Appreciating Linguistics: A typological approach
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Lecture - 39
Tree diagrams and X - bar structures

Hi, welcome everyone to this session of my NPTEL course Appreciating Linguistics; A typological approach. We were talking about syntax; before we proceed further to understand what syntactic typology is. We were thinking about the basics of syntax if I remember it correctly. I want you to recall what we have discussed. We were talking about the all and only criterion that syntax focuses on.

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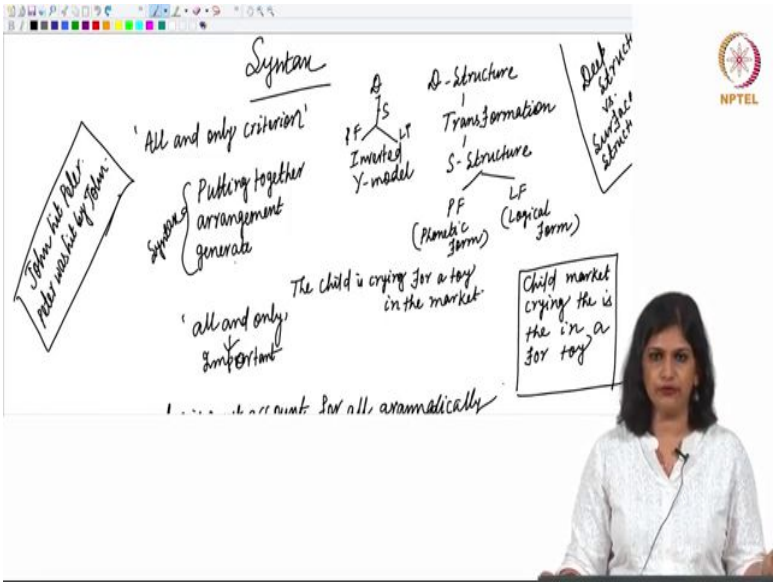

So, the concern here is that when you are thinking about the sentence structures in any given language, you need to find out certain rules which can explain all the grammatical or acceptable constructions in that language that is all. All grammatically correct constructions can be explained through syntactic theories. And what is the second one? The second one is only. So, the syntactic theories can explain only the grammatically correct constructions.

If you would give me an unacceptable construction or an ungrammatical construction, then syntactic theory would be okay to explain why this is wrong, but there is no tool by which

you can actually claim that this is correct, because my theory supports it/ Not really, it does not work in this way. So, that is what is all about all and only criterion or the theories or the rules can explain all grammatically correct occurrences, and only grammatically correct occurrences can be substantiated by syntactic theories.

Then we did discuss what is deep structure, what is surface structure and then how the inverted Y-model works. If you look at this diagram over here, there is the D-structure, then the transformation rule applies then the surface structure then it goes to the PF which is the phonetic form, and LF which is the logical form. So, this looks like the inverted Y-model that we have. So, D, S, PF and LF.

Now, the concern for us is that syntactic theories are wonderful because with just a given set of a few lexical items you can actually create very long sentences. All the expressions through the language can be created only with a handful of empirical data that you have or only a handful of lexical items that you have. So, how does it work? Considering the human communication system is so complex and then you use so many words and phrases and sentences, how does it work or how this unlimited thing come with the limited set of vocabulary that you have.

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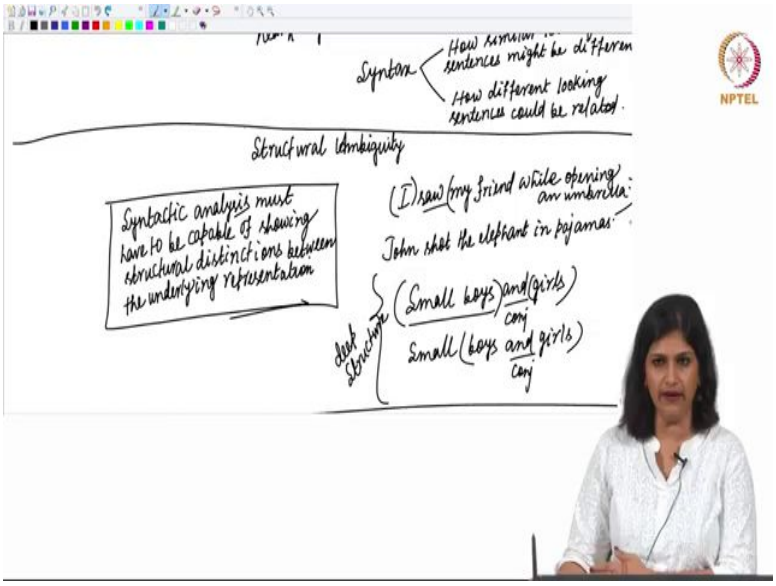

That is the instance when syntax proves to be helpful, that is just one way. Otherwise syntax is also equally helpful to understand how the structurally ambiguous sentences can be parsed or can be understood. When you say structural ambiguity, you need to find out how syntactic analyses have to be capable of showing structural distinctions between the underlying representation. To, to remove the ambiguity or to understand that there is an ambiguity here, syntactic analysis is going to help you.

The example that I have given is I saw my friend while opening an umbrella.There are two different interpretations here. You saw your friend while you were opening the umbrella or you saw your friend while she was opening the umbrella. Who was opening the umbrella? That is an ambiguity that the sentence has. In such cases the syntactic analysis is going to help you.

When you say my friend while opening an umbrella as a different phrase, it gives a different meaning. And I I saw while opening an umbrella my friend, or you can say while opening an umbrella I saw my friend, that as a phrase is going to give you a different interpretation.

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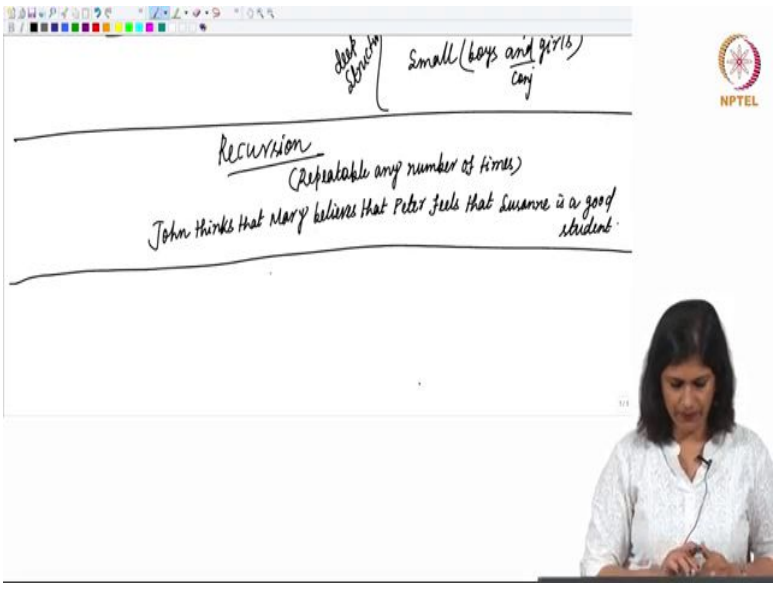

The other example I gave you is also small boys and girls. Whether small boys, you are considering it as a chunk, then and girls or small as the adjective which is qualifying both boys and girls. That is also a syntactic analysis is going to help you to remove the ambiguity

or to understand that there is an ambiguity in the construction. The third way by which the syntactic analysis is going to be helpful is recursion. And recursion is stacking of phrases with the use of a complementizer phrase or there would be a complementizer like that that helps you to stack many phrases together and to create complex sentences.

The example that I gave you, John thinks that Mary believes that, Peter feels that Susan is a good student. So, Susan is a good student that is the information which was supposed to be shared, and this information Susan is a good student it is seen being stacked after so many phrases. John thinks, Mary believes, and Peter feels, and then there is this that which is why the complete sentence is an example of a recursion.

These are the three things by which syntactic analysis is going to be helpful. These are just three things, it is not limited to this list is not exhaustive. It is just that I am giving you a few instances where syntactic analysis is going to be useful. Now, let us see how do we do the analysis that depends on the tree diagram that we draw.

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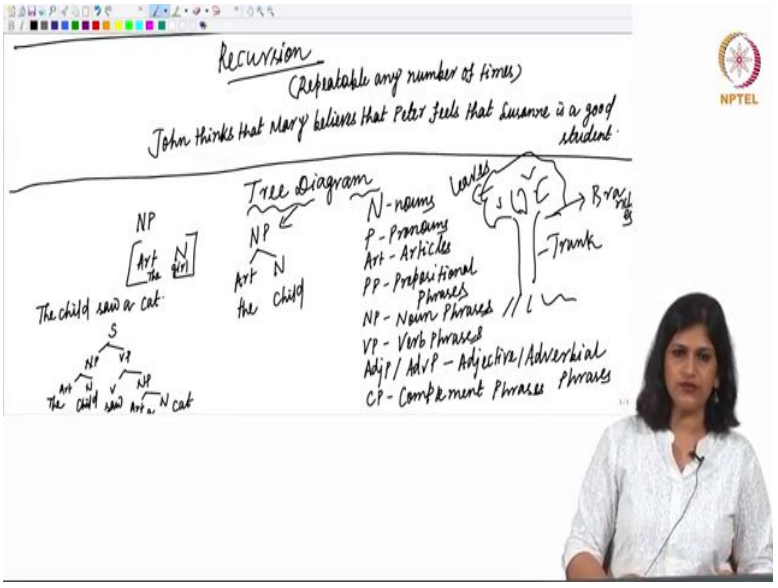

Today we are going to discuss how to draw tree diagrams of very simple sentences, and a bit of information about the phrase structure rules which are the most basic or the most rudimentary things related to syntactic analysis.

Try to visualize a tree diagram or try to visualize a tree. When you think about a tree, what exactly comes to your mind? There is a trunk, there are branches. If I draw the tree here, which I am really bad at, but I am just going to try my hand. This should look like a tree to me, the most rudimentary form. Here, there is a trunk, then there would be branches, then there would be leaves. So, this is like a tree which you generally think about. But in case of syntactic analysis or the syntactic structure, the visual representation; it is generally drawn through the tree diagram.

So, it should be a root node or it should be the top node from where all the daughter nodes are emerged, I am going to talk about the different relations between the sister nodes and the daughter nodes, and then the mother nodes in a while, but remember it will have branches. The root node would be something on the top; and after that the different branches are going to be carved out. That is how we visualize when we think about the syntactic structure of any given sentence in any of the languages. It is not just restricted to English, though I am trying to focus on English here, but eventually it is going to be a part of syntax or syntactic structure or the tree diagram can be drawn for any construction in any given language.

This is one of the most common ways to create a visual representation of syntactic structure , the most common ways. When you say I am a teacher, you should be able to find out how your brain processes such kind of information. And what are the symbols we use? You already know about it. I do not think I really need to pay much attention here considering most of you or some of you might have some information about introduction to linguistics. But just to give you an idea generally we write N for nouns, P for pronouns, Art for articles.

Then we also use different kind of phrases which I am going to come back to, PP for example, would be a prepositional phrase and NP would be a noun phrase, and VP would be a verb phrase, and there are also AdjP or AdvP either it is adjective or adverbial phrases. I will also talk about a bit of CP which is going to be a Complementizer Phrase. We can call it a complement phrase, noun phrases, verb phrases, prepositional phrases and complement phrases.

This are the most basic items or the basic units or I would rather call it basic symbols or basic items when you think about a tree diagram. Now the concern here is how to draw a tree

diagram. This is one of the most common ways to create a visual representation of syntactic structure, and then we got to know these other symbols generally used in syntax.

So, now the concern is this kind of a tree, the tree diagram that we have with its branches generally they are shown on the right seems to kind of grow down rather than up. So, this is like an inverted tree. In the real case the root is below and the branches grow up upwards. But in case of syntactic trees, here the branches are shown on the right like they seem to grow down rather than up; that is diametrically opposite to each other. In a regular tree, the root is below, the branches are up; in syntactic tree the root is here, the branches grow down. That is how it should look like when you are thinking about a tree diagram.

So, in this case, when you draw a tree or when you think about a tree, you have to start it with the tiny chunks or the small phrases. And once you have the small phrases, you have to think about it, you have to think that this unit can be considered as a constituent, and I can put it in one category or I can put it as one unit, and these units I have to put them together to get the correct sentence. I will give you some examples of some simpler ones like one of the simplest examples or the simplest phrases.

Let me give you an example of an NP, NP stands for what? It stands for noun phrases. So, if I have a phrase like the child. The child can be considered as an NP. This is the root node or this is the root and then there are two branches here. In these two branches, what are the two words? The child. So, I would write article here and I will write noun here. Article is the, and noun is child. So, the child is an NP. So, is called a tree diagram.

There is also something called a bracketed diagram. I am writing here NP and I am going to draw the bracket, let us say I am putting a big bracket here. Here is article because that is the, and here is N, and I am closing the bracket. That is how you need to find out how to draw the tree diagrams, and how to draw the bracketed diagrams. Both of them are the visual representations of the syntactic structure of any given phrase in any of the languages.

With this information, when you look at this construction, now we will try to find out with these small chunks like the child. When you say the child, we will try to build this, this is just a phrase; this is not a sentence. Why this is not a sentence? This does not have any verb component associated with it. So, if it is the child, then we have to add a verb; and if needed

we will add another noun phrase to make it a complete sentence. We already have one NP, then we need to add one verb which will be the VP, and another NP which would be used as a complement or you can call it which would be used as an object.

So, here I will draw a small tree or I would consider very simple construction. Considering we already have the child. So, the tree diagram that I am going to draw with this phrase is the child saw a cat. Is it a sentence? Yes, it is a complete sentence; it is grammatically correct; it is acceptable; the child is the subject, saw is the verb and a cat is an object.

In this case, the child saw a cat, let us see how the syntactic structure would be drawn through a tree diagram, because I am going to focus on the tree diagrams here. Considering I just mentioned a while ago, this is the most common way of visualizing the syntactic structures or the tree diagram. Let us find out how to draw the tree. I would draw it like this, I would write S, S is the symbol that stands for sentence. What is the sentence here? This is called the top down model. I am not going to draw it from bottom up approach, rather I will draw it from the top down model.

So, we have S; S stands for your subject, and it will have two branches; one branch is NP, the other branch is VP. Considering I have the child saw a cat, the child is the NP here, and there is a verb phrase which is saw a cat. And within that VP, I have a V and I have an NP. And the second NP will have an article as we have just seen, the child because a is an indefinite article, and then here it will have an N. Similar is the case with this NP also will have an article and then we will have N.

Now, let us see how we are going to write it like how we are going to associate the lexical items that we have, this is the structure, this is the skeleton. And now after this structure is drawn, what are we supposed to do? We need to fit the lexical items. So, let us read the sentence again. And remember the tree diagram should always be read from the left to right, not the other way round; it will always be from left to right.

So, what is the first one? The child saw a cat. This how it should look like which is a tree diagram of a syntactic structure of a very simple construction, the child saw a cat. Here, we

need to find out, why do we need to draw it in this way? We need to draw it in this way because of the constituents that we have.

What is the constituent? The units or the words which can be clubbed under one unit. So, when you say the as a lexical item, child as a lexical item, you can actually put them together. So, you can say the child. But can you say child saw? No, you cannot, it intuitively, it does not sound good to you. Child should be in a different phrase, and saw should be in a different phrase. You cannot just put them together. That is why, the child is a constituent, it is a unit and we are putting it under one head.

A cat which are two lexical items, one unit and we are putting under the head of NP. So, the child and a cat, these are the constituents to begin with. Then we can say saw and a cat, they are also constituent because saw a cat, a cat as one unit, and saw as one unit they can be also considered as constituents. But saw a cannot be, a cat as a unit is a constituent of like, it can be constituent constituent with saw, but a as a lexical item cannot be. Generally there are other constituent identification rules, but I am not going to go into that detail here, considering this is a typological course, keeping in mind the basic or introduction level linguistics.

Had it been a syntax course, I would have delved deep into it, but just remember in most of the cases your intuition matters when you are trying to find out the constituents, but there are other rules too. If time permits I will talk about it later, but otherwise maybe it is a different course. Now the concern is we can and since we found out these are the units which can be woven together or which can be put together to create bigger units or bigger sentences, we have a structure like this.

At the top we have S, so that is the beginning. This is a hierarchical organization which has been illustrated through a tree diagram. And what is the top node here? These are called nodes, remember S is a node, NP is a node, VP is a node, Art is a node. So, these are the nodes. It begins with the root node which is the sentence, and finally, it grew down or it grew below. S goes to NP VP, NP goes to art and N, VP goes to V and NP, and NP goes to art and N. So, the child saw a cat. This looks very simple for the moment, but then not all the sentences are this simple when we use them in the discourse.

Our discourse has a different kind of interpretation. We do use multiple complex and and compound sentences. So, the tree diagrams sometimes are not that easy to draw. And when the matter comes to your own first language or your mother language, it could be even a little more complex, but that does not mean that the tree cannot be drawn; it can very much be drawn, but then it may not be as simple as you see it over here.

Now, I will give you some idea how we are going to or what are the rules and why we need to write it as S goes to NP VP, why it cannot be S goes to PP and NP? How do we identify or how do we find out that there is a certain rule how you are going to draw the tree. And the most basic rules would be the phrase structure rules. This is about the phrase structure rules and also the lexical rules. The lexical rules would be which lexical items should appear with what. When you say a John, lexically they are not compatible. The lexical item a, which is an article, cannot occur with a proper noun John.

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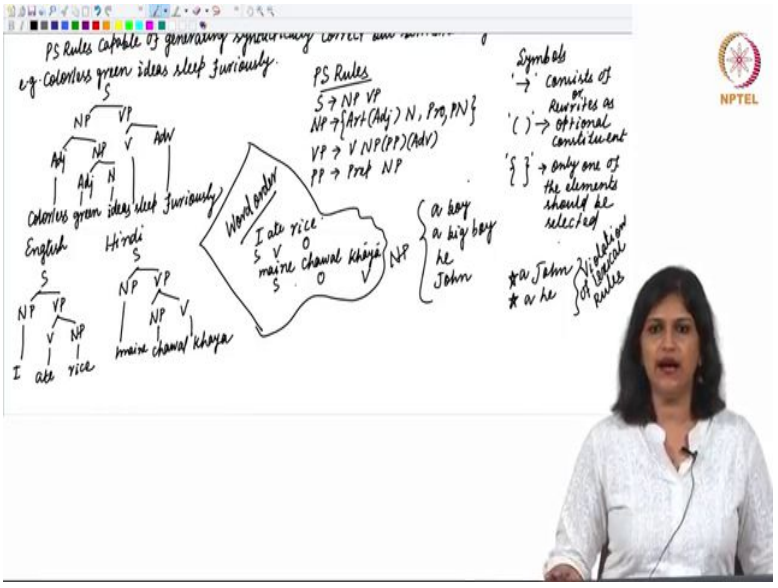

Similar is the case with the lexical rule, so this is what I would write. These are the violation of lexical rules. This is an important aspect, please remember it. Why is this a violation? Because there are certain rules which should occur with what. When you say a child that is fine. So, lexically a is compatible with a common noun child, but when you say a John, it is

wrong, because they are not compatible with each other. So, that is how it works. You need both the rules, the phrase structure ones and the lexical ones to draw the trees.

And when you draw the trees, you need to be careful that it should always follow the word order parameter that it has. When I say word order parameter, you need to remember not all languages follow the same word order. When it is English, I eat rice, that is S, V and O. I already discussed it when I was talking about typology; or let us say I ate rice. In case of a South Asian language like Hindi, it will be or it should be maine chawal khaya. This is subject; this is object; this is verb.

And when you draw the tree, you need to keep in mind that this word order difference should be paid attention to. This is very important. Now let us see how to draw the tree. If we follow the same word order with the lexical rules that we have, we cannot say a I, you, but you can say a child or you can say the child, but you cannot say the I or you cannot say a I, we have already discussed that. So, with these combinations of the phrase structure and the lexical rules now, let us see how the word orders decide how the tree is to be drawn.

Here is the English tree and here is the Hindi tree. If we go by the PS rules, I ate rice is a sentence and the sentence should go to S goes to NP, VP. This is NP and this is VP. Then VP goes to what, it could be V, it would have V and NP, then it could be a PP adverb; we do not have anything. So, we will have a V here and we will have an NP here. What is this NP? This NP is a pronoun, that is I, this is ate, and this is rice.

Now, if we follow the same pattern for Hindi, it is not going to work. Though Hindi has a flexible word order, but by default it is S, O, V. This is S V O for English, but for Hindi we have to change the branches a bit. The main structure would remain the same, you just need to flip the side of the branches. So, for the Hindi one it is NP VP, and VP should be what? Chawal khaya; it is not khaya chawal. Maine khaya chawal is a different thing like there are other arguments how we get the constructions like maine khaya chawal. The focus and topic instructions we are not going to go into that detail.

But just remember the Hindi counterpart of the English sentence I ate rice is maine chawal khaya. So, in this case if I write V and the V on the left and NP on the right, the word order does not prove to be correct. Then how should we write? We have to just flip the side. So, I

will write NP and V, it is still VP consists of NP and V, but just the word order is getting changed. So, in this case, this would be maine, this should be chawal and this should be khaya,.

My suggestion for you would be try to draw the tree diagrams of very simple constructions of your own language. So, what we understood, there are certain symbols that we use in syntax, and using these symbols we need to identify how we need to fit the lexical items. And the lexical items also follow certain rules. What are these rules? These are for example, articles do not with the pronouns, the articles also do not go with proper nouns.

These are certain lexical rules that we need to keep in mind, also the word order, which lexical item should come first, which should come later. For example, in case of English, you can say the boy chased the dog, but you cannot say the boy the dog chased. That does not work, but that might work for a South Asian language like Hindi or Odia or Bangla.

Similar is the case you should not drop a few lexical items. When you say the child chased the dog, you cannot say the child or child chased the dogs, maybe yeah, but you cannot say let us say a children, a children chased a dogs, that is not possible. The lexical item children is plural; so, it does not go with a lexical item which is a, that has a singular representation or the singular interpretation, a is not compatible with children, a is not compatible with dogs, because there is a violation of singular and the plural nature of these items.

And these rules are generally considered as universals and they stand true for most of the world's languages if not all. Just check what are the lexical rules for your own language, and then how the combination of the phrase structure rules and the lexical rules they can come together, they can fit together to create or to have tree diagrams for the syntactic analysis of certain structures. So, with that, we will see what are the other things that syntactic analysis can do.

Keywords: syntactic tree, root node, branch, mother node, daughter node, sister node, bracketed diagram, top down model