

**Indian institute of technology of technology madras
Presents**

NPTEL
National Programme on Technology Enhanced Learning

Introduction to modern linguistics

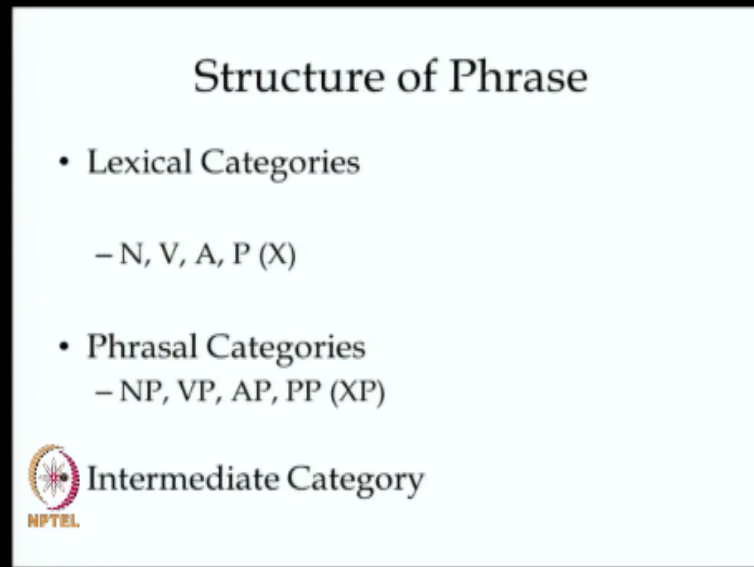
Lecture-30

Syntax: X-bar theory cont...

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So we have started talking about syntax where we understand sentence structure particularly for keeping but particularly keeping in mind that language is a phenomena of human mind how it works in human mind and how its represented we looked at language acquisition which simply tells us how we learn a language that is first language now understanding sentence structure and which we know as syntax helps us understand how its represented in human mind how we understand the underlying structure of sentences there that this is what we are doing in this.

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Structure of Phrase

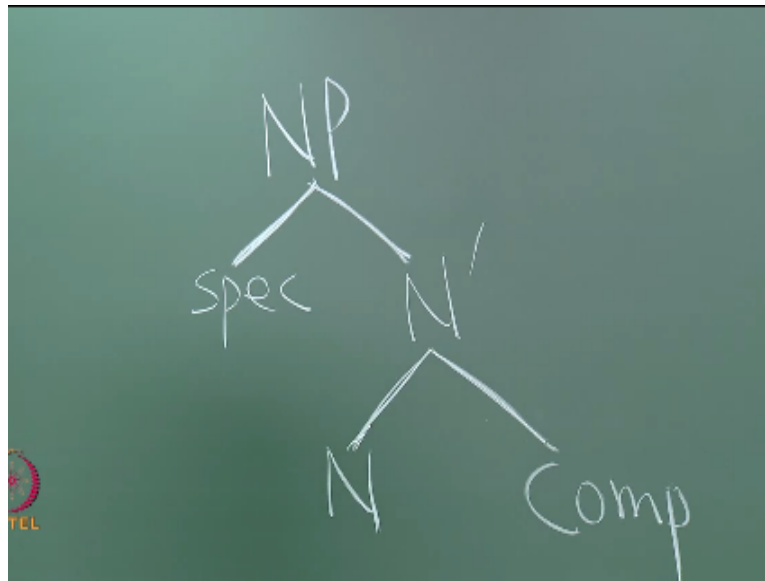
- Lexical Categories
 - N, V, A, P (X)
- Phrasal Categories
 - NP, VP, AP, PP (XP)

 Intermediate Category

I mentioned to you there are four different lexical categories prominent ones they are nouns verbs adjectives and prepositions when we develop structure of these categories we look at the

these categories in terms of their phrases and they are noun phrases for phrases adverbial phrase adjectival phrases and prepositional phrases and there are there are some intermediate categories and which I am going to show you how to draw that up and how to understand their internal structure see.

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A noun phrase is built with noun as its head and this structure is always binary please pay attention to how this is developed and then I am going to also discuss with you why this is relevant and what does this buyers why do we need to understand this representation.

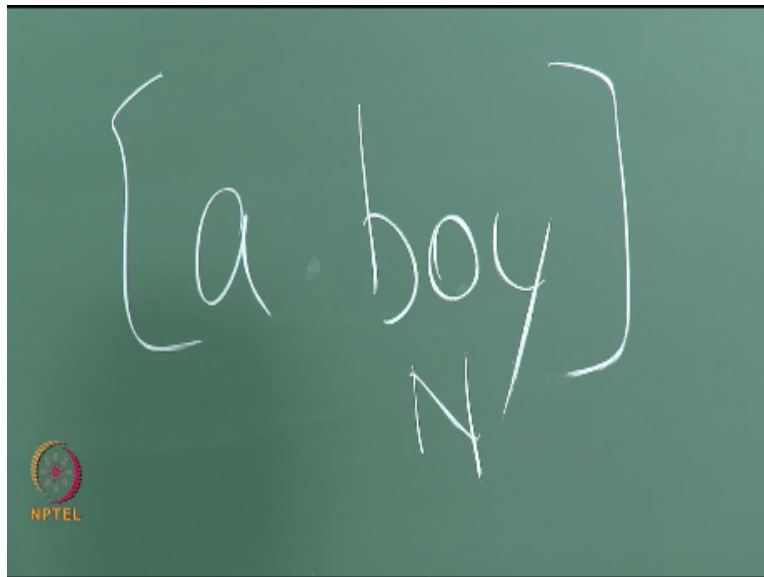
Do we really need to understand and does it does this thing really buy us something or this is just a fancier stuff to look at I will talk about that in a moment but first I want you to look at the internal structure of these phrases and how they develop when we say a phrase and when we call it a noun phrase the only reason why we call it a noun phrase is because it heads in now in other words in the center of it that is in the head position of this phrase.

We have enough that is a nominal category therefore this position is called heads position this is going to be specify position and this is called complement produces this is the fundamental structure of a phrase all the phrases all of them that you see here nouns verbs adjectives and prepositions are going to have similar structure exactly similar identical structure rather in which each one of them will have an a specified and a complement.

With respect to the position of a head in a phrase the relationship between specify and complementizer is hierarchical what comes in these positions and what is the meaning of that relationship being hierarchical is what I am going to talk to you in a moment but please look at this thing the reason why this is binary and the structure is designed this way is because with respect to the head position of a phrase.

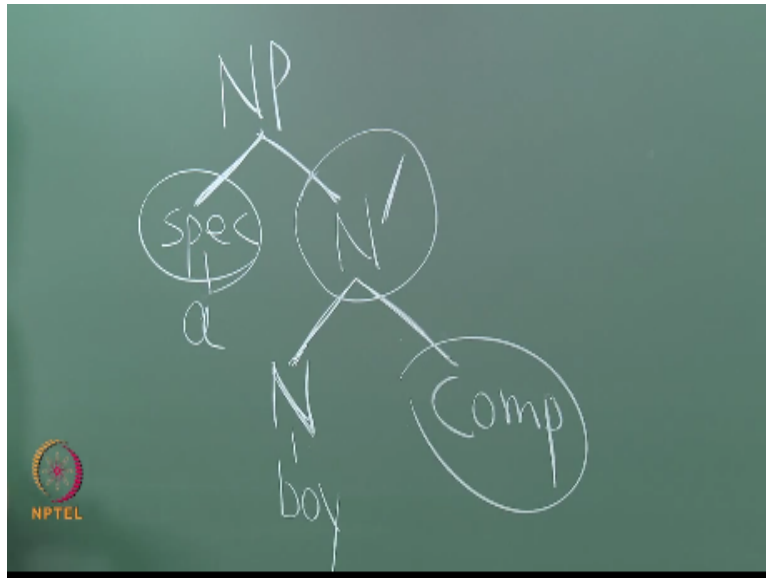
We want to capture or say that the relationship between a complement and a specify is hierarchical there are different things that appear in these positions remember I had talked to you about this example that this is a nominal category.

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However this is this is a noun but now this is more than enough be honest we understand this now this is more than enough and if it is more than a now then what is it and how do we understand these things in other words what it means is these to form a category these to make a phrase and if this is a phrase then where does this element go what is the relationship between this element and the noun in this phrase because when we use such things in a larger phrase or in a sentence we need to understand the relationship between different elements of a phrase in the entire sentence different elements different categories of a sentence and their relationship is an important factor for us to understand how sentences really work on your screen what I refer to as intermediate category is this thing this is an intermediate category.

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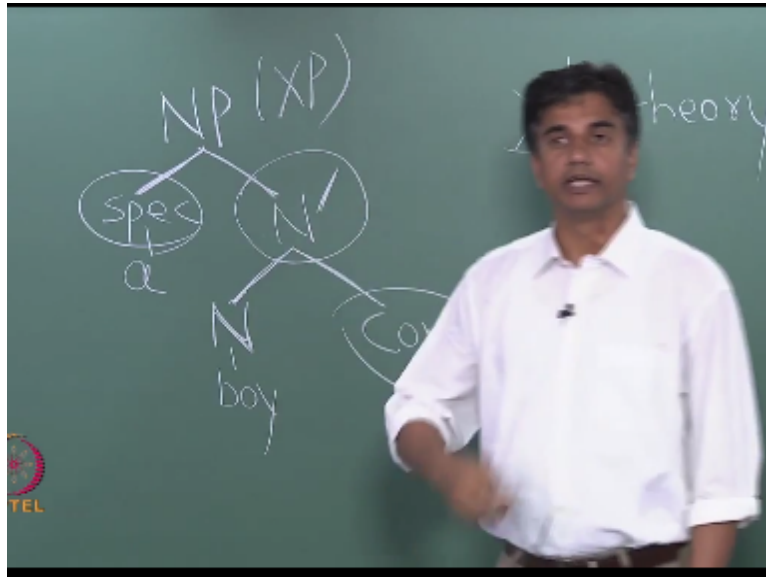


Which we call n bar this is in this intermediate category does not have any element to represent you understand this point when I say this intermediate category does not have any element to represent we may have a noun here this head represents a noun a specifier may represent something else likewise we may have a complement of the now in the noun phrase but this intermediate category does not have any lexical element to represent it is a positive note to capture hierarchical relationship between the two and therefore this whole thing is called x-bar theory.

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That is x-bar theory of representing a phrase this making sense so far hold on for a couple of more minutes and probably it will make more sense any lexical the I do not think I need to explain it to you why what is the relevance of X and this any element that they represent is an X and therefore the phrasal category.

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Is known as XP it could be in NP it could be a VP PP or DP clear now let me give you some examples of let me tell you what this is.

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- Relationship between elements and nodes.
- Lexical and Sentential Structures
- Specifiers vs. Complements
- Arguments vs. Adjuncts



C-Command

And what we are going to do this helps us and of course understand the relationship between the elements in the sentence it helps us understand sentences structure we are going to be looking at the relationship between complement and adjuncts today and the notion of see C-command and I am not sure if we will be able to reach to see commend today or not.

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NP (Noun Phrase)

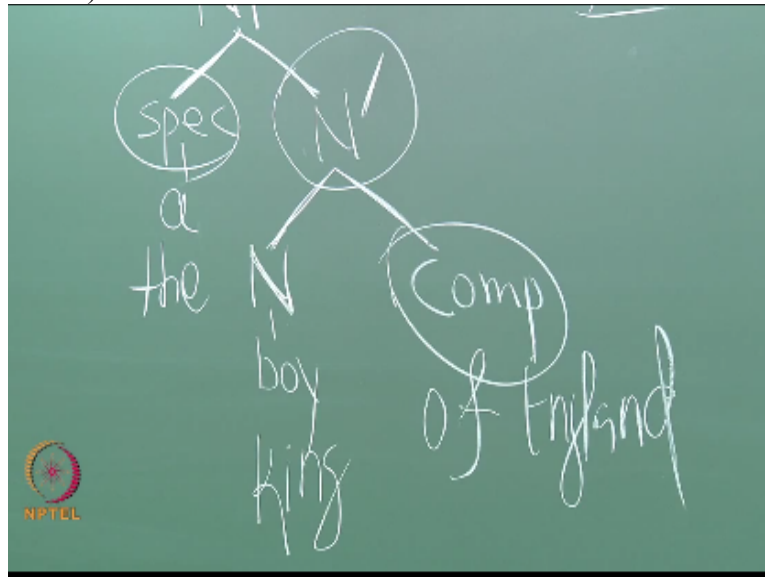
- The king of England
- A student of physics
- A student with long hair
- A student of physics with long hair



But let us look at down face down face first here is the first example the King of England is this one entity or not it is one entity and what do you think is in the center of this entity this if this is a whole phrase the King of England then what is in the center of this phrase King because

the element that precedes the king is also saying something about this the King and the element the whole phrase that follows the king is also saying something about the king and that does not have its own independent meaning besides team C that C this point.

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Therefore this whole thing constitutes one phrase if that is the case then here is here is King and here is the king the next element of England is let me give you this part and then I will ask you another question is compliment of this place this is the compliment of this place What we mean by a compliment is a required element remember when we were talking about the objects of a transitive verb remember that thing when we were talking about objects.

Of a transitive one that an object is a required element in a transitive verb whereas no object is required for intransitive verbs there is a specific role of required elements in sentences in languages in this phrase kings of when we say King of England of England ends up to be a required element of this displaced such required elements are called such required elements are called complements and the things that are or may not be there are not required.

Or that may not be required are called adjuncts okay now in this in the second phrase a student of physics again it seems to be a required element because it is giving some essential information about this student however in the next one student with long with long hair when we look at these two these two phrases a student of physics or a student with long hair to native speakers intuitively speaking with long hair is not as required as the phrase.

In the previous one student of physics what does this student of physics mean can we elaborate on that the student who studies physics describing the second phrase student with long hair can we say the same thing student who studies long hair no right so we have not developed every this mechanism so far for you to clearly see this distinction and that is my goal today for you to make see this distinction clearly which phrase which phrase is an adjunct.

And which phrase is a compliment okay I am trying to build on that so that you should be able to see but in these two examples the student of physics of physics is a required element. Is a complement of this trait of this head now the head noun King and in the second phrase student with long hair with long hair is apparently an adjunct of the head noun student okay in this city you go ahead should be independent of the semantics that is universe to date it is something like implying that in studies or it is implying we can only do it only if we know the meaning of its aperture under three be independent of semantics and working on it.

Is largely independent of semantics I am going to show you in a and if you in a few minutes the only reason why I talked about this is this description of a student who studies physics is the meaning of student of physics but for the phrase the student with long hair this phrase does not mean the student who studies long hair the only reason why I talked about that is because we have not developed this thing so far let me show you their structure.

And then you will see not the meaning rather structure tells us this difference in fact in fact just on the basis of meaning if you ask somebody right away this question then it becomes very difficult for anyone to say why or anyone to see why all physics in the first phrase is a compliment is a required element and with long hair in the second phrase is a not required element it is very difficult to see only on the basis of meaning.


So while supporting what you are what you are saying this whole description is going to show you that not the meaning whether the structure tells us this distinction give me a few more minutes and I will show you how it works in the last sentence student of physics with long hair do you see this thing a student of physics with long hair we have both in this place do we is this a sentence or less than a sentence what is not there in the sentence in this whole thing what is not available in this whole phrase therefore it is a still afraid what kind of a phrase we may need to look at the phrase to find it out but it is still a phrase less than a sentence you do not have to

figure it out I have already mentioned this is a still announced race where we have both in this race a compliment and an adjunct where a physics is complement and with long hair is adjunct.

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Verb Phrase

- John [VP loves Mary].
- Marry [VP will meet with her doctor at 5 pm].
- [VP will meet [with her doctor] [at 5 pm]].



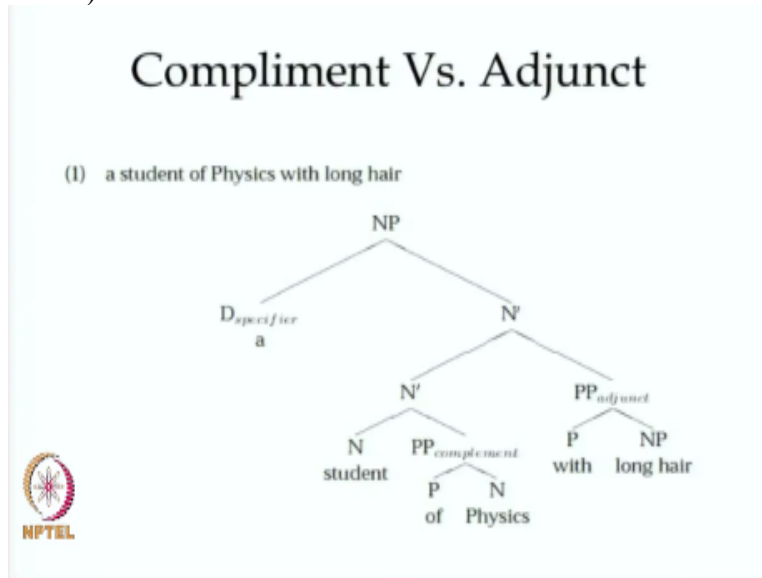
I want to give you one example of war phrase before we talk about complement an urgent distinction further word phrases are word phrase denote the elements that are associated with the world and everything that are associated with the world except the subject so in these in these two examples when you see things in red they are part of word phrase john loves Mary loves Mary constitutes word phrase and Mary met with her doctor at 5:00 p.m. Still constitutes.

The whole war phrase the reason I have tried to make the second one little look little longer is when we say a word phrase we not only mean the required element of verbs which part of this is required element that is it is in the sentence John sorry Mary will meet with her doctor at 5 p.m. the verb is meet which part of this word phrase is a required element which part of the word is a required element in this phrase with her doctor why that is the main object of the word.

With her doctor go ahead IBM it is not require it whether it is might be amount right at 5 p.m. is not required because this just gives us additional information even if we drop that the sentence sounds complete that Mary will meet with her doctor sentence is complete however if we say Mary will meet the sentence is not complete yet the get the point so in this in this whole word phrase also I am trying to show you two things one that is required element and the other

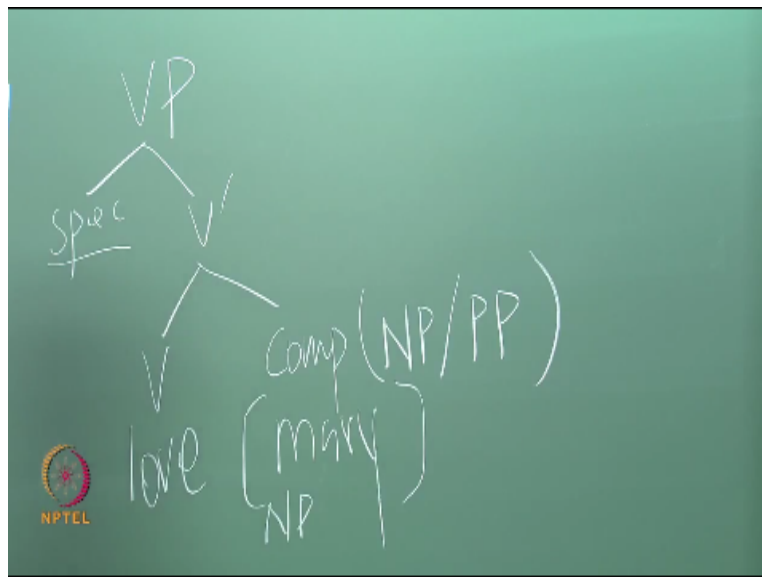
that is not required element what is not required is called adjunct and what is required is called a complement okay.

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Now I want to show you this is structure in little bit more details but even before that let me just for the visual purpose let me give you the structure of a word phrase.

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Again the structure of a word phrase is such that where the whole in the whole phrase the verb is the head of it and then we have specifier and a complement let us look at let me let me go

back to the previous slide for a moment in the first sentence this is the war love and the compliment is merely the idea for you to see here is we need not have any specifier all the time however this is not this is a structure of a phrase we do have a space for any specifier but this may not be available all the time and when a particular element is not available.

That space remains empty this is the this is where the head occurs and then the complement occurs in its position we call it a complement a compliment maybe an NP or a PP or any other phrase we call things here complement that simply means this is a required element however this complement may itself be an entire noun phrase or a prepositional phrase see my point for example here this complement is a prepositional phrase of England is a prepositional phrase.

In this case Mary is a complement which happens to be a nominal element but even in the absence of an S specifier or further complements we call such elements even with a noun this qualifies to be a noun phrase are you with me or am I talking about something this is still making sense forget about you speaking even nodding of head I see only a very few please stop me if it is not making sense to you okay I do not think I am talking about any complicated idea.

So far we are only talking about different types of elements in a sentence how they constitute their phrases and then how such phrases are represented that is all I have been talking about and that is what is the goal and then different types of constituents in a simple phrase or in a sentence are related in a certain way there in some cases they have hierarchical relations how are such relations captured is the goal of this x-bar theory.

Is what we are talking about okay so but if it feels at any point that we are losing track and I am either moving ahead or not making sense please just stop me we can look at this again is this at this point clear that this is a compliment position and this is in a specifier position in this compliment position we can have different kinds of phrases and depending upon the fact whether a phrase is a required element to its head or in non required elements to a head this can be a compliment or an emergent how we capture such a distinction I will show you in a moment so we are done with a more phrase.

Let us now look at this complement an adjunct distinction in a better way this is in a structure for the phrase a student of physics with long hair in this phrase student of physics we said is the compliment sorry of physics is a compliment and with long hair is adjunct okay which

means one prepositional phrase of physics serves as a required element where as the other one with long hair serves as an adjunct as non required element okay.

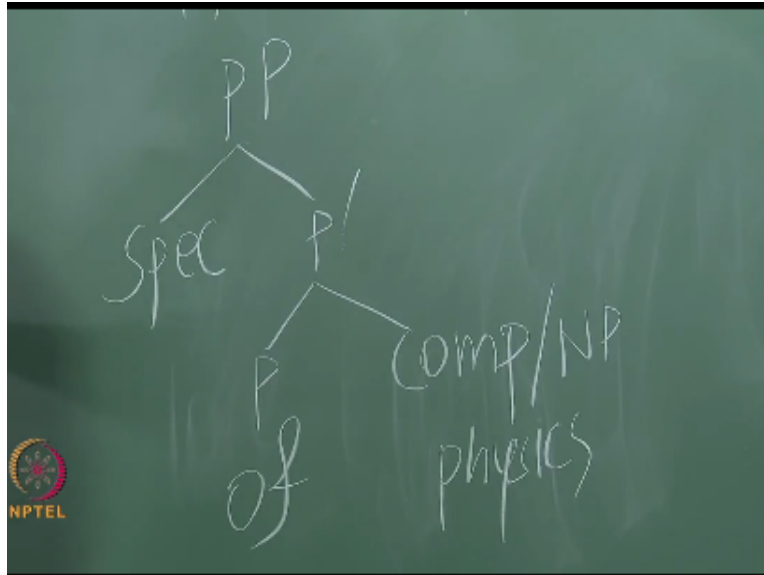
With respect to their positions in this structure do you find any difference between them I want each one of you to look at this structure and stare at it and see the try and see the distinction between this by looking at your cell phone's probably you will not be able to see that I have only talked about a complement and an adjunct and I am telling you what is a complement in what is in adjunct now at the next stage I want you to look at this structure.

And I am not asking for an answer or anything I am only asking you to see do they look different structurally that is their representation in this structure has it has a special meaning. As a special consequence if you can please see it for yourself and tell me what is the first thing that you observed as the difference between complement and adjunct okay one more step let's take a step back and see do you find this structure consistent with what we have drawn here do you find this a structure consistent with what we have drawn here that is if we are talking about a noun phrase the head of the whole noun phrase is a now.

What is the head of the noun head noun in this structure student do you see any other head in this whole phrase no or yes do you see any other head in this whole structure physics is another head do you see any other head we have actually we have several available we have off as a phrase as a head and we have width as a head these are the head positions okay and then we have a student as the head those who said they do not see any other any other head.

They are also personally right because probably you are responding to the responding to the answer with respect to this head now this X P that is noun phrase we have only one if you find other heads this is this noun physics is the head of a place right this mound physics is the head of which place it is a syllable all physics is a okay let us work with this thing these are these are done better in a better way on the board let me show you I think we still need to spend a little bit more time before we look at this structure.

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So we have a phrase of physics right this is it post positional phrase sorry prepositional phrase how do we draw the structure of this thing we and this structure must be consistent with this one so we have a PP do I do I have your attention please this is going to have a specifier and intermediate category and then it is going to have a head and then a complement okay head of this phrase is going to be we are talking about PP head of it is going to be a preposition off. And then the complement of this happens to be an NP which is physics now please do not be lost with this how this whole thing is an NP this is an NP in a very simple way okay let me draw it here in this NP we have a specifier a head now and a complement when we say physics what we mean is there is no specifier in this phrase and no complement in this phrase but we only have this one potentially yes the reason.

Why any word not any word nouns prepositions worse and adjectives because these are the elements in a sentence which may take other elements around them they constitute a phrase they still remain a phrase in absence of either specifier or a complement so we can have a noun as a phrase and here in this structure that you have seen this physics is represented just as a noun and off is also represented as a head because we know that there are no specifier and complements to this phrase.

Therefore that has been removed but I am trying to elaborate them and show you that when physics becomes the head of head noun its head of a different phrase preposition as a head is head of its own phrase PP and in this case again preposition is the head now it is sorry preposition is

the head of this phrase PP and long hair is another phrase now trace and then this whole phrase is one single noun phrase of which the head is student after this.

If I ask you this question that is the phrase that is the is this structure that you see on the screen consistent with what we have seen with respect to specifier head and complement yes okay if that is so then please answer my following question should be very simple in the bigger now in the in the noun phrase right the first noun phrase what is the complement what is the what is the specifier of this noun phrase a right and head is the noun which noun.

Is the head student and then we have two PP right of physics and wait long here which one is close to the now of physics and with long hair is away from this now do you see that the one that is close to the noun is the complement and the one that is away from the noun is the adjunct yet it but that is not all if that is not all about it now let me get back to the original question that I asked you what is the difference between these two phrases.

That you find how are these how is the proximity with the head noun and the distance from the head noun captured the structure can you please look at this structure again the proximity of complement with the head noun now is represented in a particular way and the distance of the adjunct with long hair is represented in a particular way I want you to pay attention to that distinction yes it is not about it is about and yes answer in short answer is yes.

How and why that distinction should be important we are going to look at more examples in I will show you but you are absolutely right that I am suggesting the complement is a required element an adjunct is not something that is not required is away from is not too close. To the head and that is represented in a particular way therefore what I am suggesting is the representation of different phrases suggest their significance in the phrase or in the sentence one by one please yeah classify this right because like he said you could have a sentence which says student with love is that a grammatical phrase right next to the head no it could be at the end of the sentence I mean the way absolutely not and our job come before a complement.

Must be close to the now therefore it what the example that you gave has more consequences that I am coming to that in the next slide we cannot say student with long hair of physics student with a degree in physics yes when art is playing what you are saying is it is afraid is possible where we do not have a complement we only have agents a phrase is also possible where we only have a complement and no adjunct making sense English grammar class.

You are referring to absolutely not a prepositional phrase headed with width can also be a compliment it only depends on it depends on the nature of the whole phrase I am sorry I am not we need to go to those things incrementally I only need to build these things incrementally everything cannot be right away right away but I am glad that she gave this example as a non native speaker of English we may feel that.

What is the difference between the order we can still say a student with long hair of physics but I am sure to some of you at least this order sounds odd now if that is odd to some of you and that is not acceptable to native speakers of English what is the reason for that there the reason why we are looking at the structural representation of this big place a student of physics with long hair and we are trying to look at the hierarchical relationship between a compliment and adjunct.

Is sort of an attempt to find out how we explain this ungrammaticality and unacceptability if a native speaker of English does not accept this whole phrase and say no it does not look very good that's just one judgment if we want to study English structure of English sentences then we need to know why that why that order is not acceptable unless we know this thing we have no idea why that order is not acceptable we can simply say this is not acceptable.

That is all as long as we are saying this is not acceptable that is called a judgment which is descriptively adequate but in order to understand the internal structure of a language an answer must be explanatorily adequate that is the quest the reason behind the unacceptability or ungrammaticality of a sequence of a sequence of words must be explained and the answer for that is a compliment is close to the head an adjunct is away from the head.

Therefore that is not acceptable a sequence in such case what we are actually trying to do is we are trying to put the adjunct as close to the head and which results into ungrammaticality and unacceptability get it I heard some of the things from this side as well know something.

Is a complement or if there is an engine from sweet up look I am trying to understand your question so do you understand his question to see syntax it is independent of meaning which does not mean meaning has got absolutely no role in it I am not saying anything contradictory I am saying the whole grammar or whole mathematics of meaning is something else and that is not part of syntax which is called autonomy of syntax okay.

So I am not trying to defend a syntactic structure only on the basis of meaning okay and other that is what I said I will it will make more prominent little later so let us not talk about all those things right at a time however let me first and let us understand his question do we understand his question I think I do understand what he is asking is there a possibility that this whole thing is one unit and in which this unit with long hair has something to do with physics.

All right can I let other people answer that before I answer this question do you think that with long hair has anything to do with physics No with women with long hair in this whole phase student with long hair has to do with what who has long hairs student or physics student right we mean study here in physics right but that is not clear in this place this place student of physics with long hair both the prepositional phrase of physics and long hair.

Has a relationship with the head now that is student we know that from the structure with long hair can be in the place of physics with long hair will never be a complement of a phrase one by one by one place they need to do it yes but a foot longer I am coming to that I am coming to that hold on it is possible to say I gave you the example like this it is possible to say a student with long hair we are not denying that possibility it is possible to say student with long hair.

But in that sequence we do not have a complement we only have an adjunct and in the sequence student of physics we only have a complement no agent are we clear about this deal do you understand and structurally if that is difficult to see please hold on for another moment and this is where I am asking the question do you see the representational distinction between complement and adjunct what is that representational distinctions.

Who said yes no I mean I am not trying to put you on the spot I am only trying to understand what is that it is just a structural difference please do not fight with each other okay it is alright that is alright we cannot make it we cannot find out between two people who said that well now you have pointing to the third person okay hold on their someone else please I am only asking you for a visual clarity n explanation I am not looking forward to any explanation.

From you I am only asking for a visual clarity now that so I understand that things are becoming a little bit clearer to you but I still take the responsibility of this thing that I am Telling You of physics is complement and with long hair is adjunct having settled down with that distinction do you see how adjunct is far away from complement.

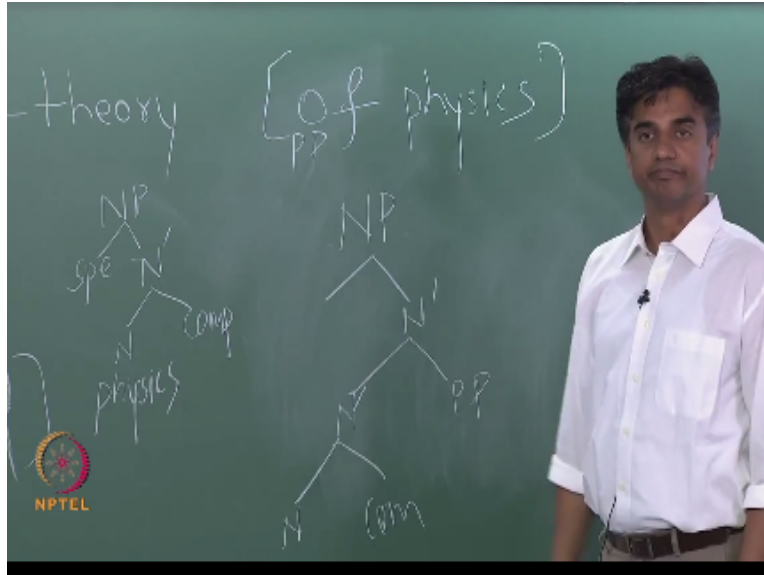
And how that has been structurally captured please tell me or tell the class about it how is that done that is fine we got this now hold on I think I think my question is not clear to you let me try to answer that question and see if that is making any difference what I am trying to say is look at the structure look at the structure we have determiner as an α specifier right and then it is being divided with an intermediate can I please have your attention.

Here on this screen we have an intermediate category n bar okay then we get two to show a complement we have another n bar okay we and through this intermediate category we have a head now and then another phrase which happens to be the complement of the noun that is which is close to the noun some PP this PP is the complement which is close to the noun and this PP is an adjunct which is just ad joint with the help of another intermediate category.

Get it this PP is just a join with the header with another intermediate category which means we can have we can have more adjuncts in a phrase however we can only have one complement in a phrase look at this there is no air junction here this is a noun which branched into a complement and end of it here you see adjuncts being represented with another intermediate category and yet away from the head noun do you see that separation.

Or you do not I want an honest answer from you and this honesty is required for me because trust me if we do not see this distinction then going any further with this structure is not going to make any sense do we see the distinction between complimentary adjunct do we see the adjunction here the role of this intermediate category n bar look at this here this is to show the relationship between harem here in the complement when we want another when we want another thing you are joined to this is how it works.

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Look at this we have an NP and n bar if we had no adjunct then we are done here head and complement if we have if we have a have an adjunct then we need to go further we will put a head here complement here and then this place becomes for adjunct there is there is no intermediate category here but there is an intermediate category here which helps us which helps this mechanism generate which helps this mechanism set up for more and more agents it is possible to have more and more agents in a sentence but not more and more complements which results into following yeah.

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Compliment


- a. John is a student.
- b. John is [_{NP} a student [_{PP} of Physics]].
- Transitive with an NP Compliment.
- * John will imitate.
- * Mary will abandon.
- * Tim will reconstruct.



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Syntax of Compliments and Adjuncts


- Role of an intermediate category X'
- a. a student [Compliments of Physics] [Adjuncts with long hair]
- b. * a student [with long hair] [of Physics]



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- Note that the adjunct rule is *recursive* i.e. in principle, it could apply an arbitrarily large number of times.

– a student [with long hair] [with short arms] [in green coat]



Look at this look at sentence number look at look at this one it is possible to say something like this a student with long hair with short arm in green coat it is possible does it sound like a possible structure we can say we can as many adjunct as possible modifying and now even though.

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- On the other hand, the complement rule is not recursive i.e. it can apply only once.

– * a student [of Physics] [of Chemistry]



We have three PPS here none of them are complements to the to the head now whereas when we have a complement we cannot have two is this sequence possible that is student of physics of chemistry this is not possible a sequence so when we are talking about a complement we must have just one when we are talking about complements as a matter of definition when we are talking about adjuncts as a matter of definition.

Adjuncts could be many in order to represent them structurally we need the help of an intermediate category we have more and more agents we keep this is the recursive nature of this structure that we keep generating more and more places and accommodate them in this structure because of the non branching nature and no intermediate category available between the head and the complement there is no it is not possible.

To have two complements therefore empirical generalizations from the language like this the fact that a student of physics of chemistry is not a possible sequence but a student with long hair with short arms in green coat at IIT in Chennai all of that is possible yet it so I do not know how to conclude this thing but I what I what I get from you is I think you understand the possibility of many adjuncts in if in afraid and it to control only one complement.

In a phrase is this a fair way to conclude that is one can I be a little bit more ambitious in concluding that you through the help of this structure that we have tried to try to understand the presence of intermediate category and the recursive nature of the structure helps us

accommodate more and more adjuncts and only one complement it is also a fair conclusion to do and the third one which should be simple.

If you allow me to can to assume and conclude that all the stuff all the phrases are going to have identical structure where we have a phrasal category.

That will have an a specifier and complement and there is a sister relationship between the head of that phrase and the complement but a hierarchical relationship between the complement and the modifier I have not talked anything about modifiers so far which comes little later or as or if we need it but I want you to see that modifier is higher than the complement this fair thing to conclude here so with these three conclusions.

I stop and I do want you to hold on give me give me give me your 30 seconds more there are books on natural language syntax available in library these materials are available online as well I do expect you to look at some of these examples because tomorrow I am going to talk about more intricate relationships between these elements for which a clear understanding of a structural representation of what we have discussed so far is going to be pre requisite please work on that thank you.

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