

Appreciating Linguistics: A typological approach
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Lecture - 38
Deep Structure and Surface Structure

Hi, hello everyone. Welcome to this session of our course Appreciating Linguistics: A typological approach.

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The diagram illustrates the concept of syntax, focusing on the relationship between deep structure and surface structure. It includes the following elements:

- Syntax**: The central concept, with sub-points: 'All and only criterion' and 'Putting together arrangement generate'.
- Deep Structure**: A box on the right side of the diagram.
- Surface Structure**: A box on the right side of the diagram.
- Transformation**: A box connecting Deep Structure and Surface Structure.
- S-Structure**: A box below Transformation, with sub-points: 'PF (Phonetic form)' and 'LF (Logical form)'.
- Example Sentences**: Two sentences are shown: 'The child is crying for a toy in the market' and 'Child market crying he is the in a for toy'. A box around the second sentence is labeled 'Deep Structure or Surface Structure'.

Since we got to know how syntax is going to help us and then how we can deploy it as a tool to figure out or to understand, how similar looking sentences might be different and different looking sentences might actually have similar theory underlying structure. So, in the coming sessions I am going to talk about it more, but now let us focus on some discipline specific jargons or syntax specific jargons that you should know as a linguist.

Those who have already had some courses in syntax or introduction to linguistics, you must have been familiar with such terminologies. But if you are new to linguistics and you are trying to understand what this discipline is, then this is for you. So, very simple terms and the very basic things that syntax deals with and I would like you to have a look at this picture that

I have drawn here. Let us look at this. There are two terms, I must focus on; one is deep structure and the other one is surface structure. These are the two very important things that you need to keep in mind when you are trying to understand syntax.

If you look at the literal meaning deep structure which is there deep inside and surface structure which is floating, which is superficial or which you can actually see. Something that you can see is the surface, something that you cannot see, but it is there it is very much there; it is the deep structure. These are the literal meanings and in linguistics also it stands true, up to a certain extent. I would like to draw your attention to two constructions; one is John hit Peter, the second sentence I am writing Peter was hit by John.

We will come back to these two sentences later. Now first let me talk about some basic concepts which are related to these terms like deep and surface structure. What is it? Now look at this diagram that I have drawn here. Here I have written D-structure; D structure means deep structure. Then I have written here transformation, and after transformation I have written here S structure; that means the surface structure, then the surface structure has been split into two branches; here I have written PF and here I have written LF. PF is the Phonetic Form and LF is the Logical Form. This is called the inverted Y-model. Does it not look like an inverted Y?

Here you have deep structure, here you have PF and LF, somewhere here is surface structure. So, this is basically this and then this is the elaborated diagram. When you utter a particular construction or a grammatically correct sentence, what you hear that is primarily the surface structure and to arrive at that surface, a lot of other operations must have happened at the deep structure level. Did I make sense? Could you understand?

All these sentences that you use or all the constructions that you use in your day-to-day life, what you hear that is primarily the surface structure and this surface structure is sometimes, not always, sometimes a deep structure and the surface structure are the same. Sometimes this surface structure is the transformed version of another form or you can say is the transformed version of another construction.

To arrive at the surface structure, sometimes you need to go through certain transformation rules. If I can give some kind of an analogy, you start it with a straight line and then you do

some designing and at the end of the operation; you do not see that straight line anymore or you do not see that straight line as a straight line rather it has become a specific design; it has become a pattern. To become that pattern or to become that beautiful design, it must have gone through a set of transformation rules. That is the difference between the deep structure and the surface structure.

And once you arrive at the surface structure, it will have two different components. What is the first component? The first component is the sound component and the second component is the grammatical component. The sound component would be PF which is also known as phonetic form in linguistics. The other component would be LF which is known as the logical form, or you can call it how you are going to arrange it in a logical fashion, so that when the speaker hears it, it should sound meaningful to him or her. That means, this particular construction should not sound like a weird construction.

If you can visualize,, just imagine the stacking of the cards. You are trying to build a house and you are keeping the cards one by one. First what you did, you put together all the cards that you have in hand. Let us say you have 10 cards, you have put all of them together. That is the first process. Look at what is written here putting together and after you put it together, the next task is to arrange it; to organize it in such a way that it would have a potential to be considered as a meaningful construction. So, the second thing that you did, you arranged it. The arrangement is the second process.

And what is the third process? The third process is generation or generating constructions. You might generate it using certain transformational rules. The deep structure does not really go through any transformation yet it arrives at the surface structure. In that case these are the declarative sentences like I am Anindita. So, I am Anindita is the deep structure. The surface structure is going to remain the same; it does not go through any transformation rules.

This is how it should look like. That is the skeleton of syntax or that is the skeleton of the entire analysis that syntax is going to propose. Remember, it is like the pack of cards that you have in hand; you are going to put it together, you are going to arrange it, then you are making it flat. You keep it one after another and now you have 10 different phrases and you have made a design. And after this design is made, you made them flat.

When you made them flat, it became a full sentence and that is the surface structure that you use or you utter or you hear in the day-to-day discourse and it will have a PF component and it will have an LF component. I hope this is somewhat clear to you. We will come back to it. This is not everything about deep structure or surface structure, especially when you are trying to understand syntactic typology. This is called theory underlying structure or the theory underlying level.

Underneath the surface level, you will have a deep level or you will have a deep structure and this can be easily explained with a construction like this. Let us look at this construction. When I ask you to look at this construction, here I have written the first sentence which is an active construction in traditional grammar or in prescriptive grammar. You are going to call it an active sentence. John hit Peter.

Who is the person who has done the action? That is John, and who has been the victim? That is Peter. So, what is the meaning? John is the one who has done the action and this action has been done on Peter. There is an agent who has done this action, there is a patient who has undergone this action.

John hitting Peter can also be explained by a passive construction like Peter was hit by John. What is the meaning? It is the same; the meaning is the same that Peter has been the victim or Peter has been the patient and John is the doer of the action. The action of hitting has been done by John. Let us see how syntax helps us to identify the similarities and the differences in these two sentences.

Let us go back. When you say John hit Peter, the meaning is John is the agent, Peter is the patient; Peter has gone through the process and John is the one who did the work. In case of Peter was hit by John, the same meaning; John is the one who did the work and Peter is the one who underwent it. Now, let us come back to this rule or this information that I wrote about syntax. It said syntax or syntactic analysis can actually help you to understand how different looking sentences can be related.

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Important

for toy

All -> The analysis must account for all grammatically correct phrases and sentences.

Only -> Only those which are grammatically correct phrases and sentences can be accounted for by using our analysis.

near London

near deep

Syntax

S -> NP+VP

PP -> P+NP

How similar looking sentences might be different

How different looking sentences could be related.

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Don't you think this is exactly the same thing happening here? The active construction John hit Peter and the passive construction Peter was hit by John, primarily it says the sentences look different, but there is a very close relation between these two at some level; maybe at the deep structure level; on the surface they are looking different.

But at the deep structure or or the underlying structure that remains same for both of them. So, what should be our concern here? Is it not surprising? They look so different; one is active, the other one is passive. Grammatically also there are more number of words in the second sentence, less number of or fewer number of words in the first sentence yet structurally they are the same or at the theory underlying level that is the same.

So, what should be our aim here? We should aim at a kind of grammar that must be capable of showing how a single underlying abstract representation can become different surface structures. That should be the crux of the story. That should be your take-home. The take-home is that we should develop or we should deploy such a grammar which must have the ability, and what ability? To show that a single underlying abstract representation can actually become a different surface structure.

So, the underlying structure remains the same from one underlying structure, you can actually create or you can arrive at different surface structures. If you are able to do that, your

grammar is self-sufficient, your grammar is an effective one which can actually accommodate data from many different languages. Then only this theory would be considered as a robust theory and syntax actually does that. The syntactic theories are robust enough to accommodate a lot of data given in different languages.

The proposition here is that or the argument here is that on the surface the structures might be different; it might look different for English, different for Latin or different for let us say, Greek or Hindi or Urdu or Bangla. It might look different; but the theory underlying structure, the abstract representation, that remains the same. And out of that same abstract representation, we do derive or we do generate different surface structures. This stands true for most of the world's languages.

We are going to talk about it in detail later. My intention for today's session is just to give you an idea how the deep structure and the surface structure work in syntax. In a construction like I am Anindita, deep structure and surface structure; they are the same. In a construction like what is your name?, the deep structure might be different, surface structure might be different, or a construction like are you Anindita?, in that case also, considering it is a question, considering it is an interrogative sentence, it has gone through certain transformations to arrive at the surface structure which is are you Anindita. So, that is about deep structure and surface structure in linguistics.

Now our task is to find out what other work can syntax do. It can definitely help us to identify how similar looking sentences are actually different and how different looking sentences are actually similar. Does it have any other ability to help us in any other domain or in any other function. The other thing that syntax might help us to clarify is structural ambiguity.

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Syntax → How sentences might be different
How different looking sentences could be related.

Structural Ambiguity

Syntactic analysis must have to be capable of showing structural distinctions between the underlying representation.

(I) saw my friend while opening an umbrella

John shot the elephant in pajamas

deep structure { Small boys and girls
conj
Small (boys and girls)
conj

NPTEL

So, this is one way by which syntax can help us or syntactic analysis can help us and then we got to know what is deep structure and what is surface structure, which are these discipline specific jargons. And now it is time to understand how syntactic analysis can help us to identify structural ambiguity and how to sort of simplify it.

Considering we have constructions which are ambiguous which might have multiple meanings, I will give you an example. Let us say I saw my friend with an umbrella. When you say I saw my friend with an umbrella, don't you think this kind of a construction might have two different interpretations or two different meanings. Maybe I will give you another very interesting example. Let us say the construction here would be John shot the elephant. This is also another example from Yule's book *The Study of Language*, in pajamas. It is a very funny construction actually.

Let us consider the second example John shot the elephant in pajamas. In this kind of a construction my question would be when you hear this sentence for the first time, don't you wonder who was actually wearing the pajamas, whether John was wearing it while he was shooting the elephant or the elephant was wearing it when John was shooting it or when John shot it? Who do the pajamas belong to, whether they belong to John or they belong to the elephant? It is a little tricky. It is actually clumsy. It is a little ambiguous to think about it from this angle. Does it have semantic ambiguity and then whether it has structural ambiguity

or not. We are going to check it in a while by deploying the syntactic analysis or the proposed analysis that we are going to discuss

Similar is the case with the first construction, I saw my friend with an umbrella. Who was holding the umbrella? You were holding in holding the umbrella, then you saw your friend; or maybe I can even make it more interesting I saw my friend while opening an umbrella. So, who was opening the umbrella, whether I was opening the umbrella and I saw my friend or my friend was opening an umbrella when I saw him? These kind of constructions are called ambiguous constructions; they have both structural as well as semantic ambiguity.

So, in this case, this might have two distinct underlying interpretations at the deep structure level. On the surface structure the ambiguity comes, but the ambiguity is not there at the deep structure level. At the deep structure, it would be very clear. While opening an umbrella belongs to who. If there is a phrase, which is the subject? That is I, and there is a verb which is saw and then my friend which is another NP, then while opening an umbrella. So, that is generally considered as an adverb, it is a temporal or it is a time adverb.

So, in this case, when you think about it from the deep structure perspective, then the ambiguity is not there. That there would be two distinct. So, in such structurally ambiguous constructions, they would have two distinct underlying interpretations. However, when it comes to the surface structure level it becomes clumsy or it does have different meanings.

There could be other constructions like small boys and girls. When you say small boys and girls, in this case also, it is confusing whether small boys is one unit, then and is the conjunction, then there is girls. This could be one representation. Or it could be small is the adjective which is modifying boys and girls; this could be the other representation and this anyway remains the conjunction.

So, this conjunction is like this is between boys and girls and small is identifying boys and girls as a unit or small is modifying boys and girls as a unit or small boys is a separate unit, girls is a separate unit and then they are joined together with the help of a conjunction. This confusion can be cleared at the deep structure, but definitely not at the surface structure.

So, if you just look at the surface structure level, then there is a confusion. But if you go back, if you try to dig deep into it, then you would see that these are actually two distinct constructions, there are two distinct underlying representations which is why you should not have any ambiguity associated with it. So, now the concern is considering these constructions are structurally ambiguous, we must have an analysis or our syntactic analysis must have the ability of showing the structural distinction between the underlying representation.

This is what is important. What kind of contribution syntactic analysis will make here? Syntactic analysis must have to be capable of showing structural distinctions between the underlying representations. This is also another important function of syntax. This is something that you need to keep in mind when you are thinking about structural ambiguity.

So, here also the same thing I is the subject and saw is the verb, my friend while opening an umbrella is going to be one unit. Otherwise, it can also be I saw my friend while opening an umbrella is going to be I while opening an umbrella saw my friend that can also be there. So, this particular structure will have two different deep structure representations. Since, our analysis has the ability to identify this distinctness, it would be considered as a robust theory. So, syntax will have multiple functions to play or syntax will have a lot of other important functions which helps us to understand human language better or the constructions in different languages of the world in a better manner.

Not only the structural ambiguity, it also helps us to identify the theory underlying structure of the languages in the sentences and it does give us an idea that how similar looking constructions might be different at the theoretical level, at the underlying level. And different looking constructions might also have some close relation; if you try to dig a little deep into it. These are the two most important things you need to understand about syntax.

Then the third one that I want to emphasize on as far as the importance of syntactic analysis is concerned is recursion.

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The image shows a Windows Journal window with handwritten notes. At the top, it says "structural analysis the underlying representation". Below that, there's a bracketed section labeled "deep structure" containing two lines: "(Small boys) and (girls) conj" and "Small (boys and girls) conj". A horizontal line separates this from the word "Recursion" which is underlined and followed by "(Repeatable any number of times)". Below that, a long sentence is written: "John thinks that Mary believes that Peter feels that Susanne is a good student." The NPTEL logo is in the top right corner of the journal window.

Recursion is an important, very fascinating, very interesting phenomenon in natural language. So, what is the literal meaning of recursion? Recursion means you are actually able to generate a long sentence by stacking many of the phrases together. This is one of the very crucial properties of grammar and what kind of grammar descriptive grammar or you can say the syntactic analysis that we are using.

The literal meaning or the etymological meaning of recursion is repeatable any number of times. That means, you are using certain phrases which can be repeated any number of times. There should be no problem. Think about a construction like let us say John thinks that Mary believes that Peter feels that let us say Susan is a good student. Look at this construction such a long construction and what has happened here? Stacking of the phrases.

John thinks that one phrase, Mary believes that one set, Peter feels that one set, Susan is a good student. That Susanne is a good student, who feels? Peter feels. That Peter feels that Susanne is a good student, who believes? Mary believes. That Mary believes that Peter feels that Susanne is a good student, who thinks that? John thinks. So, this is also one very crucial phenomenon which can be nicely explained by deploying syntactic analysis.

This property of language or this is available in most of the world's languages if not all. Recursion may not be available in certain world's languages. We will talk about it later. But

in many of the world's languages, you would encounter constructions like this. The syntactic analysis that we are going to discuss should also have the ability to capture such sentences and they should be able to account for these kind of long constructions. Then only this analysis will be considered as a robust analysis.

So, what is the essence of it? What should we understand or what should we take home? We must propose an analysis or the kind of analysis which we are going to discuss; I will talk about a bit of history of syntax in the next session, but as of now Chomsky's proposal about syntactic analysis as a whole this kind of generative ability of the grammar should have the ability to help us in these directions or in these domains.

It should help us to remove or to understand the distinct deep structure representation of ambiguous constructions, it should help us to find out how the recursion can be accounted for, it should also help us to identify or to let us know what to find out how the deep structure and the surface structures they are different and then the sentences which are looking similar might be different at the theory underlying level. And the sentences which look different might be or might share a close relation at the theory underlying level.

Considering syntactic analysis has the ability of explaining or has the ability to account for all these functions that I have discussed, it is one of the most robust theories of the contemporary time or of the modern days. And we will talk about the history of it a bit and then eventually we will move to syntactic typology. So, that is for the day and then we will discuss more about deep structures of a structure, recursion, ambiguity. We will also talk about what are the phrase structure rules and maybe some basics of advanced syntax and eventually, we will move to the typological approach of syntax.

Thank you.

Keywords: deep structure, surface structure, transformation rules, phonetic form, logical form, inverted Y-model, active and passive constructions, theory underlying structure, structural ambiguity, semantic ambiguity, structural distinctions, recursion