

**THE THEORY OF GOVERNMENT AND BINDING
EMPTY CATEGORIES AND MODERN GREEK SYNTAX**

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The paper offers a brief introduction to Chomsky's (1981) theory of Government and Binding and points out that this model represents a fundamental shift in the theory of universals away from transformational rules and towards a restricted set of constraints and conditions on the application of rules. It, then, focuses on the subtheory of Empty Categories, which constitute phonologically null but syntactically and semantically justified noun-phrases. Finally it examines the applicability of this theory to the grammar of Modern Greek with positive results.

The purpose of this paper is to present in a fairly general way Chomsky's theory which is referred to as «the theory of Government and Binding» (GB)¹.

The first and most thorough presentation of this theory is to be found in Chomsky's (1981) book entitled *Lectures on Government and Binding* (400 pages long) which, as the title indicates, is based on a set of lectures presented at the GLOW Conference in April 1979. Since then Chomsky himself has published another shorter (110 pages long) book on the same subject, *Concepts and Consequences of the Theory of Government and Binding*, has written another one, circulating in typescript and has promised yet another.

In addition to these, a large number of periodical articles as well as books have been published by Chomsky's colleagues and students. These accept the central claims of the GB theory, but try to explore its implications and extend and modify it.

All this activity shows that the GB theory constitutes a major turning point in transformational grammar. There are two different views expressed about it. Chomsky (1982:1) says that «it develops directly and without radical break from earlier work in transformational generative grammar, in particular, from research that falls within the framework of the Extended Standard Theory (EST)». Heny (1981:4), on the other hand,

1. This paper was presented to the Institute of Cognitive and Information Sciences of the University of Sussex.

claims that, «what has emerged now is a totally new theory». My view is that both of these statements are valid. Thus, it is quite true (as we will see below) that many of the essential properties of GB were around for some time before the 1980s, and that we can trace and motivate every step taken in terms of a previous stage, so much so, that it would be difficult to identify the breaking off point between the old theory and the new one. On the other hand, it is also fair to say that GB is not just another step in the progression from *Syntactic Structures* to today, but a new synthesis of ideas in such a creative integration that the resulting model is radically new and much more promising than anything that had appeared before.

The field at the present time is characterised by euphoria and excitement, but, as it is natural, it is also in a state of flux. This makes the task of presenting its essential properties in a brief but also fair way, quite difficult. For this reason, many of the technical details, some of which are quite important will be omitted or glossed over and whole areas of grammar such as the categorial component and the lexicon will not be discussed at all. On the other hand, I have chosen to focus on the sub-theory of Empty Categories, firstly because, I think that Empty Categories constitute the essential concern of the GB theory and secondly, because we can make some comparison between English and Modern Greek in this area.

Before I go into the details of the theory of GB it would be instructive to consider briefly its historical perspective. This will help us understand it better and it will throw some light on the question to what extent it is a continuation of the earlier theory and what constitutes its radical innovation. In judging the theory we should bear in mind that it must always be evaluated against the requirements of both descriptive and explanatory adequacy. This means that a theory must be (a) rich enough to account for the variety of actual grammars and (b) restricted enough to explain the fact that language is learned on the basis of limited evidence.

I assume familiarity with the so called Standard Model (ST) as presented in *Aspects of the Theory of Syntax* (1965). This is outlined in Figure 1 below:

Figure 1

The Standard Model (ST)

Base

- 1) PS Rules
- 2) Lexicon

↓

Deep Structures → Semantic Component

↓

Transformational Component

- 1) Transformational Rules

↓

Surface Structures → Phonological Component

As you can see the ST model consists of the base which is subdivided into the categorial component, i.e. the PS rules and the lexicon. The PS rules define the possible deep structure P-markers (constituent structures). The lexical insertion rules enrich the nodes of these P-markers with lexical items and thus the deep structure of the sentence

is generated. The deep structure is then sent, on the one hand, to the semantic component, where it receives a semantic reading (representation) and on the other hand, it is passed through the transformational component where cyclical transformations modify it in various ways. The output of the transformational component is the surface structure of the sentence. This then provides the input to the phonological component where it receives a phonetic reading (representation).

In ST the level of deep structure carried a very heavy functional load. Within ST the Katz and Postal hypothesis that transformations preserve meaning was accepted and turned into a methodological principle. Consequently, deep structure had to contain all the information necessary for the full meaning of the sentence. This resulted in a much more abstract underlying representation than had been envisaged in the *Syntactic Structures* (SS) model. In SS, the new descriptive device introduced by Chomsky, namely, transformations, was intended to capture relations among sentences sharing the same kernel string. Both the Structural Description (SD), that is to say, the input to the transformation, as well as the output, or Structural Change (SC) were fairly surface notions. For this reason, transformations were, in some sense, restricted or checked by the structural properties of the accessible surface structures, i.e. actual sentences. It could then be argued that in spite of the excessive power of transformations which could relate any string to any string, the fact that they connected almost surface structures to each other offered some hope for explanatory power.

In ST, however, the task of transformations was to relate a very abstract, semantically motivated and less syntactically justified deep structure to the surface string. This model then removed a great deal of the syntactic control on the SD of the rules and further increased their undesirable power.

The first step towards restricting the power of transformations was to abandon the Katz and Postal hypothesis and thus return to a more concrete underlying structure. However, it had become clear by now, that this would not be sufficient. Transformations even of the SS type were too open ended. There was no way, for example, of defining what a natural SD should be, what aspects of the SD are significant, etc.. Nor was there any hope for universally defining cross-linguistic generalisations in terms of SD and SC (i.e. in terms of transformations). Therefore, an explanatory theory based on transformations was rather unlikely, unless they could be significantly restricted. Thus, placing constraints on the rules became the primary concern since the mid-sixties. Firstly, in his paper «Remarks on Nominalisations» (1970), Chomsky argued convincingly that the relationship between, for example, a verb and its derived nominal (refuse-refusal) should be handled not by transformations but by lexical redundancy rules. This was generalised to all relationships which were traditionally classified as derivational morphology. As a consequence of this, a restriction was now placed on transformations that they must not change category labels. A verb cannot become a noun via a transformational rule, etc..

Secondly, the rejection of the Katz and Postal hypothesis removed the need for transformations which required referential identity between two NPs. Thus, transformations, such as Reflexivization, Equi-NP Deletion, Pronominalisation, etc. were eliminated. At this point it was realised that the remaining transformations were all involving movement of a constituent from its deep structure position to another one, generally to the left of the structure.

These movement rules, however, were still of a rather rich variety in terms of their

SD and SC, and there was no principled way of restricting the sets of input and output trees, if the focus of the rules was on individual SD and SC. A significant progress towards explanatory adequacy came about by the following two types of restrictions and these, I think, constitute a turning point in the theory. These are: (A) Restrictions on the output of the rules, which indicate what is a natural position for a moved element to land on. These characterise the notion natural SC. (B) Restrictions on the input of the rules which define what it is natural for a constituent to move out of, and thus offer a natural (universal) characterisation of SD. If SC and SD could be given restrictive and universal definitions, then there would be no need for each rule to make specific reference to specific SD and SC, and linguistic generalisations could now be made via the constraints and not via the rules.

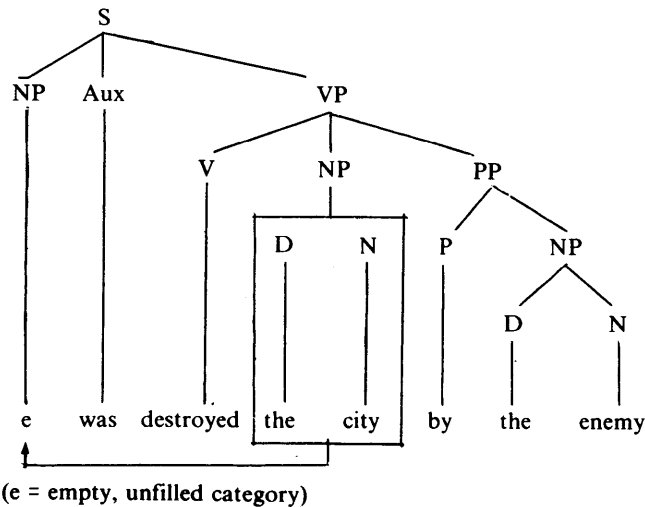
Emonds (1976) made a significant contribution towards the first type of constraints, by offering the so called «structure preserving constraint» applying to all cyclical transformations. He observes that cyclical rules move an item to an empty slot dominated by the same category label as that of the moved item, and that the host constituent is independently available in the P-marker.

We can state the constraint as follows²:

Structure Preserving Constraint

A constituent can only be moved by a substitution rule into another category of the same type.

1)

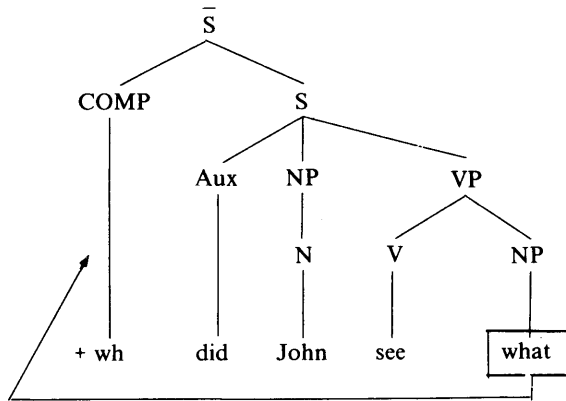


2. The formulation of the constraints used here and several of the English examples are taken from Radford (1981).

As shown above the passive transformation involves the movement of the object NP *the city* to the empty subject NP node.

Another very productive type of movement is that involving a *wh*-phrase. This moves a *wh*-word to an independently motivated COMP (Complementizer) node generated at the beginning of each clause, and adjoins it to the left of the complementizer, as shown in (2) below.

2)



In the case of *wh*-movement as in the case of NP movement exemplified in (1) with passive, the rule need not make reference to its SC. This is stipulated as a general output condition.

The second type of restrictions, which specify general conditions on input, were first mentioned in Chomsky (1964 - e.g. The A over A constraint) and then were further explored and elaborated in Ross' important Ph.D. dissertation. However, their significance and implications were most clearly captured in Chomsky's (1973) paper «Conditions on Transformations».

I will present and exemplify three of these conditions here, which are very crucial to the theory of Empty Categories. These are the following:

A) *Subjacency*

No constituent can be moved out of more than one containing NP or S node in any one rule application. Thus, NP and S constitute «bounding» nodes.

Let us consider examples of *wh*-movement in order to see how this rule interacts with subjacency.

3) [_S COMP [he will think [_S that [_S you were doing what]]]]

4) [_S COMP [you believe [_{NP} the rumour [_S that [_S Chomsky criticizes who]]]]]

If we assume that *wh*-movement moves a *wh*-word from its deep structure position to the main clause complementizer directly the rule will violate subjacency in both of

the above examples and the resulting structures (5) and (6) below would both be ungrammatical.

5) [_S what [_S will he think [_S that [_S you were doing e]

6) [_S who [_S do you believe [_{NP} the rumour [_S that [_S Chomsky criticizes e]

However, only (6) is unacceptable while (5) is correct. To account for this difference Chomsky proposed that wh-movement must be applied successive cyclically. According to this interpretation, in the first cycle, *what* is moved first to the COMP node of its own clause, then subsequently moved from there to the next COMP, etc., as shown in (7) below:

7) [_S COMP [_S he will think [_S that [_S you were doing what]]]

Under the successive cyclic analysis of wh-movement there is no violation of subadjacency in the derivation of (7). For (6), however, there is a problem as its derivation shows in (8) below:

8) [_S COMP [_S you believe [_{NP} the rumour [_S that [_S Chomsky criticizes who]]]]

In the first cycle the wh-item successfully moves to the COMP of its own clause; but from there it will need to cross two bounding nodes, an NP node and an S. Since the NP does not offer a COMP constituent to accommodate the moved wh-word, the movement cannot take place in this cycle. Therefore, in order for the wh-word to finally appear in main clause COMP it will have to violate subadjacency, but if it does the structure is ungrammatical as shown in (8).

B) Tensed -S Condition

No rule can involve two elements X and Y in a structure:

$$X \dots [S \dots Y \dots] X$$

where S is a tensed clause (finite clause)

This constraint allows the derivation of (10) from (9).

9) e seems [John to like Mary]

10) John seems [e to like Mary]

where *John* moves out of a non-finite, i.e. non-tensed clause, but prevents the derivation of (12) from (11).

11) e seems [John likes Mary]

*12) John seems [e likes Mary]

because in this case *John* has to move out of a tensed clause, thus violating the Tensed -S condition.

C) *Specified Subject Condition*

No rule can involve X and Y in a structure.

$$X [\alpha \dots Y \dots] X$$

where α is S-bar or NP containing a specified subject (lexical NP or trace)

This condition accounts for the difference between (14) and (15), below:

13) e seems [John to like Bill]

14) John seems [e to like Bill]

*15) Bill seems [John to like e]

NP movement cannot apply to move the object NP *Bill* to main clause subject position because this would be in violation of the Specified Subject Condition.

The contribution that the above constraints, and others not discussed here, have made to the theory of transformational grammar is significant. The model still contains transformational rules whose function remains to describe the same range of structures, i.e. passives, raised constructions, relative clauses, direct and indirect questions, etc., BUT, and this is the fundamental difference, transformational rules are no longer definable in terms of sets of structurally identified input trees mapped onto another set. Because of the conditions, transformational rules can now be reduced to one very general formula «move α ». The questions, what is moved, where from, and where to, are now captured by conditions with universal applicability. It is the conditions, then, rather than the rules which express now the linguistically significant generalisations.

After this historical introduction we may now move to the theory of GB and to the topic of Empty Categories (ECs).

We have discussed the constraints on what moves, where from and where to, we may now ask what happens to the position that is left behind by a moved constituent. Chomsky's answer to this is his «Trace Theory» (Chomsky 1975) given in the «Trace Condition» below:

Trace Condition

Any moved constituent of category X^n leaves behind an empty category (trace) of the same type coindexed with the moved NP.

The original motivation for «Trace Theory» can be summarised as follows:

Consider sentences (16) and (17).

16) beavers build dams

17) dams are built by beavers

These are considered to be transformationally related via the passive rule (an instance of NP movement). They share the same deep structure and semantically they are very similar, though not identical. In both sentences the NP *dams* is the object of result, and in both the NP *beavers* is the agent. These semantic relations of the NPs in a sentence are referred to as «Thematic relations» and more recently in GB as thematic roles or as θ -roles. They are assigned to NPs by virtue of their position in the deep structure P-markers in combination with the semantic properties of the NPs and the verbs involved. On the other hand, it has also been pointed out that (16) and (17) are semantically different in some ways. While (16) comments on the properties of beavers (beavers are dam builders), sentence (17) makes a statement about dams. This semantic difference is associated with the notion «topic» which is generally identified as the

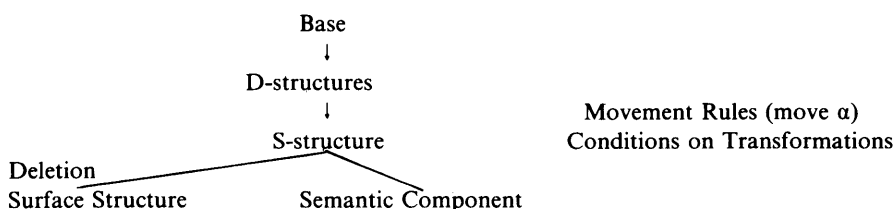
surface structure subject. We see, therefore, that both levels, deep as well as surface structure, have some semantic contribution to make and consequently the semantic component must make reference to both. However, if the deep structure position of an NP could be available at surface structure i.e. even after movement rules, the semantic component would only need to refer to this level. This has been achieved by trace theory. Thus, sentence (17) above would now appear at surface structure as (18) where e_i represents the coindexed trace of the moved *dams* and shows that *dams* is the direct object of *built* in deep structure hence its θ -role (object of result).

18) $dams_i$ are built e_i by beavers

Other arguments not only semantic, but also syntactic and even phonological, not presented here, have been put forward to justify the need for including the empty category trace (symbolised here as e) in the vacated node of a moved constituent.

To summarise the changes of the theory so far consider the grammatical model that has now emerged as in Figure 2.

Figure 2



(We will not discuss rules of deletion here).

So far we have identified one type of empty categories, namely, «trace» which is produced by movement rules. We will now justify the recognition of another empty category, i.e. another phonetically null, but semantically and syntactically present at S-structure NP. Consider the following sentences:

19) John seems [e to be nice]

20) John tries [e to be nice]

For reasons I will not go into here, (see Chomsky 1981: 25) infinitives are analysed in the deep structure as full clauses containing an obligatory subject NP constituent. The EC in (19) subject position is accounted for as a trace produced via NP movement which applies here because the main verb *seem* is a raising verb. However, the EC in (20) cannot be similarly generated. The verb *try* is not a raising verb and therefore, it cannot trigger a movement rule of the following embedded subject. Thus, *John* in (20) is generated as deep structure subject of *try*. The source of e in the embedded subject position must be the non-application of lexical insertion. This is possible, because lexical insertion is an optional rule. This EC is represented by PRO.

We have now two ECs, trace and PRO, and the question that we will consider is how these null elements might receive their interpretation. The original idea about trace is that it finds its lexical content from the coindexed and moved NP (see example (18)). PRO, on the other hand, follows a different principle referred to as «control». If PRO occurs as the subject of an embedded clause following a so called verb of control the reference of PRO is determined, controlled by the higher verb. For example, in (21) below,

21) John tried [PRO to leave]

the verb *try* is lexically marked as [+subject control], therefore, the reference of PRO is the same as the NP subject of *try*. In sentence (22) the main verb *persuade* is a [+object control] verb and thus the reference of PRO is the same as the direct object of *persuade*, namely, Bill.

22) John persuaded Bill [PRO to leave]

If PRO occurs in a non-control position, as in example (23) then its reference is arbitrary, i.e. it refers to anyone.

23) It is unclear [what [PRO to do]]

It must have become obvious from the above discussion that ECs, traces and PRO are semantically (referentially) dependent elements in the sense that they have no inherent content, but must receive their reference by association with some other explicit NP (except for arbitrary PRO).

This property of referential dependence is also shared by some explicit lexical items such as reflexive, reciprocal and other pronouns. These items, too, must or may be referentially bound, i.e. they must or may be coindexed with some appropriate antecedent. Could it be that the conditions that would resolve the dependence of the explicit anaphoric elements (pronouns, reflexives, etc.) are the same as those required for the coindexing of ECs? If this proved to be the case it would constitute a significant generalisation, because the conditions on movement which aim to guarantee the correct NP ... trace, configurations, the conditions on control for PRO, and conditions of binding (i.e. coindexing) of explicit anaphoric elements to their antecedents, would all be reduced to one type of conditions on anaphora. The theory that deals with establishing the conditions of coreference between a dependent element whether EC or not, and an antecedent is called «Binding Theory». Some of these conditions are the following:

Matching Condition

If two NPs are assigned the same index, they must match in features (number, person, gender, etc.).

C-command Condition

A coindexed antecedent must C-command the bound element. X C-commands Y if the first branching node dominating X dominates Y, and X does not dominate Y, nor Y, X.

It is also important to note that Binding can only take place within strictly defined structural units, whose delineation depends crucially on the notion of Government. Briefly, Government is a structural relation holding between an appropriate governor and a governee. Governors are lexical categories and the most typical of them are verbs and prepositions. Tense (i.e. finiteness) is also a governor for the subject of a tensed clause. Typical governees are NPs including of course ECs. Governing Category is the structural unit within which Binding operates. Its definition is given below:

Governing Category

α is the governing category of β , iff α is the minimal category (S or NP) containing β , a governor of β (and a subject accessible to β).

Binding also depends on Case. Case, nominative, objective, etc. is a syntactic property assigned to an NP through its governor. Nominative is assigned to the subject of a tensed clause only by its governor Tense; objective is assigned to the direct object of a

transitive verb and in some exceptional cases to the embedded subject of a non-tensed clause after certain main verbs. Objective is also assigned to the object of a preposition, etc..

The Binding principles are given below:

Binding Principles

- A) An anaphor is bound in its governing category.
- B) A pronoun is free in its governing category.
- C) An R-expression (i.e. referential expression such as names) is free.

Let us exemplify these principles:

24) John hurt himself

25) John hurt him

*26) Himself hurt John

27) He hurt John

28) John thinks that he will win

29) he thinks that John will win

In (25) above, the pronoun *him* cannot be read coreferentially with *John*, although *John* C-commands *him* and matches in features (singular - masculine) with it. On the other hand, the reflexive object pronoun in (24) can only be read coreferentially with *John*. Items like *himself* which are obligatorily bound inside their governing category, in this case the minimal clause that contains it, are called «anaphors». These items then follow principle (A) of the Binding theory. In (26) the anaphor *himself* cannot be bound to *John*, the only NP in the governing category of *himself* that matches it in features, because *John* does not C-command *himself*. Therefore, in (26) *himself* remains unbound (free) and this violates principle (A). In (27) *he* cannot be read coreferentially with *John*, but no violation emerges since *he* is not an anaphor and hence not subject to principle (A). In (28) the item *he* of the embedded clause is free within its governing category, i.e. the embedded clause, but it may be read coreferentially with the main clause subject *John* which C-commands *he* and matches it in features. Items like *he*, which are free inside their governing category, but may be coindexed with an appropriate C-commanding NP outside their governing category, are called «pronouns». These items follow principle (B) of the Binding theory. Examples (27) and (29) on the other hand, show that *John* cannot be coreferential either within its own governing category (27) or by a C-commanding and matching NP (*he*) in the higher clause, (29). Items like *John* i.e. «names» must be free everywhere and thus they follow principle (C) of the Binding theory.

Sentences (24) - (29) above show how the principles (A), (B) and (C) of the Binding theory apply to explicit NPs, which are thus divided into «anaphors», «pronouns» and «R-expressions». Let us now examine how these principles apply to ECs. Consider example (30) where *e* is the trace left behind by NP movement, generating the passive sentence:

30) John is fired *e*

The characteristics of this trace are the following: (i) It is in a governed position, it is in object position of a verb. (ii) It is also in a θ -position, since it is an argument (object) of a verb from which it receives its θ -role. (iii) It does not have case, because only transitive verbs can assign case to their objects. Passive morphology makes the verb intransitive and although passive verbs still govern an object NP, they cannot give it

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case. (iv) It must be bound to an appropriate NP inside its own clause. The trace in (30) must be coindexed with John. Thus, NP trace is an «anaphor» like the reflexive and reciprocal pronouns. These properties of NP trace are confirmed by raised structures which are also the result of NP movement, as shown by (31) and (32) below:

31) John seems [e to be nice]

*32) John seems [e is nice]

In (31) the trace *e* is not governed within the embedded clause, because there only a *Tense* could govern the subject, and the infinitive does not have *Tense*. However, according to the analysis given to raising verbs supported by independent evidence, the trace in (31) is said to be governed by the higher raising verb, *seem*. In (31) *e* is not case marked, because the raising verb that governs it is not transitive and thus it cannot assign case. The minimal category in which *e* of (31) must be bound is the main clause, because the main clause (not the embedded) fulfils the definition of governing category for *e*. The main clause contains the governor, main verb and the governee, the trace. Indeed trace *e* in (31) must be bound by *John*. In sentence (32), the embedded clause is finite, i.e. it contains the element *Tense*, which governs and case-marks with nominative the subject NP, here the trace. Therefore, the governing category of *e* in (32) is the embedded clause. In it, however, there is no appropriate C-commanding NP to bind the trace and thus the whole structure is rejected, because principle (A) of the Binding theory is violated.

Let us consider the properties of wh-trace. Consider first (33) below,

33) who [_S did you see e]

which contains a trace *e* produced by wh-movement. The characteristics of this trace are the following: (i) It is governed by the verb *see*. (ii) It is in a θ -position being the object of a verb. (iii) It has case, because it is governed by a transitive verb and transitive verbs assign the objective case to their objects. (iv) It is not bound inside the embedded clause which is its governing category. The embedded clause is the governing category for *e*, because it is an S, and it contains the governor of *e*. Therefore, wh-trace, does not obey principle (A) of Binding theory as was the case with NP trace. Wh-trace, then, is not an anaphor, but a variable and as such it is bound by an operator, namely, the wh-word in the COMP. Notice that, for the Binding theory to correctly treat the two types of traces it does not need to refer to their derivation, because they are differentiated on the S-structure by the absence for NP-trace vs the presence for wh-trace of the property of case. NP traces are not case-marked while wh-traces are. Notice, however, an interesting discrepancy in wh-traces.

34) who [do you think [e came to see me]]

35) who [do you think [that [they will appoint e]]]

*36) who [do you think [e came]]

It was mentioned earlier that wh-movement is successive cyclic and it obeys subadjacency. According to this interpretation the wh-item moves first to the COMP of its own clause leaving a trace in the position from which it moved. In the second cycle, the wh-item may move again, from its COMP now, to the next available COMP. This movement, too, would leave a trace behind. So, the first trace, a case-marked trace, hence a variable, will be bound by another trace in COMP, which in turn is bound by the wh-item of the next higher COMP or its trace, if it has been moved even further. In this way, we can provide an explanation for the apparent long distance dependencies between the original trace and the wh-word in its final COMP position. The question

that arises now is how to account for the irregularity in sentence (36), since none of the Conditions or the Binding principles seems to be violated by it. It has been proposed that if there are undesirable output structures which cannot be prevented from surfacing, without placing complicated and unjustified restrictions on the rules or the conditions, they should be rejected, or filtered out by surface filters. These filters will then allow the rules and conditions to operate in their most general way, whereas the filters will deal with, hopefully sporadic, and hopefully language particular phenomena.

The surface filter that will prevent structures like (36) is the so called *[that trace] filter given below.

**[that trace] filter*

A sequence of an explicit complementizer followed by an empty subject is disallowed.

This filter will mark as ungrammatical an output structure where an explicit complementizer, such as *that* or *whether*, etc., is followed by an empty subject constituent.

We may now consider the properties of the other EC, namely PRO, exemplified in the following sentences:

37) it is unclear [what [PRO to do]]

38) John tried [PRO to be nice]

The properties of PRO are the following: (i) PRO is ungoverned. In both (37) and (38) PRO is the subject of a non-tensed clause, so there is no Tense in it that could govern it, nor can it be governed by the higher verb *try*, since *try* is neither a raising verb nor one of the exceptionally marked verbs which could govern embedded subjects. (ii) PRO is in θ -position, since it is an argument of the embedded verb. (iii) It does not have Case. The interesting property of PRO is that, unlike traces, it is not governed and therefore, it cannot be said to have a governing category. Therefore, principle (A) does not apply. PRO is like a pronoun in that it can either find its reference, via control in the linguistic context as in (38), (Compare this with (28)), or outside of it as in (37), (Compare this with (27)). Consequently, PRO should obey principle (B) of the Binding theory, but principle (B) makes reference to governing category and PRO has no governing category. Therefore, principle (B) is not applicable, either. In conclusion the Binding theory does not give content to PRO.

We may summarise the properties of ECs thus:

Properties of ECs

traces are governed

NP-trace is not case marked and is an anaphor

wh-trace is case marked and is a variable

PRO is ungoverned and not case marked

Empty Categories in Modern Greek

I would like to consider the extent to which the theory of ECs is applicable to Modern Greek. If we find that the predictions of the theory are borne out by MG grammar, then their claim to universality and hence their explanatory power will be reinforced. On the other hand, if MG presents some variation we must examine whether it falls within the limits of parametric variation allowed by the theory. On this issue, Chomsky (1982:1) states «we hope that it will ultimately be possible to derive the complex properties of particular natural languages, ... by setting the parameters of general linguistic theory (Universal Grammar, UG) in one of the permissible ways».

Let us first consider the EC PRO within the context of MG. According to the Binding theory, PRO must be ungoverned and non-case-marked. The only possible ungoverned position is subject of a non-finite (non-tensed) clause, after non-raising verbs. One of the striking characteristics of MG, shared by other Balcan languages, is that it has no infinitive and therefore, all clauses, including complement clauses are finite (i.e. tensed). It would follow then, from the Binding theory that MG has no PRO. This is in fact borne out by examples like (39) - (41).

39) *den ine fanero* [*ti* [? *na kani*]]
not is clear what to do

40) *episa* to *jani* [? *na fiji*]
persuaded-I John to leave

41) *epise* ton *andra tis* [*na pane ta peδja mazi tu*]
persuaded-she her husband that the children go with him

(39) is the closest MG expression for an arbitrary reference PRO. If the subject of the embedded clause was a PRO, in this context, its reference would be arbitrary, i.e. it would mean «anyone» and the whole sentence could be translated as: «it is unclear for anyone what to do». However, the reference of the missing subject in MG (39) is not arbitrary as would be the case if this was a PRO, but specific as if the missing element were a pronoun. Sentence (40) is very close to English object control structures. So that if the embedded missing subject was a PRO, its reference would be obligatorily that of main clause object. There is, in fact a tendency for such coreferences to obtain as in (40), but this is not obligatory as is the case in English. Thus, (41) which contains the same verb *epise* (=persuaded) shows that in MG the subject of the embedded clause may be different from the object of the main. In main clause the object is *ton andra tis* (=her husband), while the subject of the embedded is *ta peδja* (=the children). This shows that the missing subject of a complement clause after the equivalent to English control verbs cannot be PRO in MG. If it were PRO it would have obligatorily controlled reference, but it does not. Therefore, it is not PRO, but some kind of pronominal.

Concluding this section we may say that the theory's prediction, which follows from the stipulation that PRO is ungoverned, is that MG should not contain PRO in its inventory of empty categories. This seems to be borne out. Let us now consider the status of NP-trace in MG. MG has passive constructions related to actives; thus, (42) below can be analysed as having an e, NP-trace, following the passive verb *pliyothike*.

42) *i maria pliyothike e apo to jani*
Mary was-hurt by John

This, however, is probably the only context where an NP may be governed, as required for traces, but it is not case marked. The other structures involving NP movement in English are raised constructions. Raising, however, can only move a constituent out of a non-tensed clause and since MG has no infinitives, all clauses are islands (in Ross' (1967) terminology), i.e. they do not allow movement to take place out of them. The prediction then that the theory makes about MG is that subject to subject raising does not exist. This is in fact, probably true, because constructions like (43) which might have involved subject to subject raising do not occur³.

3. It may be argued that the impersonal verb *fenete* (=it seems) is a raising verb in MG as it is in English. This is doubtful, however, for reasons discussed in Philippaki-Warburton (1979).

*43) o janis ine $\left\{ \begin{array}{l} \text{siyuros} \\ \text{piθanos} \end{array} \right\}$ [? na fiyi]

John is $\left\{ \begin{array}{l} \text{certain} \\ \text{likely} \end{array} \right\}$ [e to leave]

The third type of EC is variable trace produced by wh-movement. What is its status in MG? Consider sentences (44) - (45).

44) pjon [ayapa e i maria] or
 pjon [ayapa i maria e]
 whom loves Mary «who does Mary love?»

45) pjon [les [pos θa δjorisune e proedro]
 whom [do you say [that will appoint-they president]
 «who do you say that they will appoint president?»

46) pjos [les [pos [e irθe]]
 who [do you say [that [e came]]
 *«who do you say that came?»

There is no problem with either (44) or (45). Here e represents the wh-trace left behind by the movement to COMP of the who-word *pjon* (=whom). This trace is governed, and case marked by its governors the verbs, *ayapa* and *δjorisune*, respectively. Being case marked it is a variable, thus not bound within the S that contains it and its governor, but it is bound by the wh-word in the COMP constituent. What is different in MG, is that (46) is an apparent violation of the *[that trace] filter which accounted for the ungrammaticality of English sentence (36). Greek (46), however, is acceptable. We will try to account for this below.

So far we have seen that although Greek is in some ways different on the surface from English, the presence, as well as the properties of ECs in Greek are completely in agreement with the principles of the theory. The only difference and discrepancy being that Greek shows apparent violations of the *[that trace] filter. The questions which arise are: a) Can we find a principled way of accounting for this? and b) Can we identify the properties of the missing subject?

Consider the following sentences which occur very frequently in MG.

47) o janis γrafi
 John writes

48) γrafi
 writes-he «he writes»

49) γrafi o janis
 writes-he John «John writes»

In (48) there is no explicit subject, whereas in (49) unlike (47) the subject NP follows rather than precedes the verb. How do we analyse these sentences? We mentioned earlier that every clause must contain a subject constituent. According to this, (48) has a subject, but it is not filled in lexically. We may then tentatively say that we have an instance of an EC, whose properties we should try to identify. (i) Since it is the subject

of a tensed clause it must be governed by Tense, therefore, it is governed. (ii) Tense, governing the subject assigns to it the nominative case, therefore, our missing subject is case marked. Being case marked it cannot be PRO nor can it be NP-trace. It may be either variable trace or a pronoun. Here we do not have a wh-element binding it in COMP, so it must be a pronominal. Its being a pronominal also follows from the fact that it is free in its governing category as (48) shows, but it may be read coreferentially with an appropriate C-commanding NP in a higher clause as shown in (50) below:

50) *o janis ipe* [pos e *grafi*]

John said that writes-he

Here the understood subject of the embedded clause may be coindexed with the main subject *o janis*, and thus, the missing subject here follows principle (B) of the Binding theory.

We may now represent the missing subject of MG as *pro*, to differentiate it from either PRO or trace. The next question is the following. From (47) and (49) it seems that subject NPs may either precede the verb or follow it. In the case of *pro*, where is it located? Chomsky's analysis of Italian sentences, which are comparable to MG ones is as follows: The deep structure sentence pattern for English as well as Italian is NP INFL Verb, where INFL may be [± Tense]. If it is [+Tense] then INFL governs the subject NP. Italian and other similar languages which are called «pro-drop», because they allow missing subjects, contain a rule of moving INFL to the right of the verb. After this movement INFL can no longer govern the subject, and the subject NP, if it were to remain in preverbal position, would not receive case, and would therefore, violate the case filter, which requires that all explicit NPs must surface with case. Therefore, subject NP must also invert, i.e. move to a post INFL position, so that it will be both governed and will receive case from INFL. Sentences like (49) are explained in this way.

The derivation proposed by Chomsky for Italian sentences like (51) below,

51) *Giovanni mangia*

and consequently for the corresponding MG (47) is as follows: Although (51) and (47) appear to follow D-structure arrangement where NP subject precedes the verb, (51) and (47) are not reflecting a non-modified D-structure organisation, but are derived in three steps. First the INFL-Verb inversion must take place giving Verb-INFL, second the subject NP also inverts to post INFL position giving Verb-INFL NP (where NP=subject) and third the subject NP may optionally move from this post INFL, post verb position to the beginning of the sentence via topicalisation. So in Italian (51) and MG (47) the subject NP in initial position is not an argument proper, i.e. it is not in a governed by INFL position, but it is the topic. It would follow then that the subject argument in (47) is again the element *pro* following the verb. After this account of (47)-(49) we may now offer an explanation for the *[that trace] violations in Italian and Greek (see sentence (46)).

If we accept that MG, like Italian, contains this INFL Verb inversion rule very early in the syntax, followed immediately by subject movement to post verbal position, then all cyclical transformations applying to subject NPs will move it from this post verbal position. Consequently, any trace left by wh-movement of the subject NP will not be located between the complementizer and the verb, but after the verb. Under this analysis, sentence (46) does not in fact contain the sequence *that trace* and therefore, (46) is not a violation of the *[that trace] filter. Sentence (46) after wh-movement exhibits the structure shown in (52) below:

- 52) pjos [les [pos irθe e]]
 who do you say that came-he *«who do you say that came?»

From this, we conclude that English and MG do not differ with respect to *[that trace] filter. The important difference between the two languages is the INFL Verb inversion option which MG takes very early in its syntax. This option or parameter accounts for the order variation of major constituents observed in (47) - (49) and it also accounts for the apparent violation of the *[that trace] filter. There is, however, one more difference and this is the fact that MG contains subjectless sentences as (48), whereas English does not. This property also shared by Italian, is referred to as *pro-drop* parameter which should be linked to the properties of the constituent INFL of the verb. According to Chomsky's proposals (following the work of Rizzi 1979) the subject *pro* is an EC pronominal which is allowed because the verb INFL contains in addition to tense, etc., a personal ending including the features of person and number and possibly case. This ending then, includes all the information a subject clitic pronoun would include, and thus, separate subject pronouns are redundant, and therefore, may be missing, hence the *pro-drop* property. Another way of looking at it would be to consider the personal ending on the verb as being the subject pronoun. Under this analysis, all MG sentences have a subject element within the verb and thus no other subject element is structurally required. Explicit subject NPs, either in the form of full NPs or explicit pronouns, when present, would be considered as providing the lexical content of the subject pronominal ending, and placed freely in various positions within the sentence according to pragmatic and other pressures. (For an analysis of the missing subjects along these lines, see Philippaki-Warburton forthcoming)⁴.

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4. In Philippaki-Warburton (forthcoming) it is also argued that instead of a deep structure order NP INFL Verb, which is then obligatorily modified first by INFL inversion to NP Verb-INFL and then by NP subject postposition to Verb INFL NP... we could propose that the deep structure order for MG is Verb-INFL NP₁ NP₂ (NP₁ = subject, NP₂ = object). This solution is simpler since we avoid two obligatory rules and it is also justified by independent considerations discussed in Philippaki-Warburton (1985).

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