

# Formal approaches to language: The case of Generative Transformational Grammar

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## ΠΕΡΙΛΗΨΗ

Στο άρθρο αυτό επιχειρούμε να δείξουμε ότι ο βασικός στόχος της Γενετικής Μετασχηματιστικής Γραμματικής (Chomsky 1981, 1986, 1995 κ. εξ.) είναι να αποκαλύψει τις ιδιότητες του γραμματικού σχεδιασμού της γλώσσας και επομένως να κατανοήσει καλύτερα αυτή τη μοναδική ανθρώπινη ικανότητα. Εξετάζουμε τις δύο πιο αμφισβητούμενες πτυχές αυτής της προσέγγισης, την αυτονομία της γραμματικής και το έμφυτο των βασικών της στοιχείων και υποστηρίζουμε τη γενική τους ισχύ, παρέχοντας στοιχεία από τις ιδιότητες της Ελληνικής αλλά και από τη γλωσσική κατάκτηση.

**ΛΕΞΕΙΣ-ΚΛΕΙΔΙΑ:** Generative Transformational Grammar, formalism, functionalism, innateness, language acquisition

## 1. Introduction\*

The increased expansion of the field of linguistics within the latter part of the 20th century and its division into a number of subfields resulted in some quite distinct and very often opposing models of linguistic analyses. To examine each of them in detail is beyond the scope of this paper. What we propose to do is to focus on the dichotomy between formal and non-formal or functional approaches.

We must note that the term *formal* has been used to refer to a number of approaches which give emphasis to form rather than either meaning or function, or advocate formalisation of their descriptions. Examples of formal approaches are Generative Transformational Grammar (Chomsky's 1957 *Syntactic Structures* to Chomsky's 1995 *The Minimalist Program*),<sup>1</sup> Generalized Phrase Structure Grammar (Gazdar et al. 1985), Lexical Functional Grammar (Bresnan 1982, 2000, Falk 2001), Relational Grammar (Perlmutter 1983, Postal & Joseph 1990), Categorical Grammar (Steedman 1993) etc.<sup>2</sup>

By *non-formal* or *functional*, we refer to those approaches that uphold the view that form is so closely dependent on meaning that it is hopeless as well as unjustified to even attempt to derive the distribution of the formal elements of language by means of an independent set of principles. Non-formal linguistics also includes a fairly wide spectrum of approaches, such as Functional Grammar (Dik 1981, 1989), Role and

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<sup>1</sup> We use the term Generative Transformational Grammar, although it is no longer used for the recent and current theoretical framework we adopt, namely the *Principles and Parameters Theory*, with its two major frameworks, *Government and Binding* (Chomsky 1981) and *The Minimalist Program* (Chomsky 1995, 2000 et seq.).

<sup>2</sup> For a discussion of the different theoretical paradigms presented here see Borsley (1999), van Valin (2001), Sag et al. (2003), Carnie (2006), among others.

Reference Grammar (Foley & van Valin 1984, van Valin 1993) Cognitive Linguistics (Lakoff 1987, Langacker 1987, Golberg 1996, Croft 1991, 1995, Givón 1984/1986/2001) etc.

In this paper we concentrate on one formal theory, that of Generative Transformational Grammar (Chomsky 1981, 1986, 1995), which has been very influential in the development of linguistic theorising for the last 45 years. We will examine the two most controversial aspects of this theory and argue for their general validity, by providing evidence from the properties of Greek as well as from language acquisition.

The two most controversial claims that have been put forward in the course of generative theorizing are:

a) Human linguistic ability is innate, i.e. it is encoded directly in the human genome.

b) Language contains a computational system, whose primitive terms are non-semantic and non-discourse derived but purely syntactic, i.e. syntax is autonomous from semantics and pragmatics.

## 2. Arguments for the innateness of language

We will first consider the sort of evidence that leads to the position that language is innate. The arguments for innateness are basically arguments of ‘the poverty of the stimulus’ type (see Hornstein & Lightfoot 1981, Lightfoot 2000, Crain 2002). Children come to possess a complex system of linguistic abilities universally, quite rapidly, effortlessly, uniformly, and through the same steps (Crain & Lillo-Martin 1999), pathological cases aside. How can this amazing developmental scenario be explained?

According to generative theorizing, this knowledge cannot have been learned inductively given the latitude and vagrancy of the input (Hornstein & Lightfoot 1981, Lightfoot 2000, Crain 2002). The linguistic competence of children and adults includes properties that are not immediately obvious and not explicitly taught. In fact, the grammar that underlies our linguistic knowledge goes far beyond the actual sentences that an individual learner may happen to have been exposed to. Moreover, children do not have access to ‘negative data’, that is information about what does not occur in their language. So, how do children find out that certain things are ungrammatical in the language they are learning?

Chomsky claims that the answer lies in the hypothesis that part of our linguistic knowledge is innate. This innate predisposition, called Universal Grammar, has the form of abstract principles or constraints parameterized across languages, which explain not only the similarities but also the variation observed in human languages. Chomsky’s theory of Universal Grammar makes the following prediction regarding acquisition. Children’s developmental paths are constrained by principles of this innate mechanism. Therefore, children may not converge from the beginning to the target grammar, although the potential stages that they may go through correspond to some other possible human grammar and thus, crucially, do not violate principles of Universal Grammar (Pinker 1984, Crain 1991).

This is indeed born out by developmental data. There are a number of examples that show this but we will discuss here one, the production of medial *wh*-questions in child English (for details, see Thornton 1990, Crain & Thornton 1998). When English-

speaking children produce long distance *wh*-questions, they tend to use *wh*-questions without any complementizers, as shown in (1).

- (1) a. Who do you think is in the box?  
 b. Who does he think has a hat?  
 c. What way do you think the fireman put out the fire?  
 (examples from Thornton 1990, Crain & Thornton 1998)

However, as pointed out by Thornton (1990), a number of children produce instead long distance *wh*-questions with an extra *wh*-phrase in addition to the sentence initial one, as in (2).

- (2) a. What do you think what Cookie Monster eats? (age 5;0)  
 b. Who do you think who Grover wants to hug? (age 4;9)  
  
 c. What do you think what the baby drinks? (age 3;3)  
 d. What do you think really what's in that can? (age 3;9)  
 (examples from Thornton 1990, Crain & Thornton 1998)

These errors are quite systematic in the speech of the children who produce them (Thornton 1990). It is not obvious how such errors can be explained under a functionalist approach, given that they are not the result of the children's primary linguistic data and that the extra *wh*-element does not have any semantic function. However, within the theory of Generative Transformational Grammar, these patterns can be explained quite naturally: they are the product of the operation of a robust, internalised system, namely Universal Grammar. Universal Grammar allows the option of a second *wh*-element in a long distance question, as evident from the fact that although questions of this sort are not part of (adult) English, they are possible in other languages, such as German, as illustrated in (3).

- (3) Wer<sub>i</sub> glaubst du wer<sub>i</sub> nach Hause geht?  
 who think you who to home goes  
 'Who do you think goes home?'

Therefore, it appears that children learning English take a route that is not available for English but is nevertheless allowed by Universal Grammar. But what is more striking is that in choosing this option, children seem to adhere to Universal Grammar constraints that regulate the existence of medial *wh*-questions in the languages where these questions occur. For example, they never produce these types of questions with *which*-phrases or from infinitival clauses, in accordance with what is observed in adult German. This is exemplified in (4) to (7).<sup>3</sup>

- (4) \*Wessen Buch<sub>i</sub> glaubst du wessen Buch<sub>i</sub> Hans liest?  
 'Whose book do you think whose book Hans is reading?'

- (5) #Which Smurf do you think which Smurf is wearing roller skates?

<sup>3</sup> The symbol '#' indicates non-attested sentences.

(6) \*Wen versucht Hans wen anzurufen?  
‘Whom is Hans trying to call?’

(7) #Who do you want who to win?  
(examples from Thornton 1990, Crain 2002)

This indicates that whatever Universal Grammar constraints operate to exclude the structures in (4) and (6) in adult grammar (i.e. German, in this case) are also operative in early grammars (i.e. child English).<sup>4</sup>

As mentioned above, it is quite striking that the observed patterns are not the product of the children’s primary linguistic data. So, if there is no evidence from the environment, how is it that children come up with these options unless they are part of their genetic make up? It is not obvious how developmental data of this sort can find a plausible explanation under a functionalist approach.<sup>5</sup>

The existence of an innate, robust system operating with its own principles is further strengthened by the lack of particular errors in children’s speech. We will illustrate this by considering children’s knowledge of co-reference relations between pronouns and noun phrases. Sometimes, pronouns can have the same referent as another phrase in the sentence, as in (8a), but in other cases the pronoun must have a referent which is not mentioned in the sentence, as in (8b).

(8) a. While he<sub>i</sub> was dancing, the Trolli ate pizza  
b. He<sub>\*i</sub> was dancing while the Trolli ate pizza

This pattern extends also to cases where the pronoun is not overt (indicated by the empty category *pro*), as we observe in the Greek examples in (9).

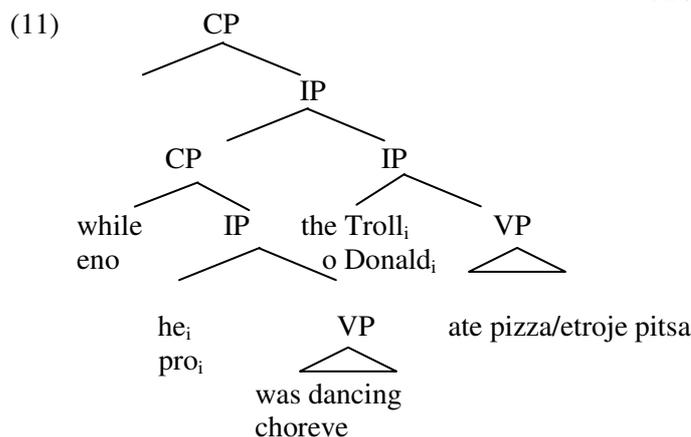
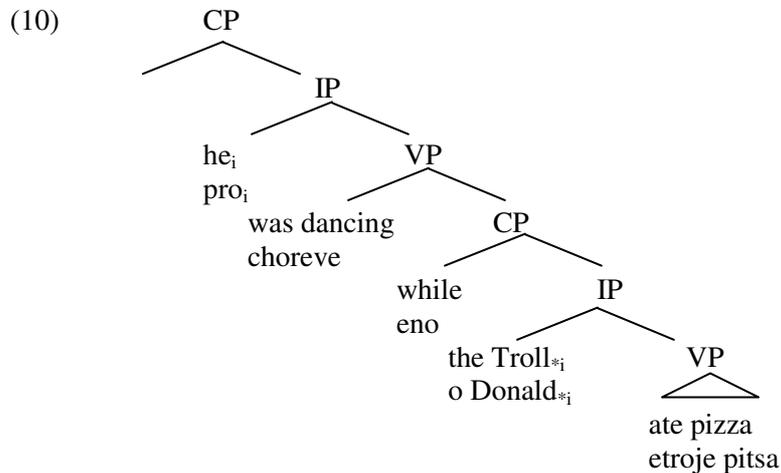
(9) a. eno pro<sub>i</sub> choreve, o Donald<sub>i</sub> etroje pítsa  
while pro<sub>i</sub> was-dancing-3SG the-Donald was-eating-3SG pizza  
‘While he<sub>i</sub> was dancing, Donald Duck<sub>i</sub> ate pizza.’  
b. pro<sub>\*i</sub> etroje pítsa eno o Donald<sub>i</sub> choreve  
pro<sub>\*i</sub> was-eating-3SG pizza while the-Donald was-dancing-3SG  
‘He<sub>\*i</sub> was eating pizza while Donald Duck<sub>i</sub> was dancing.’

Within Generative Transformational Grammar, the co-referential relation between overt or covert pronouns and noun phrases is determined by formal principles that make reference to structural properties. The difference in interpretation between (8a or 9a) and (8b or 9b) cannot derive from the linear order between the pronoun and the noun phrase nor is it semantic or pragmatic. It is structural. Sentences (8b) and (9b) correspond to (10), a structure that involves an embedded clause, where the pronoun is higher in the tree than the noun phrase. On the other hand, (8a) and (9a) correspond to (11), where the pronoun is not higher in the tree than the noun phrase. The structural

<sup>4</sup> The relevant constraints operating in (6) and (7) are presumably related to the phrasal architecture of infinitival clauses, i.e. to the fact that infinitival clauses may not be CPs and thus not have a Spec available for the *wh*-element to land. The non-availability of a medial *which*-phrase in (4) and (5) may be due to the fact that D-linked phrases, such as *which*-phrases, may not even involve movement. Again, the nature of the specific constraints is beyond the purpose of this paper.

<sup>5</sup> An anonymous reviewer suggests that medial *wh*-constructions constitute evidence for the strictly cyclic nature of the movement operation as a copying device (see Chomsky 2000, Nunes 2004, Corver & Nunes 2007). Obviously, these properties are non-functional and cannot be accounted for by such approaches.

relation that holds between the pronoun/*pro* and the noun phrase in (10) is called *c(onstituent)-command* and the constraint that determines co-reference in (10) and (11), namely Principle C, involves the notion of c-command. Principle C states that an R-expression cannot be coreferential with a pronoun that c-commands it (this formulation of Principle C is from Crain & Thornton 1998).



There is a great deal of experimental evidence that children by the age of 3, distinguish cases like (10) from cases like (11). In particular, 2-3 year olds correctly do not accept sentences like (10) approximately 90% of the time, while they accept sentences like (11) about 70% of the time (Crain & McKee 1985, Crain & Thornton 1998, Varlokosta 1999). This shows that they demonstrate adherence to the structural principle involved in the assignment of reference to overt or covert pronouns, namely Principle C. This adherence appears at such an early age that it is rather difficult to imagine how a theory that posits no innate predisposition could reasonably explain this sort of generalisations.<sup>6</sup> Furthermore, the generalisations we discussed seem to provide strong support for the thesis that children's knowledge of language consists at least in part of an autonomous and rather robust structural system.

<sup>6</sup> An anonymous reviewer points out that the arguments presented in this section are not only relevant for the innateness of language but also for the purely structural properties of syntactic constructions.

### 3. Arguments for the autonomy of syntax

So, let us now consider in more detail the sort of evidence which leads to the view that language contains a syntactic formal system and that this system is autonomous from the components which describe either the semantic or pragmatic properties of language. The autonomy of syntax entails the centrality of syntax, because it claims that we cannot derive the syntax from the meaning and the function. Syntax thus acquires priority,<sup>7</sup> since it is the computational system which generates the syntactic representations of sentences, which are then interpreted at the Logical Form (LF) (or at the Phonetic Form (PF)) component.<sup>8</sup> There are a great many examples that show this but we will discuss in detail one from Greek.

In Greek, it is observed that imperative verbs are different from indicatives and subjunctives in two respects a) they are followed (rather than preceded) by clitic pronouns, as shown in (12).

- (12) a. tu to edhosa  
 him-GEN it-ACC gave-1SG  
 'I gave it to him.'  
 b. dhose tu to  
 give-IMP him-GEN it-ACC  
 'Give it to him.'

and b) they do not combine with negation, as illustrated in (13).

- (13) \*mi dhose tu to  
 not give-IMP him-GEN it-ACC  
 'Do not give it to him.'

To express a negative order or a prohibition, we have to resort to a negative subjunctive, as in (14).

- (14) na mi tu to dhosis  
 na-particle not give-2SG him-GEN it-ACC  
 'Do not give it to him.'

How can we explain these differences between imperatives and non-imperatives? There is not any obvious semantic or pragmatic explanation. We cannot say, for example, that because imperatives express orders, requests, suggestions etc., they should not be negated. Many languages (e.g. English and also Greek at previous stages) have negative imperatives. Nor can we say that something in the meaning/function of imperatives explains the placement of the clitics after the verb. Nor can a functional semantic explanation show that these phenomena are connected. On the other hand, there is a formal explanation which shows that these phenomena are both natural reflexes of a deeper syntactic analysis.

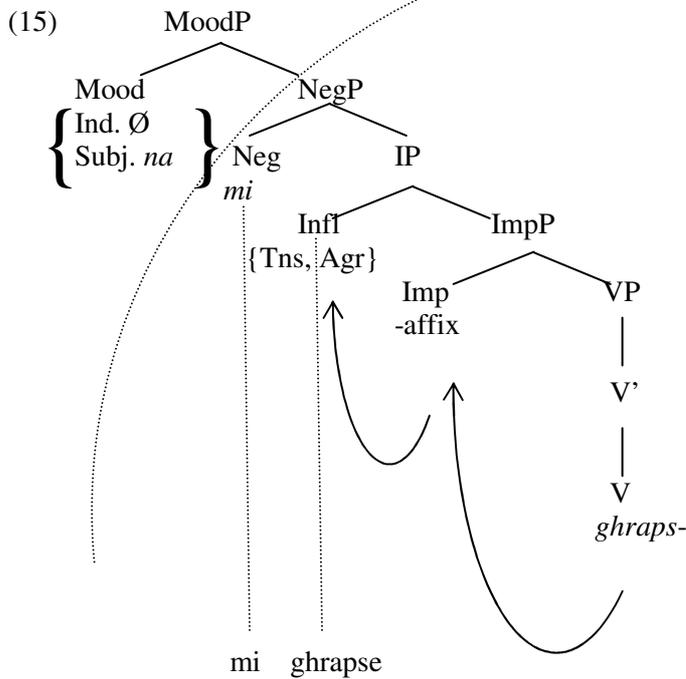
<sup>7</sup> An anonymous reviewer points out that it is not obvious whether this is a temporal priority or a significance priority. In the Minimalist Program it is implied that this is only a temporal priority, since the computational system feeds the interfaces, which are considered to be the only linguistically relevant components.

<sup>8</sup> Phonetic Form (PF) is the component of the grammar that interprets syntactic objects phonetically, whereas Logical Form (LF) is the component that gives information for the meaning of the sentence.

This analysis is as follows. The category of Mood [subjunctive, indicative, optative, imperative] was encoded in the verb ending in Classical Greek. Subsequently, the erosion of the phonological differences, which were invested in the subjunctive-indicative mood differences, set in motion a number of changes for the re-establishment of the subjunctive/non-subjunctive opposition. This was brought about by a gradual grammaticalisation of the purpose conjunction *ina* to the subjunctive particle *na* and its relocation from the position of the complementizer to the left of the inflected verb. The morphophonological exponent of the imperative was not eroded and thus the imperative remained expressed within the verb ending as an affix of the verb. Thus, for a while the Mood category was located in two different positions, outside and to the left of Inflection (for indicative and subjunctive), but within the inflectional verb ending for imperative. The well-attested tendency of grammars to generalise and to simplify the system led to the relocation of the Imperative feature within the newly created Mood Phrase outside and to the left of Inflection (Philippaki-Warbuton & Spyropoulos 2004). The two stages are shown in (15) and (16).

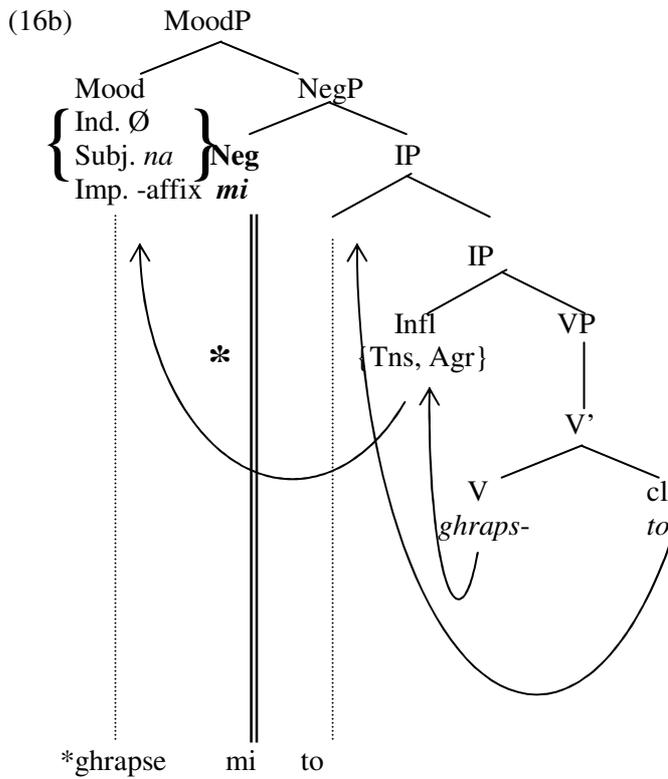
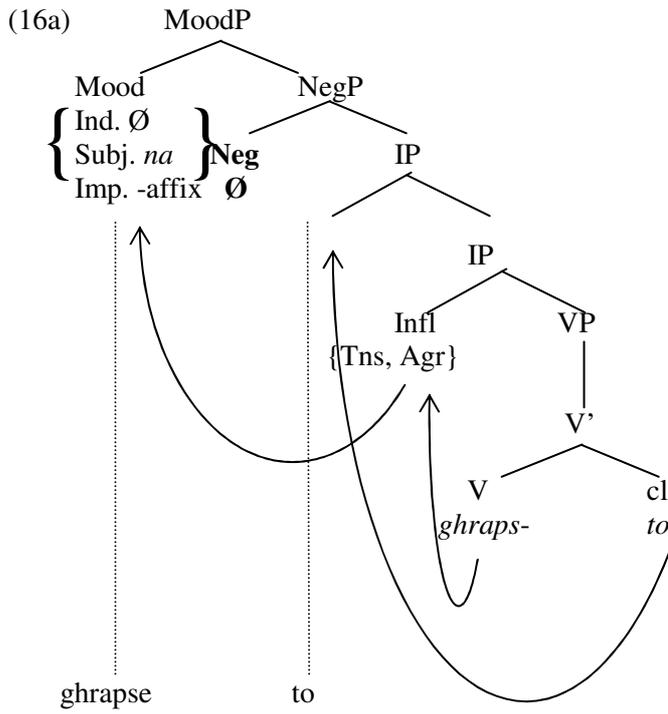
The derivation of the imperative in Hellenistic Greek, as shown in (15), involved the movement of the verb first to Imperative to check its imperative feature, and then to the Inflection to check its Tense and Agreement.<sup>9</sup> The imperative form is thus completed irrespective of the presence or absence of negation. The Negation being to the left of Inflection at this stage does not effect the formation of negative imperatives, which occur naturally.

Hellenistic Greek



<sup>9</sup> This diachronic account of the changes in the Mood system of Greek is unavoidably simplifying the actual picture. However, this simplification does not affect the main claims made here.

Modern Greek

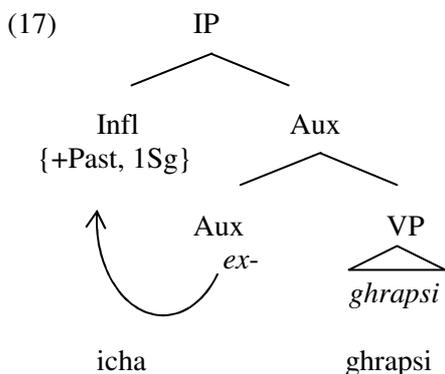


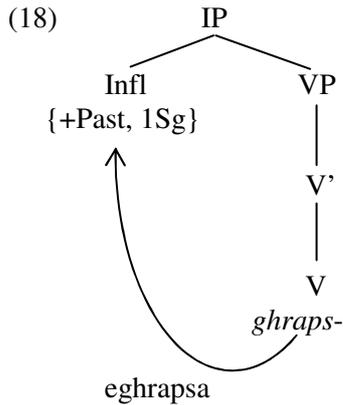
In Modern Greek the imperative affix is located inside the newly formed Mood Phrase, as shown in (16), and the derivation is as follows. The verb moves to Inflection to check Tense and Agreement but it cannot stop there, because it still has a mood feature, the Imperative, which needs to be checked, because it is an affix and without it the verb will not be complete. Thus, the verb moves to Mood Phrase to check the imperative. This movement is successful only if the Negation does not intervene between Mood and Inflection. If there is no negation, the move takes place, as in (16a). But if a negation is present between the Inflection and the target Mood Phrase, the verb movement is obstructed because in Greek (as in many other languages) Negation is a Barrier. The movement of the verb to Mood Phrase fails and as a result Greek does not have negative imperatives, as illustrated in (16b) (Philippaki-Warbuton 1994).

Regarding the order of clitics and imperatives, the explanation is as follows: the clitics, following the general rule, move to the left of Inflection. At this position, they do not obstruct verb movement so when the verb moves to pick up the imperative affix, it leaves the clitics behind, resulting in the order [Imperative V clitics], as in (16a).

The analysis proposed makes no reference to either semantics or function, nor is it clear how a functional explanation would be able to provide a unitary account for these properties of the imperative, which on the face of it seem to have no connection with each other. The principle that provides the foundation for this analysis is that inflectional properties are not only morphological elements of the word in which they appear but they also constitute separate syntactic projections. This is an insight that goes back to Chomsky (1957), where he, for the first time, separated the Tense-Agreement element (labelled then as C) from the verb forms, allowing thus a unitary description for inflected modals, auxiliaries and main verbs.

The analysis of Inflection as a separate projection is relevant to Greek independently of the imperative phenomena, as shown by the periphrastic perfect tenses, where the inflection appears on the *have*-auxiliary, if it is present, and, if absent, on the main verb. This state of affairs is best captured by separating Inflection [Tense Agreement] from the verb and placing it in a projection before the Auxiliary. When the Auxiliary is present, it will be the element that moves to Inflection (being the nearest appropriate target) giving the correct periphrastic perfect tenses, as in (17). If the Auxiliary is absent, the verb itself will move to take the inflection, as in (18).





From the discussion of the above example and many similar ones, we see that Generative Transformational Grammar focuses its attention on the formal characteristics of constructions and asks the question what are the fundamental properties of the formal design of language which can account for these phenomena. Furthermore, this theory attempts to discover whether apparently different characteristics of sentences are reflexes of the same deeper regularities or not. Another theory less abstract and less interested in the innateness hypothesis may be satisfied to simply list the different constructions and describe their features as idiosyncratic and accidental details. On the other hand, a functional theory may attempt a functional/semantic account. It may perhaps claim that clitics follow the imperative verb rather than precede it, in order to place the verb in first position and thus to communicate urgency for the action expressed by the verb. However, this explanation cannot be sustained because a prohibition (e.g. negative subjunctive in Greek) may be said to be even more urgent and yet it is expressed with a string in which the negative particle and clitics precede the verb. So, if urgency is the motivating factor for the order in positive imperatives, it should be equally applicable to negative commands. In our analysis, positive orders have the grammatical form of imperative, whereas prohibitions are expressed by negative subjunctives with different formal reasons for the different order of the clitics in relation to the verb. We see here that the semantics/function of positive and negative commands are satisfied by formally different constructions. If the meaning/function was the determining factor for syntax, we would expect the situation to be the reverse.

#### 4. Concluding remarks

In this paper we have tried to show that the basic aim of Generative Transformational Grammar is to uncover the properties of the grammatical design of language and thus to understand better this uniquely human ability. The hypotheses pursued are those of the autonomy of grammar and of the innateness of its basic features. We have also presented evidence that shows that a deeper understanding of this ability will explain a number of human situations involving language, such as language acquisition.

Before closing, we would like to add the following comments. The fact that we find the formal theory of Generative Transformational Grammar stimulating does not mean that we cannot appreciate the work done by functionalists. We feel that it is not only possible but also desirable to approach language from a number of ways, including semantic/functional ones. Language after all is not only a biological endowment but a

means of social interaction too. Therefore, it is important that linguists also study the effect that pragmatic or social parameters have on the language. Furthermore, some of these may also be universal and part of the biological endowment. Language is such a complex and multifaceted object that a) there is room for all kinds of approaches and b) only through a variety of approaches with a healthy dialogue among them can we hope to even begin to understand it.

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