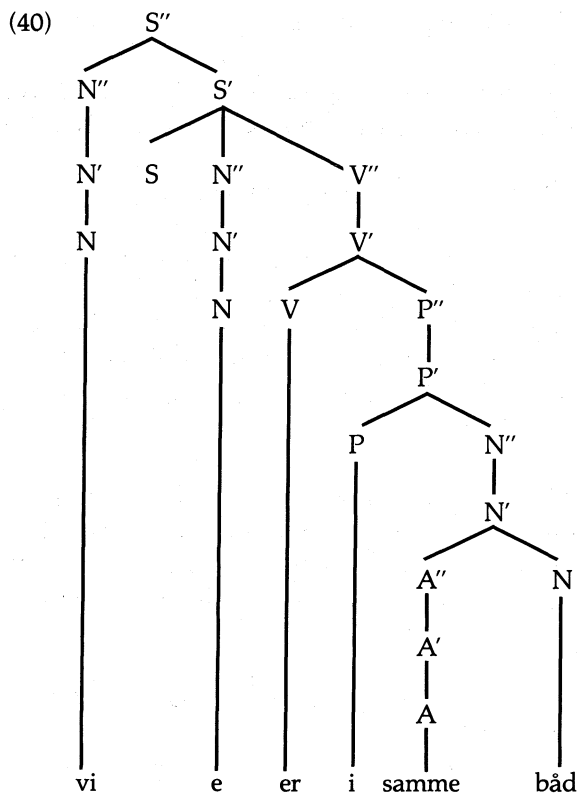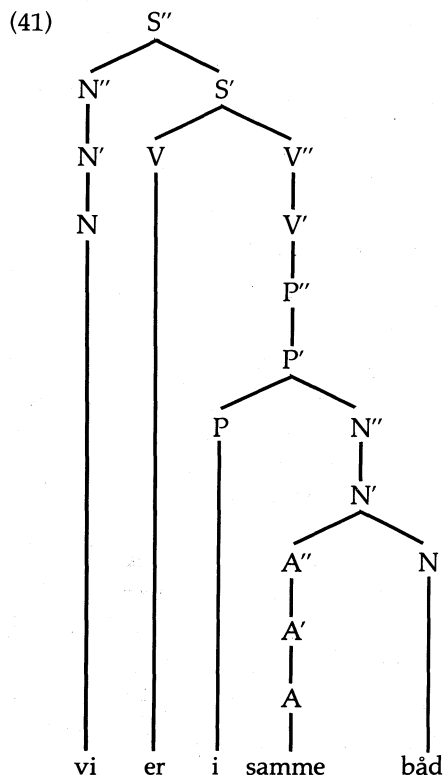
(40) is a function of two general sets of rules: the rules of the categorial component, which generate labelled phrase structures without lexical items, and the insertion principle, which inserts lexical items from the lexicon into the phrase structures generated by the categorial component. The insertion is based on a matching between the category of the lexical item and the category labelling the node where the insertion takes place. As I assume *vi* to be base-generated, (40) is also a S-structure. This S-structure is converted to a logical form in the following way. $[_{N''} e]$ is a variable in the sense that it has no inherent domain of reference. A special binding principle relates this variable to its antecedent *vi*. The propositional content of S' is translated directly from (40) without changes. This content contains the argument structure of S' and the subject-predicate relation. The fronted *vi* is thus taken into account only as an antecedent of a variable. If the verb assigns thematic roles to the arguments as a function of its lexical meaning, which I will assume to be the case with the verb *være*, they will be assigned at LF. For more details, see section 2.4. As a S-struc-

ture (40) is also converted to a phonetic form. This part of the derivation has two steps. The verb *er* is moved from its position in V″ to the position S by the rule of verb raising. The result of this operation leaves V″ intact except for the lost head, and it changes [+ Tense] to [+ Tense, — N, + V], cf. the definitions given in (21) and (20c). The next step substitutes all grammatical features such as [+ Tense] with the corresponding phonological spelling, and all empty elements such as *e* are deleted. The result is (41).

(41)
```
                    S″
          ┌─────────┴─────────┐
         N″                   S′
          │              ┌────┴────┐
         N′      V              V″
          │      │               │
         N       │              V′
          │      │               │
          │      │              P″
          │      │               │
          │      │              P′
          │      │        ┌──────┴──────┐
          │      │        P            N″
          │      │        │             │
          │      │        │            N′
          │      │        │        ┌────┴────┐
          │      │        │       A″        N
          │      │        │        │         │
          │      │        │       A′         │
          │      │        │        │         │
          │      │        │        A         │
          │      │        │        │         │
         vi      er       i      samme      båd
```

The derivation just illustrated shows some of the different roles assigned to the different components and to the different levels of representation. The base generates D-structures in accordance with the X bar theory and on the basis of the lexicon. D-structures are allowed to contain empty categories such as $[_{N''}\ e]$ with no phonological content. At the basis of a D-structure, a S-structure is derived by one or more applications of Alpha. This rule may change the ordering of phrases as well as their hierarchy. If

it moves a category somewhere, it leaves a trace (t), which is an empty category, and it coindexes the involved categories. If the fronted *vi* in (40) was moved from the subject position to the left of S', *vi* and *e* would have been related already in the transformational component. S-structures are in turn restructured and indexed to derive logical forms or phonetic forms. For a more detailed discussion of a particular derivation, see Nølke (this volume).

2.4 The lexicon and the projection principle
The lexicon is a list of morphemes (or words) containing information of the types mentioned in (42):

(42) a.   Phonological spelling
       b.   Morphological properties
       c.   Grammatical category
       d.   Subcategorization frame
       e.   Semantic properties

The lexicon contains also a set of rules such as word formation rules. As I will say nothing about rules which operate only in the lexicon, I draw the readers attention to the literature quoted in 'Further readings' at the end of this section. As for the analysis of words referred to in (42a, b), I will just illustrate it by spelling the words in the conventional way.

The grammatical category referred to in (42c) is of the same type as those used as labels in phrase structures at level zero, see (11).

The subcategorization frame indicates which categories the lexical item can be combined with in phrase structures. Each term of the frame depends on properties of the lexical item as a semantic unit, but so far, there has not been established a direct relation between those properties and the categories of the frame. Subcategorization problems are often treated in other frameworks in terms of valency properties. For an analysis of Danish and French verbs in such a framework, see Herslund and Sørensen 1982. Transposed to the present framework, this analysis can be written in terms of subcategorization frames as illustrated in (43)-(51):

(43) ____ (løbe/run)

(44) ____ N'' (eje en bog/own a book)

(45) ____ N'', N'' (give Peter en bog/give Peter a book)

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(46) ____ N'', P''   (give en bog til Peter/give a book to Peter)

(47) ____ S''   (tro at han sover/believe that he sleeps)

(48) ____ P'', S''   (sige til Hans at Jens sover/say to Peter that Jens sleeps)

(49) ____ A''   (blive syg/become ill)

(50) ____ N'', A''   (male byen rød/paint the town red)

(51) ____ P''   (bo i Paris/live in Paris)

In accordance with Chomsky (1982), I will assume that the categories used as labels in a phrase structure are in part determined by the lexical items in the following way. The X bar theory and particular feature distribution rules generate partially labelled and ordered phrase structures. When a lexical item is inserted in a tree, its category may not conflict with the features already present in the tree. A given category A must thus be inserted under an A in the tree or under the variable X. The insertion only takes place if the tree contains variables matching the number of complements in the subcategorization frame. The categories in the frame will then label the variables in the tree. The ordering of heads in relation to their complements follows the insertion of lexical heads. A subcategorization frame is thus an unordered set. This is indicated in (43)-(51) by a comma. This account answers (38a) and (38d).

The approach just sketched is presupposed in the formulation of rules mentioned so far. Rule (12) introduces only a domination relation. The same is true about rule (14). (19) states an ordering relation between a head and a complement, but it does not extend to all cases generated by selection of frames from (43)-(51). In order to account for all possibilities (19) can be reformulated as (19'):

(19') a. Complements follow their heads.
       b. S'' is never placed to the left of a constituent.
       c. Two complements are ordered with a N'' to the left of the order.

(19'c) is not sufficient to account for trees derived from the frame (45). The fact that the first N'' must be a particular subclass of indirect objects seems to me to point to a lexical solution. Rule (22) and (25) introduce both

labels and an ordering relation between the labelled nodes in question.

The semantic properties of lexical items referred to in (42e) include thematic (semantic or theta) roles. I assume that there are only three basic roles: THE(ME), AG(ENT) and LOC(ATION). These roles are attributed to particular lexical items, most often to verbs, and they may be modified in specific contexts. Within the lexical items, the roles are assigned to or related to the categories of the subcategorization frames. The proposed analysis is illustrated in (52)-(60) by an indirect reference to the frames of (43)-(51):

(52) Løbe
AG ____

(53) Eje en bog
LOC ____ THE

(54) Give Peter en bog
AG ____ LOC, THE

(55) Give en bog til Peter
AG ____ THE, LOC

(56) Tro at han sover
LOC ____ THE

(57) Sige til Peter at Jens sover
AG ____ LOC, THE

(58) Blive syg
THE ____ LOC

(59) Male byen rød
AG ____ THE, LOC

(60) Bo i Paris
AG ____ LOC

The notation in (52)-(60) suggests that the first role, which is placed before ____, is assigned to the subject. The roles following ____ are assigned to the corresponding complements, i.e. first role to the first complement in the written order etc.

Besides giving a relatively precise semantic description, thematic roles play an important role in the derivation of sentences. Chomsky has proposed two general principles which restrict the notion of a possible derivation. The first principle, called the theta criterion, is given in (61), see Chomsky 1981:36, 335:

(61) Theta criterion:
      At LF, each argument is assigned one and only one theta role, and each theta role is assigned to one and only one argument.

This formulation presupposes that the assignment of roles is to positions in LF which in turn are occupied by categories functioning as terms in grammatical relations.

The theta criterion is supplied with the projection principle, which I state in (62), see Chomsky 1981:29, 38:

(62) a. If a constituent is complement to the head H at LF, D-structure or S-structure, then the constituent is theta marked by H at the level in question.
      b. If a constituent is assigned a theta role by the lexical item I as a lexical property, then I assign the same role to the constituent in question at both LF, D-structure and S-structure.
      c. The assignment of roles is identical at all the mentioned syntactic levels.

(62a) states that subcategorization entails theta marking. (62b) projects the thematic structure of the lexicon to the syntactic levels in question. 'Thematic structure' includes 'subcategorization'. (62c) guarantees that the assignment of one role to a constituent at one level is identical to the assignment at the other levels. Some of the predictions of (61)-(62) are spelled out in (63):

(63) a. A given constituent can only be assigned a role if it is in an argument position, or if it is related to it by permitted grammatical processes.
      b. A given constituent can be moved from an argument position to a non-argument position.
      c. A given constituent can never be moved to an argument position from a non-argument position.

Whether the predictions of (63) are true or not in relation to Danish can only be established by a detailed study of the Danish sentence. However, it is interesting to note that if the analysis of Danish known from the field theory is correct as far as the verb and its complements are concerned, then it will be the case that (61)-(62) predict the permitted constituents after the main verb, given the analysis of V″ presented in the preceding pages, cf. (16), (25), (40) and the comments to (43)-(51). If this observation is correct, EST will explain some of the facts of Danish which are just noted as an accidental fact in the field theory.

The internal structure of S″ and S seems also pertinent to the principles (61)-(62), especially in relation to (63a). So far, I have assumed that S″ dominates both CP and S′, cf. (22). Say that CP is replaced by X″. This replacement still allows for the generation of complementizers in the first position, given the introduced principle of lexical insertion, cf. the remarks following (51). The first position in the main clause can now be labelled with any category which projects to the maximal level. This move is justified by the examples given in (10) and by the well-known fact that FF only accepts one constituent. The formulation just given is more precise than the traditional formulation known from the field theory. In accordance with that theory any constituent is allowed to appear in FF, given the unconstrained conception of position rules, cf. the remarks at the end of section 2.1. The X bar theory and my interpretation of it restrict the acceptable constituents in FF to maximally projected categories. As far as I know, there are no clear exceptions to this generalization. The fact that Danish apparently does not have a 'normal' FF in embedded clauses in the unmarked cases does not contradict the proposed analysis. In any approach to the distinction between main clauses and embedded clauses, one has to say something about the selection of conjunctions. In the approach assumed here, it would be easy to state the distribution of such complementizers as *at* (that) in terms of a feature rule which is sensitive to the configuration $[_{S''} \ldots [_{S''} \ldots] \ldots]$. I leave this question open and assume the proposed analysis.

The grammatical function of the constituents placed in FF can be of that type which is relevant for the assignment of thematic roles, cf.:

(64) a. $[_{S''} [_{P''} \text{Til ham}] [_{S'} \text{gav jeg en bog} [_{P''} \text{e}]]]$
          To him gave I a book.

      b. $[_{S''} [_{N''} \text{Den bog}] [_{S'} \text{har jeg givet} [_{N''} \text{e}] \text{til ham}]]$
          That book have I given to him.

c. $[[_{N''} \text{ Jens}] [_{S'} \text{ giver } [_{N''} \text{ e}] \text{ Poul en bog}]]$
Jens gives Poul a book.

The fronted phrases in (64) clearly depend on the verb, but the verb does not assign roles to phrases in that position. However, the empty elements in (64) are in the right positions. Thus, (64) could be base-generated as assumed, if it is possible to relate the fronted elements to the empty categories in a way already allowed for in the theory, cf. (63a). This is in fact possible. At the level of LF, the fronted elements will be related to the empty elements as an operator binds a variable. Within this approach, the empty category is a special kind of variable which only occurs in argument positions and which is bound by a phrase dominated by S''. The structures in (64) are thus in accordance with (61), (62) and the prediction stated in (63a). However, it should be mentioned that the binding relation just referred to needs some elaboration before the explanation of (64) can be called satisfactory, cf. Chomsky 1981: 183-185.

Let us now look at another problem which is related to the status of (61)-(63). Within the framework of the field theory, it has often been said that the predicate (= main verb) can be fronted only if it is not tensed. However, the formulation of this rule is an ad hoc stipulation: In the normal case, the main verb is placed in its position without reference to its complements. The main verb is thus considered a constituent like all other constituents. Given this analysis and the formulation of the fronting principle as a rule which places constituents in FF, one would expect to find the non-tensed main verb in this position. What one finds in FF is the verb with its complements (and much more). This fact is accounted for in the field theory by allowing two constituent analyses of the verb and its complements in order to state adequately the position rules. This analysis is clearly ad hoc because it does not extend to other types of constituents.

The problem just mentioned does not arise in the theory I am presenting. The rules and principles given so far allow only maximally projected phrases to be placed in FF. It is therefore impossible to place in FF an untensed main verb without its complements. The conception of constituents and rules assumed within EST correctly predicts the structure given in (65):

(65) $[_{S''} [_{V''} \text{ Givet ham bogen}] [_{S'} \text{ har jeg ikke}]]$
Given him the book have I not

Notice also that the fronting of prepositional phrases is correctly predicted by these rules and principles: it is possible to front the whole prepositional

phrase (a maximal phrase), but not just the preposition (a head), cf. (18) and the discussion of stranding in Herslund (this volume).

The internal structure of V″ and its mapping from D-structure to LF does not pose any special problems. It is however not clear how the auxiliary *har* (*have*) is placed correctly, and how the subject *jeg* (*I*) is assigned a role if V″ is generated in FF at the level of D-structure. Let us therefore say that the V″ is moved from its normal position within S′ to FF. In this case the principles (61)-(62) are not violated if and only if the movement takes place only after the level of S-structure, cf. the condition (62b). The movement solution allows also for a normal treatment of *har*, cf. the derivation presented in section 2.3. What is needed, then, is some reasons to move V″, and some others to do the movement after the level of S-structure.

Notice first that we cannot relate a V″ to an empty category of the same type in a binding relation. That would simply be a new ad hoc solution: There seems to be no other reason to extend the binding relation in question to verb phrases. This remark counts against (65) as a D-structure. Secondly, the raising of the tensed verb from V″ to S must take place after the level of S-structure in order to have the head of V″ at the bottom of V″ at this level, cf. (62a, b). Thirdly, if we accept the movement solution, then we need only refer to known processes: the verb raising rule and the movement of V″. Finally, we note that it is not necessary to order the application of these rules. If they operate before the level of S-structure, the derivation violates (62). If the verb raising operates after the fronting of V″, the otherwise obligatory percolation of [+ Tense] to V″, which is needed to 'tense' the verb if it is not raised, is impossible. The derivation is therefore out. The movement solution is thus quite reasonable. Given the principles under discussion and the analysis of S′, the correct structures fall out automatically. Both the principles and the analysis are corroborated without reference to ad hoc statements.

This conclusion is of some interest. First, it shows that EST in its actual formulation is superior to the field theory in explanatory power. Secondly, it shows that the distinction between a S-system and a V-system in the projection of categories leads to an explanation of the discussed facts in Danish. This explanation would be lost if we had to accept that V is the head of a system which includes what I have taken to be the S-system. Notice especially that both S″ and V″ can be fronted in Danish. The four level projections without a specific S-system proposed in Jackendoff (1977) are thus refuted by the data discussed, if my analysis is acceptable. And the three level projections assumed in this paper are corroborated. This corroboration answers the question posed in (38c). Finally, I note that the

explanation is produced by the joint contribution of the general principles, the constituent V''', and the generation of empty categories at the level of D-structure. This is the answer to (38b).

Further readings: The structure and the functioning of the lexicon are discussed in Dell 1970, Jackendoff 1974 and Aronoff 1976. Thematic roles are discussed in Jackendoff 1972, 1976, and in another framework in Gruber 1965 and Fillmore 1968. The system assumed in this paper is proposed in Korzen, Nølke, Prebensen and Sørensen 1983. The projection principle is proposed in Chomsky 1981.

3. Conclusion

In this paper, I have focused on a presentation of EST in the form proposed in Chomsky 1981. Section 1 should give an idea of the general framework, both with respect to the organization of grammars and with respect to the object of inquiry. Section 2 is devoted to an application of some specific hypotheses to Danish. At no point have I tried to go into details. Should the reader have had the impression that transformational generative grammar is a little bit complex, then he is on the right track. If the aim of linguistic theory is to explain in terms of an explicitly formulated theory, it seems that such a theory must allow for a rather complex interaction between quite different subtheories. Whether transformational generative grammar is on the right track or not is another question. It might be the case or it might not.

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