Formal Linguistics: the nature of the enterprise and why we believe that language is not taught

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Αγαπητοί φίλοι, αγαπητοί συνάδελφοι, αγαπητοί φοιτητές,

Αυτή η διάκριση είναι μία απίστευτη τιμή για μένα. Το Πανεπιστήμιο της Κρήτης είναι ένα από τα καλύτερα πανεπιστήμια στην Ελλάδα και το γεγονός ότι στέκομαι εδώ μπροστά σας αυτή τη στιγμή με γεμίζει με ταπεινότητα και ταυτόχρονα φυσικά και περηφάνεια.

Θα ήθελα να ευχαριστήσω το Πανεπιστήμιο Κρήτης, το Τμήμα Φιλολογίας, και φυσικά κάπως ιδιαίτερα τους συναδέλφους μου στον Τομέα Γλωσσολογίας. Δεν υπάρχει αναγνώριση μεγαλύτερη από αυτήν που έρχεται από συναδέλφους. Σας ευχαριστώ πραγματικά από τα βάθη της καρδιάς μου.

Και τώρα με την άδειά σας θα ήθελα να αρχίσω να μιλάω Αγγλικά, βασικά για δύο λόγους. Ένας είναι ότι υπάρχουν ανάμεσα στους προσκεκλημένους μερικοί φίλοι και συνάδελφοι που δεν μιλούν καθόλου Ελληνικά. Και ο δεύτερος λόγος είναι ότι δεν έχω συνηθίσει πολύ να μιλάω για γλωσσολογία στα Ελληνικά. Θα χρησιμοποιώ πού και πού Ελληνικά αλλά κυρίως θα μιλήσω στα Αγγλικά.

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THE TITLE of the talk is "the nature of the enterprise and why we believe that language is not taught". But you should think of it as having a larger title, which is "What is Formal linguistics about? What is it that we do? And why do we believe that language is not taught? What do formal linguists do all day?"

So what do formal linguists do exactly? How do we spend our day?

Well, we do research, we teach and we are pretty good at those. What we are not good at is explaining to the general public what it is that we do.

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The general public does not know what it means to do formal linguistics. If you are sitting on a plane next to someone and you tell them that you are a linguist, they ask you "how many languages do you speak?". Knowing many languages has nothing to do with what we do. So we are really not good at making our case. And sometimes even our university administrators don't know what it is that we are doing. I would like to try tonight to take on this challenge and actually talk about linguistics at large. Some of you, I imagine, don't know a lot about formal linguistics, others know too much linguistics for this talk. But I will take this opportunity to talk about linguistics in general nevertheless.

So as I said, we do research and we teach. Let's start with our research.

Formal linguistics is the scientific exploration of Language as a function of the brain. So we study Language as a function of the brain, not as a social phenomenon. And not as a literary phenomenon either. Just as a function of the brain. There are two questions that I would like to focus on:

- What does "scientific inquiry" mean and how does it apply to language?
- What does it mean to "know" a language?

Let's start with the first one. We know what scientific inquiry is. Basically it consists of two things: formulating questions and formulating falsifiable hypotheses. Now, what does it mean to formulate a question? Let's say it starts raining inside this building, or it starts snowing in August in Rethymno. Everybody will say 'This is strange. How is this possible?'. But the genius of scientific inquiry is to find questions where everybody else sees normality, and only normality. So here is an example. It's a fact that if I hold something and let it drop, it will fall to the ground. So for most people this is completely normal: of course if you let go off things they will drop! But for a few, for example, Isaac Newton, it is like "What is going on here? Why do things drop when you let them go?". Newton is, of course, famous for having formulated the law of gravity, but his genius really lies in posing the question and seeing that even though it is completely normal and everybody takes it for granted, it is a question for scientific inquiry. We don't know why things drop to the ground. Even if it is the most common thing in the world, it still is a research question. The same with the sun: everybody sees it rise and set,

and most people do not spend any time thinking about it, but for some it is a research question.

So the same thing happens with language. It is a fact that right now when you hear me speak, you understand what it is that I say. Most people will say: "Of course we understand what you say. We have a common language!". But the language scientists will ask "but how is this possible? What is it that you do when you take an auditory signal, a sound, and transform into meaning? How do you do this? What is going on in your head right now?"

Somehow you "know" how to take the auditory signal and transform it into meaning. It becomes meaning in your head. What is it exactly that we do when we do that? What is going on right now in your head? How do you "know" to take the sound that comes out of my mouth and transform it into meaning? Note that the word 'know' is in quotes. This is because you are not conscious of this knowledge. You can't say what is going on in your head right now. You don't know what it is that you do.

That is, you have "knowledge" that you manipulate but you don't know what it is, nor how you manipulate it. This is "tacit knowledge". In Greek, one might translate this as "άρρητη γνώση".

So the cornerstone of scientific inquiry is identifying a question (possibly where others see none), and our question is 'what is it that we "know", when we know a language, and how do we come to the point of "knowing" it?'.

Knowledge is a question that philosophers have debated a lot. For some things it may be easy to answer it. For example, what does it mean to know a phone number? Easy: it is to know the digits and the order they come in. What does it mean to know chess? It means to know how to play, to know the rules. It means to know how each piece moves. For example, to know that the queen moves this way, the rook moves that way, and so on. But what is it that we know, when we know a language? Well, one quick answer is that we know how to speak; that we know the rules. But what are the rules exactly?

Now, "the public theory", that is, the answer you will get when you pick a random person on the street who is not a linguist, would go as follows: "We consciously know the rules of our language and we are taught them by our parents and teachers".

For example:

There is a rule: Greek first person singular verbs in the present tense end in –ω.

Indeed, you can formulate this rule, so let's say you are conscious of it.

It is doubtful that your parents actually formulated this rule for you when you were little, but that does not matter. Let's assume for the sake of the argument that you have that sort of parents.

Let me show you a few examples of things that you "know" without being conscious of them. That is, you cannot formulate the rule. And there is no way you can look me in the eye and tell me that this is something your parents or teachers taught you.

Yet you "know" these parts of language.

Let's get a bit technical for a moment.

(1a) is an English sentence and (1b) the corresponding Greek sentence. You can see that where English has the pronoun 'she', Greek does not pronounce a subject. I have indicated this with an underline in the Greek sentence and I will refer to this as a 'gap', as you can think of it as something missing where English has a pronoun.

1a. Mary$_{m}$ thinks that she$_{k/m}$ is smart
b. Η Μαρία$_{m}$ νομίζει ότι __$_{k/m}$ είναι έξυπνη

2a. She$_{k/*m}$ thinks that Mary$_{m}$ is smart
b. __$_{k/*m}$ νομίζει ότι η Μαρία$_{m}$ είναι έξυπνη

(1a) can mean that Mary thinks of herself that she is smart. This is one meaning of this sound string. But (1a) also has another meaning. If I ask you 'What do you think about Katherine?', you can answer with (1a) «Well, Mary thinks that she is smart». This is a possible meaning for (1a). And on this meaning, the pronoun 'she' does not refer to Mary. It refers to Katherine. The way we represent this is by using subscripts. We see that the pronoun 'she' has two subscripts. On the subscript 'm', we indicate that 'she' refers to 'Mary', which also has the subscript 'm'. On the subscript 'k', the pronoun refers to somebody other than Mary, namely in our context, Katherine.

In Greek there is no overt pronoun in the embedded sentence. Yet, this sentence has the same properties as English (1a). That is, (1b) can mean that Maria thinks of herself that she is smart. But it can also mean that Maria thinks that someone else is smart. For example, in response to "Η Κατερίνα είναι έξυπνη;", you can respond "Δεν ξέρω αλλά η Μαρία νομίζει ότι είναι έξυπνη". In other words, (1a) and (1b) have the same range of meanings.

Now let's look at the sentences in (2). I have taken the pronoun and name and switched their positions around. This has an effect on the meaning. Now, in (2a), 'she' cannot refer to Mary anymore. That is, (2a) cannot mean that Mary thinks of herself that she is smart. It can only mean that somebody other than Mary thinks that Mary is smart. If I do the same thing in Greek, that is, take the name and the gap and switch their positions, we get the sentence in (2b). Now we get the same result as in English (2a). That is, the sentence cannot mean that Maria thinks of herself as being smart. It can only mean that somebody other than Maria thinks that Maria is smart. The asterisk '*' in front of a subscript indicates that the reading with this subscript is unavailable.

So the two sentences in (1a) and in (1b) have the same two meanings: the pronoun or gap can refer to Maria or to somebody else. The sentences in (2a) and (2b) have only one meaning, namely that somebody other than Maria thinks that Maria is smart.

This phenomenon happens in a number of languages, not just English and Greek. It occurs in Russian, in Zulu, in Chinese and many other unrelated languages. It is a very widespread phenomenon. So these meanings are something that speakers know how to generate. But the question is, what is the rule for when a pronoun and a name can refer to the same person and when they cannot? Can you formulate it? Can you say what it is you are doing in your head?

When you have just this set of data, it is possible to propose something like a rule R1:

R1: when the pronoun (or gap) comes before the name, the pronoun (or gap) and the name cannot refer to the same person.

This gets the right results so far: In (1a) and (1b), the name comes before the pronoun, so the name and the pronoun can refer to the same person. On the other hand, in (2a) and (2b), the name comes after the pronoun, so the name and the pronoun cannot refer to the same person.

So far so good.

But there are many counterexamples to R1. For example, in (3) and (4), the pronoun in English (and gap in Greek) precedes the name. Yet, the pronoun and the name can refer to the same person.

3a. Her$_{m/k}$ parents think that Mary$_{m}$ is smart
 b. Οι γονείς της$_{m/k}$ νομίζουν ότι η Μαρία$_{m}$ είναι έξυπνη

4a. The man she$_{m/k}$ married thinks that Maria$_{k}$ is smart
b. Ο άνδρας που ___ $_{m/k}$ παντρεύτηκε νομίζει ότι η Μαρία$_{m}$ είναι έξυπνη

5a. That she$_{m/k}$ failed the exam really bothers Mary$_{k}$
b. Το ότι ___ $_{m/k}$ απέτυχε στις εξετάσεις στεναχωρεί τη Μαρία$_{m}$ πολύ

So R1 is not correct.

What is the correct rule then, for when a pronoun and a name can refer to the same person? Whatever it is, you can do it in your head. You know that sometimes a pronoun and a name can refer to the same person, and sometimes they cannot. You "know" this, even though you cannot express in words when it is possible and when it is not possible. And speakers of Zulu, Chinese, and Russian all have this phenomenon. Yet, nobody taught them or you. Your teachers did not tell you how to do this. Your parents did not tell you how to do this. Yet, you all do this.

This is tacit knowledge.

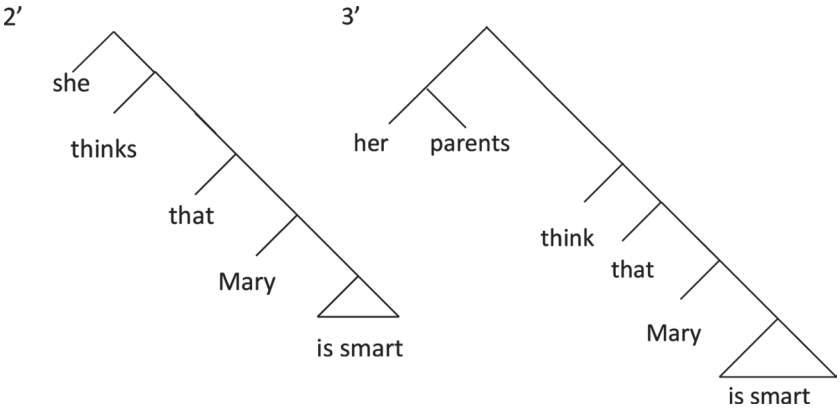
These are computations you do in your brain but you don't do them consciously.

The answer to this problem is something that we have known for many decades and we also know that the rule that is operative is impossible to define on the linear string. On the linear string, the only relationships that you can define are 'the pronoun comes before the name' or 'the pronoun comes after the name'. This is why we work with what are called "syntactic trees". On a syntactic tree, more relationships can be defined, among which, the crucial one needed here. One of the major early discoveries in linguistics is that language is NOT computed on a linear string but in two-dimensional representations, which are our syntactic trees.

Here are the syntactic trees for (2) and (3):

2. She$_{k/*m}$ thinks that Mary$_{m}$ is smart
3. Her$_{m/k}$ parents think that Mary$_{m}$ is smart

We can see that there is a particular topological relationship between the pronoun and the name, and this relationship is different in (2′) than in (3′). The tree in (2′) represents the sentence that does not permit the



pronoun and the name to refer to the same person, and in (3′), we have the tree that does permit them to refer to the same person. What is the difference between the two trees? In (2′), if you start from the position of the pronoun, go up one branching node and then down the tree, you will find *Mary* on the way down at some point. In (3′) if you start from the pronoun, go up one branching node and then down, you will not find *Mary*. You will only find the noun *parents*.[1]

Now we are ready to formulate our Rule R2 about when a pronoun and a name can refer to the same person:

R2:
— Start from the pronoun.
— Go up one branching node and down the other.
— If you find the name going down that branching node, the pronoun and the name cannot refer to the same person.
— If you do not find the name going down that branching node, the pronoun and the name can refer to the same person.[2]

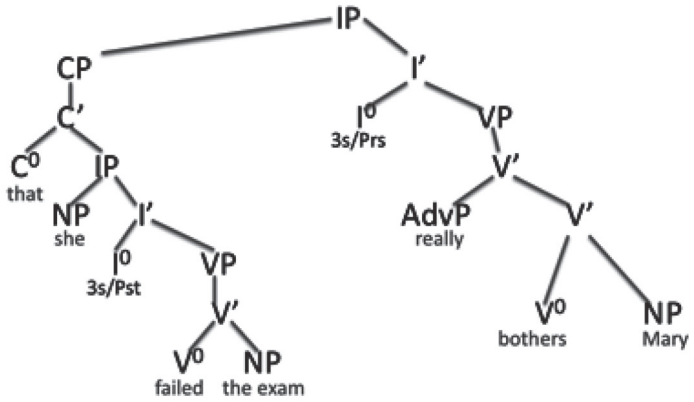
Here is a somewhat more sophisticated syntactic tree for (5). That is, it shows a little bit more information than we need for our phenome-

[1] This topological relationship is called "c-command" and was first formulated in Reinhart (1976).

[2] This phenomenon falls under what is called "Binding Condition C" of Chomsky 1981.

non, but it shows that we put a lot of information in our trees. But what is relevant for us still holds: if you start from the pronoun, go up one branching node, and then down, you don't find the name hence, by R2, the pronoun and the name can refer to the same person.

5. That she$_{m/k}$ failed the exam really bothers Mary$_{m}$



All of this is way too complicated to comprehend if you have never heard it, but this is what is going on in your head.

You, as speakers, use R2, so you "know" it. But you could not have described it.

Do you remember your parents or your teachers teaching you anything like R2? Of course you don't, because they didn't.

We, as scientists, can formulate this rule.

And we can also say why it is the way it is.

This is tacit knowledge that you have but you cannot formulate it and you were never taught it!

Since you are not conscious of this knowledge, you did not internalize it consciously.

It is what it is, because language is a function of the human brain.

And since the human brain is the same no matter what language one speaks, it follows that this tacit knowledge will be the same for speakers of all languages.

In other words, it can be detected and studied in all languages. For

example, the phenomenon I showed earlier is the same in all languages around the globe. And all speakers behave the same way in a very complicated phenomenon, and nobody taught them.

So the working hypothesis is this:

- infants are born with certain limits on the range of possible languages
- this endowment enables language acquisition to proceed the way it does.

What do we mean by limits? I am born with the ability to move my head a bit to the left or to the right but not too much. I cannot turn my head 180 degrees. Similarly with languages. Languages have many many things in common. They do differ in many things but there are limitations on how they can differ.

This innate endowment enables language acquisition to proceed the way it does.

We want to find out what this in-born endowment is. We have a name for this inborn endowment. We call it "Universal Grammar". Universal Grammar is the reason behind deep and untaught similarities between languages. Part of what we do is explore the content of UG. And one way of doing this is comparing languages. For example, we compare Greek and Zulu, and we find many deep similarities. We know that these similarities are not the result of contact between Greek and Zulu speakers. The similarities are the result of something much deeper. They are the result of this tacit knowledge that we call UG.

Here are some examples of tacit knowledge from my own work. The following sentence is bad:

6. [BAD]Peter left tomorrow

But if you take this string and put it inside a sentence like (7), it suddenly becomes good:

7. [OK] If Peter left tomorrow, he would get there next week

The same thing holds in Greek:

8. [BAD]Ο Πέτρος κέρδιζε το λαχείο αύριο
9. [OK]Αν ο Πέτρος κέρδιζε το λαχείο αύριο, θα λύνονταν όλα τα προβλήματά του

So you can do these things in your head. But do you think your parents ever told you 'do not put a future-oriented-adverb with a past tense verb unless you do so inside the antecedent of a conditional'? Of course not. Yet, you do it perfectly well. This is another example of "άρρητη γνώση".

Or look at these:

10. Η Μαρία είχε αυτοκίνητο
11. Mary had a car

If you put this string inside a conditional, as in (12/13), what happens?

12. Αν η Μαρία είχε αυτοκίνητο, θα ήταν ευτυχισμένη
13. If Mary had a car, she would be happy

The sentences in (10,11) convey that Mary has a car. If you take those strings and put them inside the antecedent of a conditional, the sentence conveys that Mary does not have a car.

What do you know and how do you know this? You might say: "Oh this is because 'η Μαρία είχε αυτοκίνητο' ("Mary had a car") is inside a conditional. This is why you get the meaning that she doesn't have a car."

But this is not so. It's not just that there is a conditional. In the following sentences 'η Μαρία είχε αυτοκίνητο' is inside a conditional, but the sentence does not convey that she does not have a car:

14. If Mary had a car at that time, she must have been wealthy
15. Αν η Μαρία είχε αυτοκίνητο εκείνη την εποχή, θα πρέπει να είχε αρκετά χρήματα

In other words, going back to (12,13), it is not the case that these sentences convey that she does not have a car because *Mary had a car* or η Μαρία είχε αυτοκίνητο are inside a conditional. Something else is at play here. I don't want to get into the details of how this inference does come about in (12,13) but the point is that you all create this inference in your head, and nobody has taught you how you should do this, nor even that you should, to begin with.

Again, you compute this meaning in your head. There is no mistake that people make when they hear these sentences.

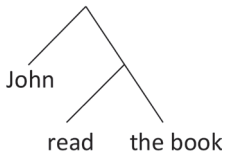
So how we spend our day:
We look for and explore…
— similarities between languages
— but similarities that were never taught
— nor are due to historical reasons
We try to find such crosslinguistic similarities, we try to understand them, we try to model them as best we can and ideally we try to explain them. At this point, there are several things that we can explain, but there are also many things that we can only describe.

Languages also differ, of course.
But *where* and *how* they differ is restricted, as was stated in the working hypothesis earlier. Languages do not differ randomly. The space of possibilities is limited.
We call these differences "parameters".
What defines the differences are "parameter settings".
For example, English and Japanese differ in word order. In English, the object of a verb comes after the verb: *John read the book*.
But in Japanese, the object comes before the verb:

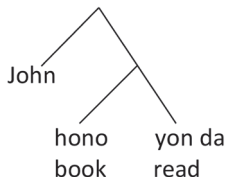
17. John-ga hon-o yon da
John-SUBJ book-DO read PAST
'John read the book'

That is, the two languages differ in the left-to-right dimension, but if you look at the syntactic trees, you will see that the hierarchical relationships are identical. The trees are mirror images of each other, but the hierarchical relationships are the same:

18.



19.



The hierarchical relationships are given by UG, the word order is a parameter.

We saw above tactic knowledge of similarities between English and Greek. Tacit knowledge can also be seen where languages differ.

Here is an example of that. Consider the Greek sentence in (20a), which I translate as (20b):

20a. Έχω να δω τον γιατρό
b. I am supposed to see the doctor

I do not translate (20a) as "I have to see the doctor".
That is:

21a. Έχω να δω τον γιατρό
=/=
b. I have to see the doctor

There are several differences between (21a) and (21b) that necessitates that we do not consider them equivalent. Each of the pairs in (22,23) and (24,25) shows something that the English sentence (21b) can do, but the Greek (21a) cannot:

22. It is 5pm. He has to be at home
23. Είναι 5 το απόγευμα. [BAD]Έχει να είναι στο σπίτι

24. To know what the patient has, I have to examine him
25. [BAD]Για να μάθω τι έχει ο ασθενής, έχω να τον εξετάσω

So even though (21a) and (21b) look very much alike, they are also different. And you "know" these differences, despite the fact that quite possibly, until this evening, you were not aware of them. Tacit knowledge!

Next, compare (21a) to (26):

21a. Έχω να δω τον γιατρό
I have PART see the doctor

26. Έχω να δω τον γιατρό πέντε χρόνια
I have PART see the doctor five years

The meaning of these two is very different. (21a) means that I am supposed to see the doctor. (26) means something like "I haven't seen the doctor in 5 years".

How is it possible that if you are a speaker of Greek, you know exactly how to derive the difference between (21a) and (26)? They seem to differ only in the presence of *πέντε χρόνια*. But the addition of 'πέντε χρόνια' does not always have this effect. For example, consider the following two sentences:

27. Είναι άρρωστος
    is sick
    "S/he is sick"

28. Είναι άρρωστος πέντε χρόνια
    is sick five years
    "s/he has been sick for five years"

Sentence (28) does not mean that I have not been sick in five years! That is, the addition of *πέντε χρόνια* to (21a) has a very different effect than the addition of *πέντε χρόνια* to (27).

Do you think your parents ever sat you down and talked to you about the difference between (21a) and (26)? Or that they told you that the addition of *πέντε χρόνια* to (21a) has a very different effect than the addition of *πέντε χρόνια* to (27)? I bet they did not! There is no way they did! Yet you all, ALL of you, know exactly the different meanings these very similar-looking sentences have.

So what we do:

Our working hypothesis is that language is the result of Universal Grammar and Parameter settings. Universal Grammar consists of deep, untaught similarities that are present in all languages. And these are the result of the genetic endowment of the human species for language. Parameters are highly-constrained differences between languages. So these are some things that we do.

Here are some things that we don't do:

We don't say that people should talk in a particular manner.

You often hear things like "Today's youth doesn't know how to speak

proper Greek". For us, this is completely irrelevant. If it is spoken, it is an object of study. It doesn't matter what the social class is, what the upbringing is, or the level of education. If it is a human language, it is part of what we study. The rest are the result of belonging to a certain social class etc, which are questions we do not address.

Something else we don't do is think that one language is in some sense better than another.

Some people think that there are "primitive" and "advanced" or "richer" languages. All the languages that we have studied have the same level of complexity. There is no sense in which a language is richer in this sense, or better than another.

Moreover, from a linguistic point of view, there is no difference between a 'dialect' and a 'language'. If it is spoken, it is our object of study. You may have heard the saying that the difference between a language and a dialect is that "a language is a dialect with an army and a navy".

So these are some things we don't do.

Until now, I have spent all our time trying to convince you that children are not taught language. That is, you speak a language, not because your teachers or your parents taught you. You have all this computational ability that you have, but it was not put there by your parents. Alright, then how do we come to acquire language? This debate goes back to the 1950s.

The debate was framed much in terms that we have been using so far: How do children acquire Language? More specifically: Is instruction, for example correction by the parents, crucial?

There were two expressed views. The first view is attributed to the psychologist B. F. Skinner. Pay attention in particular to the underlined part:

View I:

"In teaching the young child to talk, the formal specifications upon which reinforcement is contingent are at first greatly relaxed. <u>Any response which vaguely resembles the standard behavior of the community is reinforced. When these begin to appear frequently, a closer approximation is insisted upon.</u> In this manner very complex verbal forms may be reached."

(B. F. Skinner (1957) *Verbal Behavior*, pp. 30-31)

What the underlined parts says is that B. F. Skinner believes that the community of the speaker, the teachers, the parents, the friends, insist on the correct way of taking.

Noam Chomsky wrote a review of Skinner's book. The following is an excerpt:

View II:

"It is simply not true that children can learn language only through 'meticulous care' on the part of adults who shape their verbal repertoire through careful differential reinforcement, though it may be that such care is often the custom in academic families. It is a common observation that a young child of immigrant parents may learn a second language in the streets, from other children, with amazing rapidity, and that his speech may be completely fluent and correct to the last allophone, while the subtleties that become second nature to the child may elude his parents despite high motivation and continued practice."

(N. Chomsky, 1959 review of Skinner's *Verbal Behavior*, p. 42)

According to View II, children do learn from their environment, but not from conscious corrections. So what are some arguments in favor of View II?

One argument: Have you ever seen a parent or teacher correct a child on some of the complicated things I have shown you, like (2), on when a pronoun and a name can refer to the same person?

2a. $\text{She}_{k/*m}$ thinks that Mary_{k} is smart
b. $\_\_{}_{k/*m}$ νομίζει ότι η Μαρία_{k} είναι έξυπνη

Of course not!
Nor would their parents know how to correct for them!

Plus, as anyone who has raised a child knows, children ignore facts or instructions that they are not yet "ready" to absorb, even if that fact is presented to them in the form of explicit instruction. Here is a sample conversation, between a mother and a child, as reported in W. O'Grady and S. Whan Cho (1997, 461):

Child: Nobody don't like me.
Mother: No, say "Nobody likes me."
Child: Nobody don't like me.
[*Exchange is repeated eight times.*]
Mother: No, now listen carefully; say "Nobody likes me."
Child: Oh! Nobody don't LIKES me.

Or, also from O'Grady and Whan Cho (2011, 354):

Child: Want other one spoon, daddy.
Father: You mean, you want the other spoon.
Child: Yes, I want other one spoon, please daddy.
Father: Can you say "the other spoon"?
Child: other … one … spoon.
Father: Say "other."
Child: other.
Father: "spoon."
Child: spoon.
Father: "other spoon."
Child: other … spoon. Now give me other one spoon?

A second argument in favor of View II: There is plenty of evidence which suggests that language acquisition is to a large extent independent of other types of cognitive development. Now why is this important? If we were learning language the way we are learning chess, you might expect normally developed people to talk better than people who do not have normal cognitive development. But that is not always so. There are counterexamples both ways.

There are cases of people with severe cognitive difficulties but with fine grammar.

O'Grady and Whan Cho (1997, 465 = 2011, 355) describe the case of a 15-years old with preschool abilities on non-linguistic tasks but with recorded utterances like the following:

"She keeps both of the ribbons on her hair."
"If they get in trouble, they'd have a pillow fight."
"She's the one that walks back and forth to school."

And there are cases of people with normal intelligence, who have language specific difficulties ("Specific Language Impairment").

They can have trouble with non-lexical categories, such as plural or past tense (O'Grady and Whan Cho 2011, 356):

"The boys eat four cookie." (no plural)
"The neighbours phone the ambulance because the man fall off the tree." (no agreement)

A third argument in favor of View II: The existence of a critical period. We all know that when you learn a language early, you can sound like a native speaker, but if you learn a language when you are thirty or forty, you will not. You will always sound like a foreigner. Normal linguistic development is possible only if the child is exposed to language during roughly the first 6-10 years of life.

If acquiring language were a process of instruction and conscious internalization, we would be able to learn a language natively at any age. The way we can learn complex math, as adults, for example.

So acquisition is the result of Universal Grammar and Experience.

Experience is crucial in at least two ways:
— It has to occur during the critical period.
— It determines parameter settings.

Universal Grammar reflects our genetic endowment for language.

Parameter setting reflects our linguistic experience in early childhood.

We do not yet know a lot about Universal Grammar. Nor about what all possible parameters are. But this is what our research agenda consists of. And if you want to know more…

… talk to the linguists!

So let's go back to the main question: What do formal linguists do all day?

In addition to doing research, we teach.

Formal Linguistics is a scientific research field: it explores a part of the natural world.

This means that the discourse in it has certain properties that students should become conscious of early on. As practitioners of a research field, we should have certain attitudes:

We should find happy excitement in being proven wrong in unexpected and surprising ways.

Second, we should not feel insecure about our theories changing.

Quite the opposite: As our understanding of the natural world changes, our theories about the natural world will change as well. This is a good thing! If our theories do not change in ten years, this means that we have stopped learning. It means we have stayed with the same knowledge of the natural world as we had ten years ago. Fortunately, this is not the case. We learn more and more and we change our theories.

Third, we should be willing to live with ignorance and love it.

If you want ready answers to settled questions, this is not the right field for you. It is not just that the answers will change. The questions will change too.

So this is the attitude that researchers should have and in addressing the students among you, it is the role of the teachers to help you, our students, develop this type of attitude and thinking.

Our goal when we teach you:

To take you from being good at answering somebody else's questions to asking your own questions. This transformation is easier for some than for others, but I have found that the time at which it happens is not an indication of ultimate success in the field. As long as the transition happens, the student will be in a good place.

How can we help you make this switch?

By making it clear that we are not teaching you a *truth* but teaching you the best theory that we can come up with today. And there is a difference between teaching a "truth" and teaching a theory. When you teach a theory, you teach a snapshot of a developing object. Our theories today are not the theories we had ten years ago. And hopefully, our theories ten years from now will be better than our theories today.

We all work and are educated within certain theoretical assumptions that are characteristic of the time and place we live in. That is, we work and are educated in a snapshot of developing theories. Our imaginations and analytical abilities are seriously restricted by these assumptions.

We need to be aware of these limitations.

So it is important to teach you today's theories not because they are correct but in order for you to see their shortcomings, and in order for you to understand where and how the theory has to change. Because it should and will change.

But education is a two-way game.
You have to do things too!
And what should you do?
You should not take anything that we tell you as written in stone.
Try to find the errors in our beliefs and improve on them.

In short, disagree with us and help us identify our mistakes because for sure we are wrong in several ways. You should be intellectually assertive. It is you who should correct our mistakes. And if there is one thing I would want you to take away from this talk, it is this.

Thank you.

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