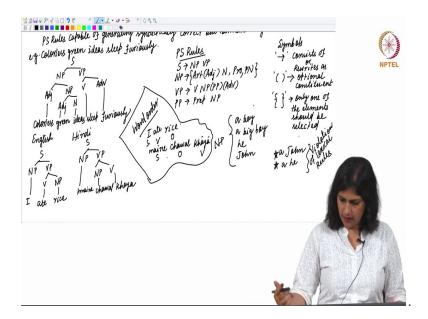**Appreciating Linguistics: A typological approach**
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Lecture - 40
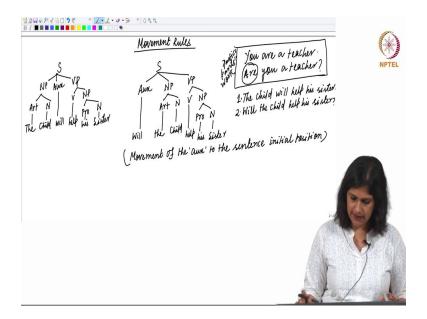**Movement and Recursion**

Hi, welcome everyone to this session of my NPTEL course Appreciating Linguistics; A typological approach.

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If you remember, I was also talking about Recursion. I will go back to recursion in a while; but before that, I would like to draw your attention to things like movement. So, with this information about the lexical rules and then the phrase structure rules, now, I will talk about the movement rules.

What are the movement rules that we have in syntax? Why do we need movement? We need movement because there are certain lexical items that move to form or to have constructions like questions. If you go back to the deep structure and the surface structure story, the deep structure is primarily like all the sentences or all the utterances that we have in syntax, they are based generated in a different form; they by default are considered to be the plain sentences. There is no question, to begin with, at the deep structure level, we do not have any concept of questions. Questions happen after the movement.

Once the lexical items go through certain movement rules, you get a question like are you a teacher. So, a construction like are you a teacher begins with you are a teacher, I hope I made it clear. This is you are a teacher and the second one is are you a teacher. Are you a teacher is not the deep structure; the deep structure is you are a teacher. And are you a teacher with a question mark, which is an interrogative sentence, is formed through the movement rules.

What kind of movement? There are many, but for this course I would focus only on an interrogative sentence because if we talk about syntax more, then it should have a separate course altogether considering the vastness of syntax. So, the concern or the idea here is that we just have a very small set of phrase structure rules and it is not practically possible to generate the constructions that we have following only those rules.

Then what are we supposed to do? The complex structure of English grammar or the complex structure of constructions in any given language cannot be accounted for or cannot be produced using only a handful of phrase structure rules. So, then what do we need? We need the movement rules. There must be some movement of certain lexical items which is why we get for example, in an interrogative sentence and these rules are treated as the representations of the deep structure.

The deep structure goes through movement and it comes to the surface structure then it goes to the LF and PF, if you can remember the inverted Y model that we were talking about. So, in case of are you a teacher, the deep structure representation is you are a teacher, then there is a movement. What kind of movement? The movement of one particular lexical item to the sentence initial position. What is that item? That item is are, which is the auxiliary here.

This auxiliary verb has moved to the sentence initial position, as a result we got the interrogative sentence. So, now let us see how it works and in case of a construction like you are a teacher, we need to find out how we get the construction like are you a teacher. I am going to draw two different tree diagrams like two two different examples. One is this construction I will leave it up to you to think about it, the other example let us say will the child will help his sister.

 Now let us look at this construction and what will be the interrogative form? Will the child help his sister. So, my concern here is that, in case of this construction number one, the child will help his sister, the deep structure and the surface structure; the representations are same. But in case of will the child help his sister, the structures can be a little different. So, what kind of movement does it or what is the movement here? The movement of the auxiliary verb.

When we draw the tree, either you go for this or you go for this. I am with both, since I wrote the second two sentences I will focus on this. So, this is for your work and you should work on it, participant work, I am going to work on this. Here I have the surface structure of the first and the surface structure of the second. So S goes to NP VP, but we also have an auxiliary here. The auxiliary is will.

So, instead of writing NP VP, I will write NP, Aux, and VP. What is the NP? NP will have the child. Considering we have the child you remember we had an article and it could be a noun, then aux is aux and VP will have V and if it has V then remember the phrase structure rules. so V NP. And NP will have a pro, pro is the pronoun here and then there is N. So, this is, the, child, this will be will, this will be help, this will be his, this will be sister.
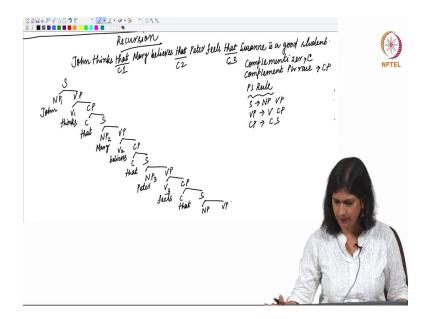
That is for the declarative sentence, but when you get the interrogative sentence, there is a movement. What kind of movement? The movement of the auxiliary. Here the rule or the diagram should be like this. First you will have the Aux then you will have the NP then you will have the VP. So, what has moved? The auxiliary has moved to the left. There are other ways also to draw such trees. Sometimes we show the movement like this, but then for the moment I will refrain from showing this head to head movement because these are the more advanced stuff, but just to give you an idea.

So, basically the movement has happened here, this is Art and N this is V and NP this NP will have a pro and an N. So, this is sister and this is let us say will this is the, this is child and this is help, this is his. So, in this case, you see the movement of the auxiliary to the sentence initial position. Because of this movement, this is the by default construction, the child will help his sister the first tree and the second tree is the example of the movement.

So, what has moved? The movement of the auxiliary item to the sentence initial position. So, this is what it is important, movement of the aux to the sentence initial position. So, follow the same formula and then find out you are a teacher and are you a teacher, which is a very simple one. This is just one way of showing you the movement. There are many, active passive, how the passive constructions are formed; there are movement rules proposed by Chomsky.

These are the advanced stuff, but then just remember this is an instance of movement. Now the last thing that I want to talk about is, if you remember I was talking about recursion. The recursivity of natural language is one of the most interesting phenomena that we have in syntax. We will see how syntactic analysis accounts for a recursive phenomenon.

When it is a recursion, you primarily see stacking of many phrases, if we go back and if we see what is the example that we had and will try to draw the tree; for the recursion example we wrote, John thinks that Mary beliefs that Peter feels that Susan is a good student. That is what I am going to write here and we will see how do we do the syntactic analysis. Now, let us see how a syntactic analysis helps us to understand recursion on how tree diagrams can be drawn for the recursive constructions.

This is the example I gave it in the previous session, this is John. I am going to write the sentence here John thinks that Mary believes that Peter feels that Susan is a good student, Look at the construction, it is extremely clumsy if you read it at one go; there are so many phrases which have been stacked one upon another to have this complex construction. This is the recursivity of natural language. Theoretically you can have any number of phrases to stack and recursivity allows you to do that.

Then what is the problem, why can't we have unlimited number of phrases? Because of the constraint or the limitation of human memory. So, the phrase structure rules might have the potential or they might have the capability to have a construction which has many or multiple number of phrases; but then there is a limitation to the human memory. That is the reason why we do not really see long recursive constructions in the day to day discourse.

Keeping that discussion aside, our concern here is to find out the syntactic analysis can be done using the phrase structure rules. I will introduce two new terms here; one is a complementizer. We generally write it as C, and what does this stand for? This is primarily that, in this construction that is the complementizer and the phrase which has a complementizer, we call it a complement phrase is known as CP.

What is the head word of a CP? The head word of a CP is C. And what is the phrase structure rule for that? The PS rule for CP is it goes to C and S. So, CP is the complementizer phrase which has the head word complementizer and then there is S which is the sentence. This is one rule and there is also the other one. Sometimes this CP can be contained by a VP.

In this case the VP goes to V and CP this is also possible. So, there are two things. Instead of drawing the tree, I will write the PS rules. CP might have C and S and the VP will have the CP. These are the two new rules that I want you to remember when we draw the recursiveness or draw the recursion. So, to put it in the other way, if I started from the top to bottom approach; here we we already know S goes to NP VP or S consists of NP VP; then we have VP, VP will have V and CP and CP will have C and S.

So, we start with an S and we will have another S inside it. Look at this, S has NP VP and VP will have a CP and this CP will have a C and S. That is the interesting thing about the recursion in natural language. Now, using these three formula we are going to draw the tree for this extremely long sentence, John thinks that Mary believes that Peter feels that Susan is a good student. So, what are the complementizers here? One complementizer the first 1, complementizer 2, complementizer 3, there are three complementizers here. And how many sentences? Susan is a good student is an independent sentence, Peter feels that Susan is a good student is another complete sentence.
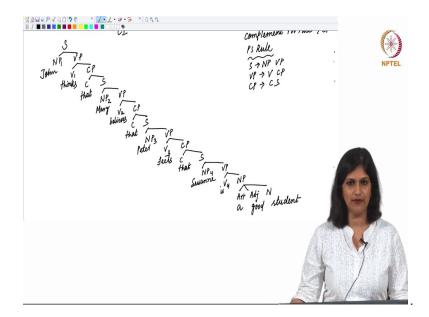
Mary believes that Peter feels that Susan is a good student, further a complete sentence; and then the entire thing John thinks that Mary believes that Peter feels that Susan is a good student. There are so many sentences stacked inside one another Considering the complexity that involves of such recursion, we will try to draw the tree. It might look extremely long, but then remember these are the three formula that we have in hand S NP VP, VP V CP and CP C and S.

Following this we are going to draw the tree. Let us begin. We have S to begin with, and it goes to NP and VP, and what is VP? I have written VP goes to V and CP. If V and CP, what is CP? CP again goes to C and S. So, what is the first NP? The first NP is John. What is the second V? Second V is thinks. What is the first C? The first C is that. So, John thinks that; John thinks that what? John thinks that Mary believes that Peter feels that Susan is a good student.

This S will again go to what? So, once you have CP goes to C and S, again S goes to NP VP, the same story. This VP will again have V and CP and this CP will have another S. Now let us fix the lexical item John thinks that, then the next NP let us say NP 1 NP 2. So, what is the NP 2? NP 2 is Mary Similarly we can also segregate the verbs, V 1 is thinks, V 2 is believes. Then there is C, C is always that. Then there comes S, so John thinks that Mary believes that; what Mary believes? Mary believes Peter feels that Susan is a good student. So, that is also a full sentence. So, this will again go to NP and VP; same thing will repeat VP goes to V and CP, C goes to CP goes to C and S.

Now we have NP3 V3. So, what is NP3? NP3 is Peter. And what does Peter do? Peter feels again C is that, S then the last S which is Susan is a good student. So, in this case Susan is a good student again S will go to NP VP. This NP is Susan and VP will have is a good student. It is sort of a complex thing. So, here we have V, then we will have Susan is what V and NP.

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This is which V? V4 that is, Susan is. Then a good student, there are three items here. There would be an article, there would be an adjective, there would be a noun. If you can remember in the first phrase structure rule of NP, I wrote this. Here this is good and this is student. This is how recursion looks following the tree diagram.

So, John thinks that Mary believes that Peter feels that Susan is a good student. Like that you can actually have this NP is NP4. These are primarily the proper nouns; you can actually write PN if you want, up to you either you write PN or you write NP. So, with this information about recursion, we got an idea what syntax can do or syntactic analysis can do to understand the complexity of grammatical constructions in natural language. I hope this will help you to get a basic idea what syntax is, what are the phrases and how to identify the phrases and how you are using both the phrase structure rules and the lexical rules to draw the trees.

With this basic information I would move to syntactic typology in the next discussion or the next set of discussions. My suggestion for you would be, do revisit the PS rules, try to gather more information about it and think about how using these rules you can draw the trees of your own language.

But phrase structure rule syntax has advanced a lot, already we have reached minimalism now; in the meanwhile we had GB, but considering this is an introductory level course I would restrict myself to discuss only the phrase structure rules, that too very simple constructions because the objective of this course is to give you an idea how linguistics should be appreciated following a typological perspective.

Now, since you got to know these are the basic or the rudimentary things about syntax, I hope you can follow me or you are able to understand what I am going to talk about when I move to the syntactic typology in the next session. Until then do draw the trees, follow the phrase structure rules, scribble as much as you can, not only from English; but also find out data from your own language.

Since our medium of instruction is English, I am using a lot of English examples. But that does not mean that these rules cannot be explained or cannot be extended to your own language, not really. They are very much extendable to your language. Please find out very simple constructions in your own language and try to draw the trees. If there is any confusion, do get back to me, either write to me or let us discuss it during the live sessions. So thank you. We will meet again with discussions on syntactic typology in the next session.

Thanks.