Lecture – 02

Basic Concepts in Psycholinguistics

Hello and welcome, to the course on, 'Introduction on Psychology of Language'. I am Dr. Ark Verma, from the Indian Institute of Technology, Kanpur. We are talking about, various aspects of what it what language is, in this week. The title of the week is, introduction to language. Wherein, we are talking about various, aspects of knowing; what it is to use language? What are the various aspects of language? In this lecture, I am going to talk to you about, some of the basic concepts, in psycholinguistics. Some of the basic concepts, in understanding, what language study is about? What, how do, how does the psychologists' study language? So let us move to this very interesting quote. This quote is from this novel, 'Pygmalion', written by, Bernard Shaw. And one of the main characters, say's something like this, she says, 'I don't want to talk grammar. I want to talk like a lady in a flower shop'. What is the language of the lady in a flower shop, if I may ask? How does a lady in a flower shop, speak? Now I will just give you a brief background, to where this is situated. This is basically situated in that time, in England, where speaking perfectly, grammatical, perfectly, rule-based language, was considered, a mark of pedigree, was considered a mark of, sophistication. And if you could not produce language, with that degree of, you know, a rule-bound perfectness, then your language was considered to be, less rich. Then you are considered to be coming from a slightly poorer, social class. And that is how people would look at you. It was that important, to speak, language correctly, in that time. Is it very different now? Is it very different, in the way we treat, say for example, English now? I think, there is a lot of emphasis on speaking grammatically perfect, grammatically correct language, here and now, as well.

So let us ask, how important is grammar, for a person, to start, to say for example, acquire and use language? Yeah, we have been talking about grammar, in the last lecture as well. So let us just revisit, that for a bit. We know, that grammar consists, of the rules of a language. Grammar consists of rules, that we use to combine words into sentences and sentences in say for example, longer sentences, paragraphs, text, that is, typically forms the entire language. Grammar is also something, that lets us understand, when others are speaking to us. Suppose, say for example; there is a sentence, it says; The cat chased the mouse. Now, unless we know the rules of how this sentence is constructed, we will not be able to understand it. Let me give you an example; Suppose for example; the sentence was to be; The cat chased the mouse. But somebody is saying the sentence, in a way, that's, that goes like; Cat the mouse chased. Now, the meaning kind of gets lost, if the rule is not there. Also, unless you know the rule, you will not be able to understand, what has been said. It is very interesting. Because it is something, that we take for granted, for the most part. It is grammar that is helping us, make sense of those words, appearing, in that particular order, in that particular way, to convey, that message, that the cat was, you know, the cat is chasing the mouse. So it is a matter of controversy, when people have talked about it differently, linguists and other, people who have a find on language, Psychologists, Psycho linguists.

They have talked about this at some detail. And it is almost a matter of controversy, that whether the rules of grammar are psychologically real or they just serve, as descriptive properties, of the language. So the proposal is; Is grammar something that is, actually necessary for us, to understand, the message? You know? I was telling you, say for example, what perfectly grammatical sentence looks like; The cat chased the mouse. And what an ungrammatical sentence look like; The cat mouse chased. Okay? This is an example of grammar violation. However if you are actually looking at; The cat chasing the mouse and I tell you; The cat Mouse chased, you can actually look at that event and completely understand. what I am trying to say. Even if, I'm not really speaking in a perfectly grammatical manner. So the question is, whether grammar is something that is psychologically necessary, for the listener, to understand the language or for the speaker to produce the language in a particularly way? That's a very important question. The other way or the other idea is that, maybe grammar just, describes the you know language to us. Maybe grammar just looks at, tens of, thousands of, sentences and just describes, the way those sentences are structured. So are we

deriving? Is it descriptive grammar or is it prescriptive grammar, to kind of you know, touch on the thing that we talked about in the last lecture? So this is something that, people have been trying to understand. Okay? Let us look at some of the aspects of grammar.

One of the very important aspects of grammar is, 'Word Order'. In what order, should words appear or say for example, in what particular order, specific words should appear, in order to convey the desired message? Say for example, let us take this; I see, what I eat. Is or is not the same, As. if I say, I eat, what I see. Obviously, the two meanings from these sentences, are very different. What has changed here? It is the same amount of words, only the order of the words has changed. And the order of words in that sense, is having a profound influence, on the meaning of the sentence. It might have a profound influence, on how I am saying this. And it also has a profound influence, on how you are hearing it. So word order is something which is, very, very important aspect, of any language and that is specified by the grammar of the language. This, say for example, there are different languages in the world and the word order kind of manifests, in very different ways, across these different languages. There are some languages, that have this particular word order, which is referred to as, subject-verb-object. Say for example, English; The cat chased the mouse; The boy chased the girl; The girl chased the boy. So you see, the girl chased the boy, so there's a noun, there's a verb and there is another noun and the idea of the sentence is, subject. The subject comes first. Who are you talking about? So you're talking about the girl, the girl chased the boy, so I'm talking about the subject and the verb is chased and object; Who is being chased? The boy is being chased. The object is coming at the last. So the girl chased the boy, the cat chased the mouse, the boy chased the girl. And this is typically, how sentences in English are framed. You first have the Subject, you then have the verb and then you have the object. There are other word orders, also possible.

Suppose for example, particular languages have this concept of, subject, object and then verb. Suppose in Hindi, when you have this particular word order, which is a subject, object verb, an example of this could be, Ram ney sita ko, kitab Di. So Ram, Kis key barey mey, baath kare? Who are we talking about? We're talking about Ram, who's the subject and you're talking about, Sita ko, who's the object and you're talking about; What has happened to Sita? He's been given the book. So Kitab Di. So you have subject, you have object, you have verb. Hindi for that matter permits, other kinds of word orders as well. And that is, that is something, that brings us to this concept of, that. You know? Different languages are very particular or are very specific, about word order, in different degrees. Each language has its own, canonical or typical word order. But say for example, there are languages like, Russian, that say for example, do not care about word order at all. If say for example, 'Celceut', is a verb. 'Celceut' probably means, ',Married' I'm not very sure of that, we can check that at some point. But suppose, say for example, you somebody has to say, Viktor celeut Lenu or Viktor married to Lenu, something like that or kicked Lenu or whatever. Viktor celeut Leno, Viktor Lenu celeut, celeut Viktor Lenu, Lenu celeut Viktor. All of them are Giving, the same message and are Perfectly, grammatically, acceptable, in Russian. So, you have this language, where you know, which is completely, you know, flexible, about word order. So word order is a very interesting property, of language, which is obviously specified by grammar, but you have to understand, that different languages, have their different, aspects of word order. Okay?

Some languages have, one particular word order, some language have a different particular order and some language do not really care about, word order anyways. These languages, which basically, you know, say for example, do not really care about, word order or are fairly flexible about word order. Might be making use of, suffixes or prefixes ,in order to convey, very specific meanings. Say for example, in English, we have; Trip, Tripped, Tripping, which is basically, just the addition of these suffixes, which tell us about, some of the, you know, wish which basically act as, tense markers, on this verb trip. In Turkish for example, 'Hail', means, 'Come'. and 'Hail many', means, I could not come. So you just add something, at the end of the word, 'Hail' and it is already being used, to

communicate a slightly different, meaning. So, these properties are manifested in different ways, across these different languages. Another very basic property of language, that we can talk about, is, which is not really specified in syntax, by the way, is the phonology of the language. So we not we've finished the discussion on syntax, we're talking about a different basic property of language, we're talking about Phonology. A phonology basically, is the, makeup, of how the sounds, are in a particular language, are structured. There are two ways, in which you can look at sounds. You can say for example; look at the acoustics of the particular language, which is, you can just take the signal, you can record what I am saying, put this into a particular program, in a computer program and that can analyze the frequency of my speech.

So for example, you're basically talking about the, physical characteristics of the sound. So you can say, for example, come up with a spectrogram and see say for example, in the beginning, there is high frequency sounds emitted and there low frequency sounds emitted, then other high frequency sounds emitted. So that is, physical characteristics. That's not something we are particularly interested in, for this course, at least. The other way to look at the way sounds are structured, is the phonetics, of the language. What is the Phonetics? Phonetics is again, is the physical properties of, the speech sounds. Voicing or manner of articulation, place of articulation, those very specifics. How are these sounds being produced? Okay? If you know about, how are these particular speech sounds, being produced and what are the properties, of these particular speech sounds? Then you're probably talking, you know, a little bit more about, phonetics of the language. Phonology is typically ,a sound categories, that each language uses ,to divide up the space of the possible sounds. As I told you in the last lecture, English has 40 phonemes. However it does not really mean, that there are only 40 sounds, in English. Entire space, sound space, in English, has been carved out into, 40 different basic sounds. Which will be combined, to form words. So there are 40 phonemes, 40 basic sounds, in English, that are combined in various ways, to come up with words. Suppose, say for example, as I was telling you, you have to be able to distinguish between, pat and bat, you have to also similarly being, you know, be able to distinguish between, pin and spin. Now the only difference. between these two sounds, pin and spin, is basically, that, spin is unaspirated, you cannot hear your breath, when you're speaking spin. But you can say, for example, hear your breath ,if you are speaking, pin. Okay so you can kind of, this a very easy test of checking, whether something is aspirated or unaspirated. Now, Phoneme is the basic unit of sound, in this particular language. So what are the basic units of sound, in a particular language? These are referred to as, ‘Phonemes’.

Changing phonemes, how do you know? say for example/ something as, phoning of the language, you can do it in different ways. Say for example, in Thai, ‘paa’, which is, unaspirated, refers to, ‘forest’ and ‘paa’, which is, aspirated, refers to the, act of, ‘to split’. Okay? So as soon as you change this property, the meaning changes and hence, these two sounds, are distinguishable from each other, on a very basic level and these are recognized as, two different phonemes. So that is one way, that you can understand how phonemes, are different from each other. The other way, also is, say for example, ‘Allophones’. Different forms of the same phoneme. So pin and spin, are typically just the same, phoneme, the only difference is, whether they are, aspirated, versus unaspirated. They are the form of the, same phoneme. Then you have this concept, of minimal pairs. If you have two words and you can say, for example, you change just one sound and the meaning can be changed. Then these are referred to as, ‘Minimal pairs’. So for example, Cat, Bat, Pat, Matt, you are just seen change, changing, one sound. So this is referred as, the minimal pairs. Similarly, Dog, Log, Cog, Hog, etc., is also another example of, minimal pairs. Sound, is produced by, moving the parts, of the vocal tracts, Lips, the teeth, the tongue, the voice box, that is larynx. And sound is also understood in a way, by you, say for example, different kinds of sounds are categorized, on the basis of, where they are coming from. Say for example, the larynx modifies the floor, so voice box here, it modifies the flow of air from the lungs and it produces, a range of different, you know, higher frequencies or different sounds.

So, depending on, how these sounds are coming across? Say for example, you have this family of sounds, called, ‘Vowels’. Vowels, basically are sounds, which are made with a relatively, free flow of air. You can do it and you can check it. Say for example, these are, when you are making, these sounds, the vocal tract, is more or less, open. So whenever you saying, a, e, i, you're basically, keeping the vocal tract, relatively open. Then you have, ‘Consonants’. Consonants are typically found by, constricting or closing, the part of the, vocal tract. Suppose, say for example, you, when you're doing, P, you are, obstructing the flow of the air. You are saying, B or T, or De, you are obstructing the flow of air, through the vocal tract and what you're creating eventually, is a family of sounds, referred to as, ‘Consonants’. There also, say for example, this combination of vowels, that are present. So for example, these are those vowels, that are basically, looked at, as a combination of two basic, vowel sounds. Say for example, Boy, so, o and i, you're kind of combining those sounds. Cow, you're combining, two basic vowel sounds. Okay? So then you have, vowels, you have constants and you have diphthongs, or vowels and diphthongs and then you have consonants. So that is again, a very important aspect, that you, should remember. Another important aspect of, is, you know, when you look at sound, is, where is it being, articulated from. Linguists are mostly interested in, these kind of things and I'm just kind of bringing that. So as to, give you, a very basically, a basic primer into, things that we will be talking about later so this is very important, place of articulation, is very important. Part of the vocal tract, that is closed or constricted, during articulation, is referred to as, the place of articulation. for that sound. Suppose, say for example, some sounds are referred to as, ‘Dentals’. They are formed by, putting the tongue tip behind the upper front teeth. So for example, ‘Theta’.

How are you saying Theta? If you sound, theta, you will see That, theta is coming from by your putting the tongue, on the back of the, upper teeth. So, you're using your teeth, to produce the sound, hence the name is called, ‘Dentals’. Then you have things like, ‘Labiodentals’. Labiodentals, is say, say for example, you're using the, lower lip, and touching it, to the, upper teeth. Say for example, ‘V’. How do you produce V? If you do it in slow motion and if you're conscious of what you're doing, you might be able to figure this out, very quickly. Another important aspect in this is, say, for example, manner of articulation. How do you modify the flow of air, through the vocal tract? We talked about, placing, we talked about place of articulation, you can also talk about, manner of articulation. You can say for example, there completely restrict, the flow of air. And in that sense, you will be creating a family of sounds, referred to as, stops. You know, say for example, you're completely restricting the flow of air, /p/ ,/b/ etc., /t/ Okay. And you can have things like, Fricatives, when you are constricting the airstream, by making a hissing sound. So /f/, /v/, /s/. Okay? So these sounds are, can be classified, in this manner as well. Now another way, again we're still talking about, the sound structure, of the language. We can another way to, or, say for example, organize, the sound space, is, probably by this, point of, syllables. Now particularly, different languages, have syllabic structures and they're kind of, you know, talked about, as syllable based languages and some other languages are, different, they are alphabet based language. We’ll come to that, when you're talking about reading. But what are syllables? Syllable is typically, you know, these are rhythmic units, that form words. So this is almost like, referred as the smallest note, in a word. When I'm talking about, say for example, Matter, Mat ter, 2 syllables. Cat, just 1 small note, so Cat has 1 syllable, matter has 2 syllables. Syllable, Sy Lla Ble, Has, 3 syllables.

So it's very easy, if you have to say, for Example, if somebody tosses words at you and you have to divide those words, into particular syllables, the best way is to, try and sing them. And the smallest note will be, your syllable. So, matter, syllable, cat, all of these kind of gives you a good idea, but how to chunk these words, into syllables. What is the basic makeup of syllable, syllable is basically looked at, as a combination of an onset and a rhyme. The onset is typically, the initial consonant, cluster. Say for example, Cat, /k/ sound, in cat, is the onset of the syllable, Cat. Then you have

something in the middle, so that is your. Or say for example, after the initial Sound, is your rhyme, so rhyme has a middle part and an end part. So At, At is the rhyme, of this syllable, which is referred to, which is, Cat. In that, in the, in At, you have a nucleus sound, which, which is basically the central vowel. So in Cat, that is, /a/, that is the nucleus. And then the sound of /t/, which is the Coda. So if you really look at, how the syllable is constructed, you can say, it is, onset plus nucleus, plus coda. And then you can do some, basic maths it is. Say for example, it is onset plus rhyme, rhyme is nucleus plus coda, so a syllable is onset plus nucleus, plus coda. Very easy to look at it in this way. Cat /k/ is the onset, /a/ is the nucleus, /t/ is the coda, this is typically how you understand, how syllables are made. Okay, let us move to something, slightly different. We were talking about sounds, so till now. Let us talk about, how words are constructed. What is the anatomy of words? You know what does the anatomy words, look like? So if you have to understand the anatomy of words, you have to understand, how words are created. What are the rules we are following, in order to create words? Something that a science, say for example, the field that looks at, how words are created, is referred to as, 'Morphology'.

Morphology, is typically the system of Rules, that governs, how words will be formed. So for example, the system of rules, that governs, formation of words, is referred to as, 'Morphology'. I'm giving you very informal, very nonspecific, kind of definitions, but this is, probably something, that will help, you know, in picking up, the basic concepts, in, in a much clearer manner. Obviously you can refer to the reference book, I am following, Matthew Traxler's, introduction to, Psycho Linguistics, as the main book. Now you can go back, read the book and there are so many other materials, available. But what I'm trying to give you here is, a very basic understanding of these basic, is of these concepts. So what is morphology? A system of rules, that governs, how words are formed. Let us come back. Let us take an example. A very interesting way to look at, you know, how morphemes, figure, is this. Let us take this word called, 'Player'. Now you have this word called Player, if you divide this, you have, play and you have ER, er. Okay? Play is something, that can stand on Itself, has its own meaning and hence it is referred to as, a free morpheme or a lexical morpheme. It is something that can stand alone and has a specific meaning, of its own. What about the ER? ER is something that is you know fulfilling a grammatical function here. It is added as a suffix, at the end of this free morpheme, play, in order to, convey a particular meaning or fulfil a particular grammatical function. Hence ER, is referred to as a, bound morpheme. Because it cannot stand alone, it does not really have a meaning of its own, Or as a grammatical morphemes, because they, basically it is there, to fulfil, a grammatical function. Okay? So do you get it? You have free morphemes or lexical morphemes, which can stand alone, have their own meaning and you have bound, slash, grammatical morphemes, which do not have a meaning of it, of their own, which cannot stand alone, but they are used at the end of words or sometimes in the beginning of words, in order to, say for example, sometimes impart more meaning of the word, impart a different sort of a meaning from the word or fulfil particular grammatical purposes. So this is about morphology. Now we started with sounds, we went to words.

Where do we go next? Let us go to sentences. One of the rules, that governs, say for example, combination of sentences, is referred to as, 'Phrase structure rules'. What are, Phrase structure rules? If you look at a particular sentence, you can divide the sentence, into smaller constituents, referred to as, 'Phrases'. Okay? A phrase, say for example; How do you understand the phrase? A phrase can be understood, as a combination of, a critical word, one main important word and some other words, together, expressing one single idea. I'll give you an example. Let us say, I say, 'The young swimmer, accepted the silver medal'. Now you have, two phrases here. You have, 'the young swimmer', I'm talking about, one single idea and 'accepted the silver medal', is another idea. So the young swimmer, is one phrase, 'accepted the silver medal', is another phrase. Okay? Or you can say, for example, divide it slightly differently. Say for example, you can say, ' the young Swimmer' and then

you can have, ‘accepted’, and then you have, ‘silver medal’. You can look at this, in terms of, three different ideas. So you can kind of divide the phrases, so you know in this particular manner. One thing is, say for example, you know, all of these divisions, how are you chunking, this particular thing. There’s not really a very, strict guideline, of doing this. If you do it in one way, you get a particular meaning, if you do it in another way, you get another particular meaning. Or say for example, that is something that, you have to, always remember. Now there are particular rules by which these spaces are constructed and combined. Okay? So syntactic rules, that specify the permissible sequences, of these constituents, in the language, are, let us say, referred to as, ‘Phrase structure rules’. The central idea here, is that, you these sentences have to be build up in a hierarchical fashion, one structure, then other structure, then the other structure. That is typically, you know, how the larger body of language, will be constructed. These rules are referred to as, ‘Rewrite rules’. Let us take an example.

Suppose you have a sentence. you know? The sentence will be composed of a, noun phrase and a verb phrase. So, the young swimmer, accepted the silver medal. So you have the noun phrase and you have the, verb phrase. What is the noun phrase, typically consisting of? So noun phrase is consisting of, a determiner and the noun. The young swimmer, so THE is the determiner, young swimmer, is your, noun. Noun phrase, you can further divide this, the young swimmer, also into two nouns. So there can be, two noun phrases, if you look at it. Another way is, let us come to the verb phrase, ‘accepted the silver medal’, you can have, verb plus noun phrase. So ‘accepted the silver medal’, again you have a noun phrase here and you have a verb here. You can just, you know, go till the verb and have this entire verb phrase. We can have ‘accepted’, as just one verb phrase. And then, if you have understood these rules, you can kind of, have any noun or any verb, figuring in and using that, you know, you can create any number of language, any number of sentences. Suppose there could be many nouns, I, I was saying, ‘the young swimmer accepted the silver medal’, you can say, Blad, accepted the silver medal, you can say, ‘Boris accepted the silver medal’, anything. Or say for example, you can use, any verb. He accepted, you know, instead of accepted, you can use, say for example, made the silver medal, loves the silver medal, likes the silver medal, whatever. Determinus, obviously can be, a, and then those, articles, that you know of. Okay? So this is, this is, in, in that sense, slightly, interesting demonstration of, why, there is this concept, of discrete infinity, in our language. These are, these rewrite rules and these phrase structure rules, that kind of, permit us to create, infinite amount of language, in a very systematic and a very intelligible, comprehensible manner. So this is, this is, how, say for example, a lot of language is created. Now obviously you might be wondering, that, how, how easy it is, or whether or not, this system runs into any errors, at any point in time. Obviously, when there are rules and you know, you have to use them, there will be obviously some kind of confusion sometimes, some kind of misapplication of rules sometimes. So there is this concept of, phrase structure ambiguity. Wherein, say for example, these phrase structure rules, may lead to a degree of confusion, may lead to a degree of, ambiguity, which makes it difficult, for the listener, to unders or the reader, to understand, what is written or the listener, to understand what is said. Let us take this example.

Let us have a sentence, the sentence again, is, ‘they're eating apples’. Okay? So you have the sentence, you have noun phrase, ‘they’ and then you have word phrase’ ‘are eating apples’ and you can structure it, in this sense. Noun phrase, ‘they are eating apples’, this is one. You can however, disguise and divide this in a different sense as well. Say for example, you can have, ‘they are eating apples’. Say for example you can divide this, to give a completely different meaning. We can also say, for example, look at this and how it will create a different meaning completely. Let us say, ‘they are eating apples’, these are apples, that we eat. Or say for example, ‘they are eating apples’. We are talking About, they, who are eating apples. If you divide the, if you divide the construction, of the word, in different ways, you can look at the, how, you know, this is done in your slide, you can, based on how you chunk the material, how do you chunk the sentence, into phrases, is creating, the sort of a

different meaning. Okay? And that can obviously, say for Example, sometimes happen, with a listener or with the reader, if appropriate, path, with the reader, is sometime we see, because the punctuation marks, can be used. But with the listener it is almost, you know, many times, that they will say for example, run into these kind of confusions. Another basic property, of language, is this property of, linguistic productivity. It is again very similar to that of, recursion or generate. it we just again discussing it, how does this really come about. So linguistic productivity is, our ability to create and comprehend, Novel utterances. We are talking about phrase structure rules, we are talking about these things. These things allow us to create, new language, they allow us to create, novel utterances or understand something, that we haven't heard, ever before. So, given this infinite amount of possible utterances, we probably, must be storing these infinite, amount of rules, we might be kind of sorting it. Okay, if this comes across, this is the way I understand this. So let us say, for example, your understanding of the world phrases, verb plus subject. So the child thinks, which is the verb phrase, the man left, so that is another sentence. And then you can, divide that sentence into, the man and the left, is the verb phrase. Okay?

So, one has to kind of wonder, what is it that, allows us to create, so many of these novel utterances and what is it that helps us, to understand things, that we haven't ever heard or we haven't ever come across. So that is typically the property of, linguistic productivity. Now linguistic pro, productivity comes about, only because of this particular rule, which is referred to as the, 'Recursive rule'. Because you can embed things into each other and because, say for example, you can create that kind of an embedding, that is how, you can create this infinite amount of, sentences. This is something that is a resilient property of, human language. It is used by children, even, it's used, even but it's not something that is, say for example, something that you master, once you have mastered language, for five years, only then you can use it actually. You can always use it. Even children you use it. Say for example, two to three year old children, a lot of times, create something, that you have not heard, you have not taught that to the child. But the child is coming up with these sentences, all by themselves. So that is obviously possible. We all the time, we create new words, we create new structures. And that again is, you know, a testimony or an evidence of, how linguistic productivity works. We've talked about, some of these properties of language, let us say for example, spend some time, talking about, Syntax. Now when talking of the role of syntax, in human language, processing, one of the names, that comes to the mind, is that of, Noam Chomsky, you know? Noam Chomsky, is a Linguist, is a thinker, is a political thinker and somebody who kind of, you know, came to the scene in around 1950, 60s. And has it, had a very profound Impact, on how people understand language.

On most of the theories, about language at the moment or suppose, say for example, if you have a friend, who's studying linguistics, you talk to them, they will tell you that Chomsky, is probably one of the most important linguists, of this century. Two things, Chomsky talked about, one was the relationship between, language and brain. He particularly believed that, say for example, there is something called, 'The language acquisition device', some unique capability or our brain that allowed us, to acquire language, that allowed us to learn language, that is one. And the second is, Chomsky has done a lot of work, on the Technical, description, of language. How our language is structured? What is unique, about the structures of language? What is unique, about the structures of different languages in comparison with each other? So, the obviously, you're doing this course on, psycholinguistics or the psychology of language. But suppose you have, some interest in, understanding, linguistics per se, Chomsky is one of the people, you should certainly, read about. We'll talk a little bit about, some of the stuff, that Chomsky said and is also very important, to us, in a sense that we'll be using these concepts, again and again, during this course. So, one of the things, Chomsky said is, 'language is innate it is biologically programmed and this is unique to the human species, it is not something, that any other species on the face of the earth, could have acquired'. Okay? So that is something

interesting. The other thing, that Chomsky also says, Is, language is, independent of other cognitive functions.
Chomsky treats language, almost as a, independent cognitive function that, does not, rely on the other cognitive abilities. Suppose, say for example, attention, perception, learning, memory, etcetera, in order to exist or it does not really, interact with them, a lot. This concept has also been, in some sense, addressed by people like, Jerry Fodor and if you, if you want to, you know, talk more about this or read a little bit more about this, you can refer to, some of the other lectures, that I have been, given, in a course, called, 'Basic cognitive process', is also running In, in this semester. Now another thing That, Chomsky did was, he distinguished between, two things. He distinguished between, competence and he distinguished between, performance. What is competence? Competence is your knowledge of the language. You know, most of the time, when we are creating new sentences, when you're creating new paragraphs, giving speeches ,etc, we have the sense of, what we, whatever we are saying, is grammatically correct. We are not really, before every sentence, wondering, whether this is, whether this is what I'm going to say, is grammatically correct or not, whether the next sentence is correct or not. We have this intuition, about grammatically acceptable samples. Both when we are listening to them and we are producing them. So that is your knowledge of how language is, that is your competence about the language. The other important aspect is, your performance. So our actual production of language.
You might know everything about language, but because, you are excited, because your, your attention is not there, you're thinking about something, you might create errors, you might perform language, in a way, that might be erroneous, for a bit and you can realize that, and correct that. So Chomsky distinguishes between, these two things. He said, yeah, there is, there is the sense of competence and there is the sense of performance and these two might not be, always, equal, These two might not always be one and the same thing. There might be a difference between whatever we know about language and whatever we do with this language. So that is interesting, it's been used, in understanding a lot of performances of language, a lot of, theories of, how children acquire language, these concepts are very interesting, to understand and we will talk about these concepts, in more detail, when we move ahead. Chomsky also talks about, in some sense, externalized an internalized language, it is very similar to, competence and performance. So externalize language, is the language we use. Samples and properties of real utterances, may be analyzed, may be, you know, looked for, particular patterns. And it is the job of linguistics, that should be concerned with the regularities, of real language, by a grammar. Say for example, one of the things that linguists usually do is; they look at, large samples of language and they look for particular patterns in them and they come up with particular rules, describing these patterns. So that is your E language or Externalized language. And then there's this concept of, i language, that is again very similar to, competence. The knowledge of language. that what you know. you know those things. that you know about language. i language, however, is different in sense, that this is typically talking about the, mental phenomena, that precede, the performance and they follow the performance. Say for example, how did you come up with this sentence? and once the sentence is said, how did the other person understand the sentence? Or say for example, how did you understand that sentence? So, i language is the mental phenomena, that precede and follow the performance. Okay.
Another thing that, Chomsky talks About, is the surface structure and deep Structure. So he says, surface structure refers to the, superficial arrangement of constituents and reflects the order, in which these words are pronounced. So I'll take some examples, in a bit. And the deep structure is, the underlying structure or the gist of that sentence. Let us take an example. Let us say the sentence is, 'flying planes can be dangerous'. Now, 'flying planes can be dangerous', is one sentence and there are ways in which you can look at it and it may be, very ambiguous. Are planes that fly, dangerous? or is the aspect of, is the action of, flying planes dangerous? You know? Flying planes can be dangerous,

can be understood in at least these two ways. So there is a deep structure, ambiguity, here. The word is perfectly alright, it is, the sentence is perfectly alright, is perfectly, grammatically, acceptable. But there is an ambiguity, at the level of deep structure here. Okay? So, let's take another example. John is easy to please verses John is eager to please. Here you see, the ambiguity is mostly, in terms of the, surface, the word is already changed. Surface structure is very different. Or say for example, you can have, something, you know, different, it say, Arlene played the tuba, the tuba was played by Arlene. The deep structure here, the message here is the same, but the surface structure is different. Okay? In the first sentence, flying planes can be dangerous, the surface structure is same, the deep structure can be different and can be ambiguous. In the last example, Arlene played the tuba or say for Example, if you're saying that, tuba was played by Arlene, the surface structure is different, because the exact words that are used, are different. But the deep structure, is pretty much the same, the same message is getting across. So, this is, this is some of the properties of language, some of the base very basic concepts of language. And I've mentioned, Chomsky again and again. That we will come across, that we will encounter, in some of the other chapters.

So this lecture is typically about, you know, priming you with some of these basic concepts, you can come back and listen to them again and you can go back to the book and refer to it and you know, try and get a basic understanding, of what these things are. I will obviously explain them again, when they come up, in the next lectures. Now one of the things, we can talk about Is, the relationship between language and Grammar. This is something that we Started, today's lecture with. So what is Language is, infinite set of well formed Sentences. What is grammar, it is a formal Device, which has these particular rules. And these using these rules, you can generate all of the language, that is possible. There are, various theories of language and these various theories of language, are composed of, very different, specific or general hypothesis, about the structure of language. This is how the structure of language should be and this is how structure of language should be. There are these various things. Now, how do you know that, whether a particular grammar, is useful or it is not useful? So Chomsky says, there are three ways in which you can, evaluate that. You can check whether the grammar is observationally adequate, meaning; a grammar must be able to generate, all the possible structures. So if you are specifying a particular Grammar, for a particular language, it should be able to generate, all the sentences that are possible, within that language. There should not be on, one sentence or two sentences that are left out, unexplained, by this, particular, specification of rules, that is grammar. If a grammar does that, it is, to be, observationally, adequate grammar.

The other thing is, ‘Descriptive adequacy’. Suppose, say for example, there are these different utterances, as sentences, words, phrases, clauses, in this thing. They might be similar, they might not be similar. A particular grammar should be able to describe the relationship between, utterances, that are similar or the differences, between utterances, that are not similar, syntactic differences. This is a subject, object, word, this is subject, verb, object, these kind of things. So the grammar should be able to tell, by, its rules, whether these two structures, are similar, if similar, in what manner, if dissimilar, again in what manner. So if, grammar is being able to do, that it is supposed be, descriptionally adequate. Then finally this important aspect of, Explanatory adequacy. This concept of explanatory adequacy, means, Typically, what involves the ability, to explain the role of linguistic universe, universals, in language acquisition. Linguistic universals, typically are those concepts, that Chomsky has very well specified, which are, common across all known languages. Any language, that we know of, that is documented, should have, at least, this concept of, say for example, recursion, generativity or say for example, symantisity or for example, arbitrariness. So a language, say for example or the grammar, you know, the features of grammar or the rules basically, that are across all language. So there should be, a subject and there should be, an object and there should be a verb. These are things, which are, say for example, you know, universally present, across all languages. So this is, you know, explanatory adequacy.

So the grammar should have, some sort of, sense about, what are the universes, in this language and how children are using these universals, to acquire language. Now, if you kind of look at these things, you will be able to appreciate, whether the grammar is, you know, doing its part or not? Is it, you know, useful grammar or not? Now, even though, this system is there and People, I have talked about this, in two different degrees, we have this problem, that, say for example, most grammars, that we have specified, still cannot fully, account for all, the linguistic utterances. It cannot really, explain, all that is said in the language, by follows these, particular rules. Also a lot of these grammars, do not take into account, cognitive processing consideration. They do not really take into account, how is the person understanding the sentence. Suppose I give you a very long sentence? Ram said that Sita, thinks, that, say for example, John, did something. So if I give you a very long sentence, how is it, that you are, processing this sentence? Because we have, limited memory. We can Retain, limited amount of information. So these things also, are not very well understood or explained in, so many of these grammars. Also when you talk about smaller components, you know, morphemes and phrases, etc. A lot of these grammars, lack details, in expressing all of this. So, that is also some of this, problem, with this grammars. So let us look at, two kinds of grammars, that have been proposed and we, say for example, at some point see, if they are following these, you know, aspects of adequacy or not.

So Chomsky specified these, **free and days [42:54]** grammar refer to as the transformational grammar and he basically said that, the face structure rules, that we were talking about earlier, they don't, do not completely capture, linguistic competence. They do not completely capture, what is known to language, by the, languages, users. So they say, these set of, these Relationships. between these constituents, that is known to people. can be captured by a set of rewrite rules and he called these rewrite rules as, 'Transformational rules'. So what is the transformation rule? A grammatical rule, that can convert, one syntactic structure, into another. You know, we've been doing these exercises, when we were in school. Say for example, you know, Passivization. So the vampire chases the ghost, the ghost is chased, by the vampire, you know. You have to, have this transformational rule, you apply this transformation rule and you convert one sort of syntactic structure, into another sort. The meaning you see, is still the same here. The other kinds of things, say for example, the particle movement transformation. John phoned up the woman, John phoned the woman up. So the particle is shifted, from the middle, towards the end. So, so these, rules are there. Another interesting grammar, that has been proposed by, Bresnan, is this concept of and there are so many of these grammars, also available, which are referred to as, 'Lexical functional grammars or Psychologically Realistic grammars'. Now, psychologically realistic grammars typically, are proposed to, address the concerns of, the user. How is the speaker, speaking this language or the listener, understanding this language? Whether the rules that we are specifying in our grammar, are psychologically, realistic or not? Do they make any sense, in a psychological, on you know, explanation of how people use language or not? So these lexical functional grammars, typically, they take into account, these individual lexical terms. That is what, they are very concerned about, how these words, are being used? How is the user, understanding these words? Say, for example, lexical, it talks about, these lexical entries, which, by the way, exist in many forms. Say for example, the word, kiss, kissed, kissing, etc., these are all, this is just one lexical entry, which can exist in, these many forms. And then you can talk about, the kind of compatible sentences, which can be, created, using these different lexical entries. So you can have, May, Mary kissed John, John was kissed by Mary, Mary was kissing John, something you know, that kind of, accommodates, all of these different lexical entries. So, the focus here is on words and how these rules, are kind of changed, to accommodate these words. Okay? This is, this is just an example. I'm not really going into details of the grammars or there, you know, adequacies. Because that's not really, what, we are here to do. We'll talk mostly about, the psychological aspects, of how people understand language. However, one of the things, that we can note, before closing this discussion on

grammars, is that these psychologically real or the lexical functional grammars, they simplify the explanatory burden and they put it towards the lexicon. These are the kinds of words and these are, these are the kind of rules, that are made to explain, understand or use those words. They seem like a more, economical and a plausible way, of explaining effortless, comprehension, of sentences. How do we understand sentences, just like that? How do we understand, every, almost language, without, you know, too much effort? Probably because, we are kind of, understanding the words very effortlessly, we are kind of getting the words, very quickly. So that is another, you know, advantage of, having these psychologically, real or psychologically, realistic grammars.

Also the psychologically realistic grammar, kind of, you know, they take into account, the consideration, that working through these syntactic rules, might be, slightly more difficult, than just, picking up these words, from the mental lexicon. What does this word? If kissed is their, kissed means that, in a kiss, has happened in the past, if kissing is there, kissing is happening in the present. And that it might be much easier to, you know, recall from the mental lexicon, which is a dictionary, for words, in our head, as compared to, kind you know, going through that entire phrase, structure going to how the sentence was constructed, in order to understand that aspect of language. We will talk about these things, when we are, you know, talking about this, in chapter on sentence comprehension, in, in, in later lectures. So let's talk a little bit, about, what others have to say, about grammar. So one of the very important people, you know, language scientists, is a Ray Jackendoff and Ray Jackendoff, kind of comes as a very interesting opponent, or say for example, very interesting alternate position, to that of, Chomsky's. So Jackendoff says, that syntax is not the core, of our linguistic language. He rejects that view. He says, linguistic productivity is, not just due to syntactic rules. It's probably due to our creativity and how do we, come up with these different word. He suggests that, grammars have multiple, formation rules, which operate in parallel, to facilitate simplified language processing. So it, it cannot, be that, you know, there is a particular grammar, that says, rule one, rule two, rule three, till rule 10 and these are the rules, in this fixed order, in this non flexible arrangement, that will be applied. He says there can be multiple, number of formational rules, which people are using, flexibly, all the time, in order to communicate with each other, in order to effortlessly, produce and understand language, at the same time. So one of the things that he also says, is that, grammars must be studying these interfaces, say for example, it's only a parent, not a teacher. It’s only a parent, not real. So just by the way I'm producing this, I can create different meanings. I'm not really going into the structure of them of the sentence or anything.

So this is also very interesting, position to take on, how important, syntax is to language or grammar is to language. The idea of today's lecture was, typically, to just give you, a very, very brief, a very, very, superficial account, of what are the basic concepts, in understanding language processing. So I hope, you've kind of, got it, some of the take-home messages, for today, is that, you should have this, concept of, how these linguistic rules are applied, to get a deep, understanding of language. And this deep understanding of properties of language, may then help you, in studying, language processing at large. I mean, all of the things that we talked about today, are probably going to be very useful, when we talk about, sentence processing, sentence production and combination, in one of the later lectures. Also we have to understand, that these linguistic rules or syntax, are not paramount. They do not really, completely specify how language is to be produced. So that is something that, I’ll leave you with. The material is obviously borrowed from, Traxler’s book, on, ‘Introduction to Psycholinguistics’. Thank you