Basics of Language Science
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Lecture No. 08
Language Acquisition

Today we will look at language acquisition that is learning language. Like we have discussed about language and dialect. And remember I discussed those parameters with you through which people would want to believe that something is language and something is dialect. Remember those things? Remember, why something is language and why something certain, why certain languages are considered language and certain languages are considered dialect? We discussed some of those parameters with you last time.

Similarly, when and those parameters do not make much sense in technical terms they are all very superficial. They are all very trivial. Similarly, when you, when we talk about language acquisition, there are so many things that people would want to tell you, which do not really make much of a sense. However, we cannot deny all of them right away.

So, if I ask you again and which I asked you earlier to think about, how do we learn language? What happens to us? What will you answer? How will you answer this question? Should not be a very difficult thing. It is like asking someone what happens when you get fever. What happens when you get fever? You have higher temperature you can realize that you have higher temperature and others can feel that too.

Not exactly in that sense, but when you learn a language, you know you are learning a language. Or after you have already learned a language, you speak others can see and you know. So, this question is about something not obscure. It could be a little bit abstract. I am not denying the abstract nature of language learning. But it is something that you have gone through. So, having given that background can you tell me? What happens when we learn language?

While you are thinking let me add two parameters to that. When we say language learning we do not make a distinction at this level between learning and acquisition. What would be the difference between learning and acquisition? Learning could be with a little bit more effort. That is what you mean. Whereas, acquisition is automatic. Acquisition is automatic unavoidable. Learning is with effort.

But at this time, we are using the two terms interchangeably when I say language learning I also mean language acquisition. We are not making a strict distinction between the two terms. So, when I am asking you how do we learn a language I actually mean, how do we acquire a language? And when I am asking you, we are not talking about learning English when we went to school. When we were a grown-up kid. We are talking about the language that you learnt as your natural language as your first language.

What are the things that happened, let me talk, let you talk. So, what happened when you were learning? I have already asked you this question about the number of languages that you speak. And all of you grew up speaking a language. Which language did you grow up speaking?

Student: Telugu.

Professor: Telugu. Malayalam, Malayalam, Telugu, Telugu, Tamil, Hindi, Telugu, Telugu everybody Telugu. Kannada good, Malayalam. So, on this side we have Malayalam people. So, what happened when you were learning Telugu or Malayalam? Or Kannada or Tamil for that matter. What happened? How did you do that? Do you remember? How do you learn it? If someone forces you to tell the story of how you learnt a language. What would you say? What happened?

Student: We do not remember but I guess we put into memory the sounds which we heard at that phase of our age. And we started telling that properly.

Professor: You put sounds in your memory.

Student: I found how to articulate them into memory and formed the rules that make the sounds and started communicating with the people around us.

Professor: That is what happened. So, if I ask you okay hold on, let me ask let me wait before I ask you another question. What happened to you?

Student: People around me were just talking.

Professor: People around you were talking. What? Which language were they speaking around you?

Student: Telugu. So, then it is like when they speak, I get a direct co-relationship between the word or the object. So, I learn it quickly.

Professor: And fine.

Student: Hearing sounds and how to hear those languages.

Professor: Hearing Telugu other Telugu speakers. What happened?

Student: Acquiring how to articulate the sounds and…

Professor: So, when you heard others then you also acquired how to say those sounds.

Student: And what the sound means to which object.

Professor: Wait, what those sounds mean to which object?

Student: For example, a book.

Professor: A book is a sound. Book is what?

Student: object.

Professor: No, in terms of language book is what? A word, very nice. So, first you learnt sounds. And what are the sounds in the book. Of course, we are talking about an English word but let's say what is the word for book in Telugu? Pustakam. So, what are the sounds in pustakam? p, u, sa, ta, ka ma, these are the sounds of this one-word pustakam. So, you first learned these sounds then did you learn how to make a word? Yes, or no. Am I asking you too many questions? Are these questions not making any sense? Did you learn how to make a word? Automatically, it is true but did you if I ask you now. Okay fine you learnt automatically but if I ask you now tell me how to make a word. Can you tell me?

Student: There are some rules.

Professor: That is right, that is exactly what I am asking for. So, if I ask you to tell me the rules of words the way words are made, and this question is not just for him. This question is for everybody. Tell me the rules through which we make words. Can you tell me those rules? No.

Student: Derivation from other languages.

Professor: You are adding more complication but that is okay. So, derivation from which language? Tell me you learnt Malayalam? So, how did you learn Malayalam?

Student: 7-year kids they teach you to say a particular word at a particular situation. When that repeats you will tell him to learn. For example, if you are a kid and when you are leaving out someone else is hearing. You tell him to say that, and he repeatedly it turns that is what he has to do, that is what you say when you are leaving.

Professor: Sure. But where is the role of other derivations in other languages? That is for the previous question. So, and does this, can I take it, what you said as follows. That we learn when people teach. Can you say that? That would eventually mean that we cannot learn if we are not taught. Is that true? I hope I am not asking too difficult or too complicated questions but some of you look like I am asking some nuclear science or something.

I am not asking you, how to make a nuclear bomb. I am asking you how to make a word. So, you have taken it to a little bit more fundamental level which is fine. But tell me the answer to this question, and tell me only what you think. You do not have to be right or wrong. Can we learn only the things that we are taught? Or can we learn other things also? We can learn other things, then do you not think the role of teaching is negligible.

Do you see that? The role of consistent teaching to a child is negligible. So, some people can teach you how to say tata. I see sometimes I am sure you must have seen those things too. Say hello. Say thank you. But those things are responsible in a very minimal way for learning language. And I want you to see that and therefore, I am asking you these questions. That do you remember when you were learning Telugu, how did that happen?

So, you said we learnt first sounds, two of you said that. If I ask you to write down all the Telugu sounds in your notebook. Can you do that? No. And this is no surprise for me. I have talked to you about this even in the last class, that this is an example of something else. Which we will come to in a moment but you were right. You are not wrong when

you say I learnt sounds. But when I ask you to write all the sounds of Telugu, you say I cannot write. Why?

Did we learn the rules to make words? Or did we learn words themselves? Word themselves? If that is so, then what is the problem in writing all the words? If you learnt all the words, then what is the problem in writing all the words? That I can assure you, they could not be new. The sounds that you learnt in Telugu when you were 4-year-old or 5-year-old, there is no extra sound that has been added in Telugu. That I can assure you.

I know nothing. I do not speak Telugu but I can assure you based on my understanding there are no sounds and this is not just for Telugu. This is for Tamil, Malayalam, Kannada, English Hindi or for that matter all the languages of the world. No new sounds, a new word may have come. For example, the word computer is not just a word in English but this is the word in all the languages that we know.

Do you say a different word for computer in Telugu? In Tamil? You do right, do people use that word all the time? Tamil Nadu yes. Malayalam? What is the word for computer in Malayalam? Computer? But apart from that word. What was the word? Apart from that word do people use computers also? So, my point is computer is not just a word for English it could be a word in many languages.

So, a word may have been added but no new sound has been added. That I can assure you. Still you cannot write all the sounds. And if you say we learnt just words then you should be able to write all the words and particularly if we learnt only the words that we were taught or we heard, then all the more easier. This exercise should be for you to write them. But can you write all the words that you know? The answer should be very imprecise. No. That we cannot write all the words that we know. Why not?

So, let me change the question a little bit. When we say 2 plus 2 is 4. Do we learn the process involved in that or do we learn 2 plus 2 is 4. And then do we need to learn 2 plus 3 is 5 separately. Which one do we learn? Which part do we learn? And that process is what? Addition. So, there is a process of addition. I do not want to take you

into that you already know. So, we do not learn every single number that is generated through addition. What we learn is there is a process where you put two different numerical values on two different sites. And then a total of that you get as an aggregate for something. And then there are all other mathematical processes for that.

So, when we learn that process can we add any number after that? Or do we need to learn for bigger number for numbers in 2 digits or 3 digits and 5 digits. We need to learn additional operatives. No, no additional operations I needed. So similarly, there is evidence in language that we do not learn words. What we learn is the process of making words and that process is learned way too early and here the difference is when you learn the process of addition you know that you are learning that. When you learn the process of word formation you do not know that you are learning that.

It is important for people. I mean addition and subtraction are very simple, they are not even, at least for many people they are not even mathematical processes. They are part of general knowledge. But then there are complicated mathematical calculations you need to learn them specifically. They do not come to you automatically. Whereas, all the processes involved in word formation come to you automatically, so automatically, so effortless that you do not even realize that we do not even know to the extent if someone asks me to write them, we cannot.

Can we say the same thing about mathematics that I know how to do 2, 3 plus 3 but I do not know how to tell you. You see my point, that is the difference between learning two things. And I have already given you examples of swimming, and riding, and flying a plane. Why are these kinds of learning different from learning languages? Get the scene? So, now let me take you through, how it really works. How that happens we will come to word formation in a couple of days but I want to show you how it works.

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LANGUAGE

- Language is a rule-governed system.
- Linguists/linguistics makes such rules explicit with scientific investigation.
- Language is the most sophisticated product of Human Mind.

LANGUAGE

- Language is one of the strongest marker of society, culture, and identity.
- The nature of language is that of a system. It is mathematical. It is one of the things that we learn without putting much efforts to it as a native language.
- In short:
  - Language is child's play!
  - In learning of the first language children perform better than adults.
- Language is special purpose cognitive ability.

So, we have already seen these things that there are lots of rules in language and those rules are right now what we are talking about is all those rules we learned automatically. Before the age of 4 to 5, we have already learned them without us knowing and realizing them. We have already learned all the sounds but we can just not write them. I have learned the process to make any word or even the capability I have through which I have acquired the capability to tell anyone whether this word belongs to my language or not.

I would not take more than 10 seconds. Or 10 seconds is also too long a time. So, we do not take too long to tell whether a word belongs to our language or not. That computation, the scanning or search, is how we work that fast. And we know that.

So, see how it works. But before that, I want to tell you one more story about this, like your friend was saying we are someone who tells us how to say something, for a long-time people believed in the whole understanding of language acquisition that we learn language is behavior. We learn language by imitating others. We listen to people in society and then whatever they say we repeat and we learned. Just now somebody said I forgot who said that there you said.

The process that your friend explained was when someone tells us we hear that, we repeat that again and we say those things several times and we learn that. Get it? This process of learning was given a name it was called behaviorism. And people who gave this theory were called behaviorists and the simple role of the theory was, we get input and we produce output. Get this?

But there are limitations of this principle, limitations of this theory which is, if we hear, if my learning is contingent upon listening to something. Or in a more precise way, if my learning is restricted only to the terms that I hear. Then what follows from here is I would not be able to learn the things that I have not heard. See the limitations of this theory, I would not be able to understand words that I may not have heard before.

Now check yourselves as speakers of Telugu, Tamil, Malayalam, Kannada, Hindi. Have you heard all the words of Telugu, Malayalam, Kannada? At least you cannot say that with confidence that by now I have heard all the words. But just now I gave you an example: if someone gives you a word whether you have heard that word before or not, you understand the meaning of that. Then how did that happen? If it was contingent upon, if learning of a word was contingent upon me listening to that word then how did that happen that I also know the words that I have never heard before? Get my point?

Because of this, this theory was rejected. Input equals to output there seems to be some problem in that. In fact, input is okay that it is limited and by input we mean what we hear. So, it definitely happens that we hear something without hearing nothing happens. True we hear something but the output is not directly proportional to input. Output in fact is infinite. Input may be limited, we do not know how much. It is difficult to quantify but input is limited but output is infinite. So, there must be something else happening somewhere.

On the basis of that something came up. Something else came up and this is what we call the innateness hypothesis for language learning. And in that innateness hypothesis what was this term is borrowed from the philosophy poverty of stimulus. And stimulus here refers to input. So, this theory was built on the following that input is limited but the output is unlimited. Output is numerous, infinite. And then people examined this hypothesis and proposed that learning capacity is innate. Do you understand the meaning of the word innate? Can you tell me what it means? Inbuilt that is right.

So, it also refers to the learning capacity of humans that the learning capacity is inbuilt. So, when we are born, we are born with the capability to learn a language. Or just to learn language making sense so far. I come to this last part of language computation as part of generative mechanism, I will introduce this generative mechanism in a few minutes. But does language computation make sense to you? Language computation simply refers to language processing, that is, and to be more precise, it means learning or internalizing rules of the ones that we just figured out that we do not know.

So, all those computations are part of the generative mechanism which is already here. This is what this hypothesis means that this is already here. So, the one more difference between behaviorism and innateness hypothesis is there was an almost negligible role of the human mind in the behaviorist hypothesis. Behaviorist hypothesis was simply repetition, copying, or just listening, and speaking, practice these were the key terms of behaviorist hypothesis. Whereas, the term of innateness hypothesis is the capacity itself is inbuilt. And the moment we say inbuilt, it is inbuilt in the human mind.

Therefore, the role of the human mind in acquiring a language is already assumed. It does not even require further underlying or highlighting. But we need to say there was a huge role of the human mind in language computation. Language processing unpacking those rules. Get it? And I talk about generative mechanisms in a few minutes, imperfect stimulus. What does this mean to you? Imperfect stimulus meaning imperfect input. So, what does this refer to and this is also an important part for us to understand.

Imperfect stimulus means when a child is listening to things in society. Nobody speaks to children in a way that will be easier for them to learn the language. Have you seen a child growing up, you may not remember yourself as a too young child but have seen a young child growing. All you must have seen some or the other child. What do they do? What do people do to them? When they are talking to children what do they do to them? Do they talk to them as pa, u, sa, ta, ka, ma, so that they learn the word pustakam? Or they just keep talking to them? People just keep talking to them.

And definitely children do not like this. They in fact talk a lot to a child. What does a child do if you talk a lot to them? Any idea? That means you have not seen a child growing. Cry, you know why they cry? No, they do not even realize their input at that time but you are right. So, much input you are right. What happens to them is everything you tell them or you think you are telling them sounds like noise. And what happens if someone keeps talking to you in German, Spanish, French sitting next to you for 1 hour.

As a grown-up person, you can at least say shut-up men. Whether other person understands shut-up word or not. You just say shut-up. What is this nonsense? The

problem with the child is the child does not even know how to say nonsense, shut-up all that. So, in response, they just start crying. Which literally means look I do not understand these things. These things do not make any sense to me. But trust me the acquisition of sounds begins through that. And the fact that people are not aware of what they are saying, they think they are being nice to children without realizing that you are becoming really nonsense to them.

This is what is called an imperfect stimulus that nobody is being nice to children in terms of that learning not that they need you to be nice. The point is the inbuilt capacity of the human mind in work on the basis of imperfect stimulus, imperfect input, and a still you keep talking, you keep giving them words, sounds you do not even need to worry whether I am giving all the sounds of Telugu or Tamil or not. In a matter of a few months or a few days or whatever the total number of periods maybe the child has figured out all the sounds of the language that are spoken around them.

I do want to draw your attention to one more point that when children are learning a language, they are not learning either Tamil or Telugu or Malayalam or English or anything. This has a meaning you may say what I am saying means the same thing. But what I am saying is as a meaning they do not learn these languages, what they learn is whatever is spoken to them. They are two different things for you, they may mean the same thing. But it has different implications, they are not learning Telugu, Tamil, Kannada, Malayalam, Hindi, English, they are learning whatever is being spoken to them.

So, if you learn, if a child is born in Tirupati and the only reason why I am giving you the name of this place Tirupati is, because it has, it probably that place speaks both Telugu and Tamil. Equally well and probably that has emerged into a new kind of, different kind of Telugu or a different kind of Tamil. So, what if you are speaking that language to that person if someone is speaking to a child growing up in Delhi in Hindi, Punjabi or Hindi, Punjabi mixed or whatever the child is not learning Hindi or Punjabi or anything. The child is learning the language spoken in Delhi. The language is spoken in its neighborhood and language is spoken to the child. Get it?

All that depending upon different children are imperfect stimulus. They go here and they keep going to the human mind all the time. However, the output is completely perfect. When the child speaks, starts speaking they do say the word pustakam without any difficulty. A child if you say the word scooter to a child, school to a child the child says school, scooter. Anybody understand Punjabi here? No. a little bit. A little bit of Hindi. How many of you understand a little bit of Hindi? A little bit, many of you.

Well that is good. How many have you been to Delhi? Quite a few of you. Great. Have you heard some Hindi speakers in Delhi which is an influence of Punjabi saying sacooter. No, probably you have not, maybe you have not noticed or you have. Yes or no. Yes, instead of school they will say, other people say, is school Punjabi people say sachool. Sachool, sacooter, satation. Now what is that happening? Let me take you to that process. If you, these are English words right? Sachool, sacooter, satation.

When you learn these words as English words, then the first two words, first two sounds of these words are clusters. First two sounds are clusters. Cluster is in the words station and the cluster is between sa and ta. In the word scooter the cluster is between two sounds sa and ka. Get it? In English speakers use them as clusters probably Hindi speakers also do and Tamil speakers also do. But Punjabi speakers do not like clusters. So, they just simplify the cluster, that is, the cluster is gone.

If you remove the cluster from there and insert another vowel then it becomes sachool, sacooter, get this thing? So, they are not doing anything wrong. This kind of thing may appear funny to us, by us, I mean funny to people who do not speak that way. But keep in mind the process. The process of Punjabi is limited to a limited number of clusters. And trust me I will come back to clusters in a couple of days. And then you will understand these clusters and sounds in more detail.

Right now, I am giving you this example for just simple reason to see that if you talk to them with a language, in the language that follows clusters. The child will learn clusters, if you talk to them without clusters, they will not learn clusters. And eventually when they say something, they will use their word without a cluster or for that matter if they use

remember what I told you they do not learn words or we do not learn words. What we learn is the process of words, underlying process of word-formation. So, if they learn any, if they need a new word and that word has a cluster, they will just remove the cluster and use it. Get it? So, this is why they speak that way.

This is what I am saying, the stimulus is very minimal, little, limited, and all the way to imperfect. However, the output is complete. No one learns incomplete words when the child produces, starts producing a word, the words are complete. They have learned all the sounds and all the rules involved in word-formation. Get it? Specific examples are coming up. I will give you those examples.

- One of the most powerful theories of language learning/acquisition assumes that all normal human children are biologically hardwired to learn language (Chomsky 1965). This requires INPUT from immediate surroundings.

- Input is fuzzy and inadequate in both quality and quantity.

- This theory has imprints of Plato's Problem of how given so little we know so much (also known as Poverty of stimulus).

So, look at this again how it works. Every many things that I have told you so far are written in these 2, 3 sentences. So, one of the most powerful theories of language learning assumes that all normal human children are biologically hardwired to learn language. This is what the meaning of, what was the word innate. Human children are by birth guaranteed that they will learn language. And here you can read this carefully we are talking about normal human children, not children with disabilities, unfortunately there are some children who may have some kind of disabilities. So, this theory does not talk about them.

There may be some kind of learning deficit or deficiencies, those are unfortunate situations. But for normal children the capacity to learn is inbuilt. Input is fuzzy, imperfect, limited, inadequate both in quantity and quality. Very limited in quantity, quality may be very distorted. But the child fixes all those things. And remind me about these things I will give you more examples. Or even I mean these examples will come up anyway in any case.

The word poverty of stimulus was borrowed from philosophy as I told you. And this was Plato's idea. And in fact, that is known as Plato's problem in philosophy where he says how does it happen that given so little, we learn so much. And he is not really talking

about language but Plato's idea was borrowed and then applied to this kind of learning situation. So, this way this poverty of stimulus is carried till to Plato's problem.
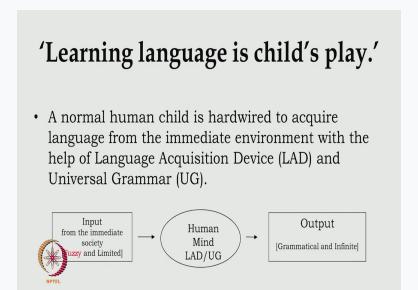
- With the help of inbuilt Language Acquisition Device (LAD), a complex system and generative capacity miraculously develops.

- This process is fast, effortless, and requires no instruction. It recognizes patterns, develops rule, and generates a perfect system called Language.

- Results into a body of knowledge – 'Knowledge of Language (KoL)'.

With the help of, so, now there is one more thing that need to tell you. This inbuilt capacity has a name and the name is called Language Acquisition Device, language acquisition device in short it is called LAD. This is a complex system, I will elaborate that little later. You will remember this thing. Language acquisition device. Now it is important for me to note here at least for you that this is not a physical device. This is a hypothetical device. Right yesterday we have looked at the fact that there is nothing here.

So, when we say the human mind has a language acquisition device in it, we are not talking about a device like this or a device like this. These are physical devices. Language acquisition device is an idea. It is a hypothetical device. Get this thing? What it does and why it has been hypothesized is the following. What it does is it has two parts in it. It is, it has just one thing inside that device which is called Universal Grammar. Have you heard this term before? No.

Let us look at this thing. This will make more sense. You see in the middle, the circle represents the human mind which has got a language acquisition device in it. And that language acquisition device has something called universal grammar. The word grammar you must have heard before. What does that mean? What does that mean? Set of rules. And I am asking these questions not to check your vocabulary here anything. I am asking you these things just so that we are talking about a specific. Set of rules or a book that describes rules.

Most of the time, when we hear the word grammar, the idea of a book comes to mind. Which is like a rule book, the grammar of English, or grammar of Hindi, or Telugu, Kannada. This universal grammar is not the grammar of any language. As you can see the term it says is universal grammar. If at all it is a grammar of anything, it is the grammar of all the languages of the world, all the languages of the world. Get this thing?

This grammar has two parts, one part is called principles and the other part is called parameters. That is just two parts in that principles and parameters. Principles dictate the rules that are common to all the languages of the world and parameters talk about the rules that are different in different languages. If there is a rule that is different in too many languages, they become universal for those many languages. Get it? So, it is

hard to put a finger on the rules of parameters. But it is so easy to talk about principles. And those principles are so easy to talk about. And those principles are not really very complicated principles, they can be as simple as all the languages must have sounds.

And hereby language we refer to natural language, spoken language. The moment we say we are talking about the spoken language we cannot have a spoken language without sounds. That is the universal principle. All the languages of the world must have verbs. These are, this is also a universal principle. All languages must have sentences. All languages must have words, these are universal principles. And I have given you examples of parameters the other details such as where the words occur in a sentence and more specific details become part of parameters.

So, a system that contains both principle rules and parametric variations is called universal grammar. And that grammar now you can see that includes both differences and similarities of all the languages, all the rules of all the languages. Let us put it this way, all the rules of all the languages are embedded in universal grammar and that we have here. This is all a hypothesis therefore we talk about it as a language acquisition device. Get this thing? If there is any confusion about it, any difficulty about it you can ask me about this thing later as well.

Now so this is how it works as you can see a normal human child is hardwired to acquire a language from the immediate environment. And this is another key word that guarantees us that, if you are born in Chennai you will learn Tamil effortlessly. If you are born in Paris you will learn French effortlessly. And again, the word born is not important what is important is if you live there.

You could be born anywhere and if you are dislocated to another place then you learn the language of that place. So, the word born is not important. What is important is if you are in a particular place while you are learning the language, while you are growing up then you learn the language of that place. This is what it refers to when we are saying from the immediate environment. Get this thing? From the immediate environment part.

And the way we learn it is with the help of a language acquisition device which has got universal grammar in it. If you look at this screen, then it talks about input and output, the input goes into the human mind, and then it gives us the output. Now if you compare both behaviorist hypothesis and innate hypothesis you can see that the whole role of this circle was missing from that or was not at least hypothesized.

With the hypothesis of these things, this mechanism guarantees us that the fact that we know a lot more than we have been exposed to is because of this. And what also follows from this particularly with the hypothesis of universal grammar, with the term of universal grammar and universal grammar being in your mind, do not be confused that we will be able to, why is it that we do not speak all the languages of the world. If we have rules of all the languages of the world in our mind, if we are born with all the rules, then why do we not speak all the rules, all the languages.

The constraint is, do we input, do we even know the memory, or do we even know the capacity of the human mind? It is hard to define it in terms of 32 GB or 500 GB, it is impossible. We do not know. Therefore, we cannot say a memory could be a problem. You know all the languages of the, all the sentences of your language. In fact, you know all the sentences you may not have ever heard before. Do you feel any lack of memory? Does it tell you to delete some files? Does it? It never tells you to delete some more files. Otherwise, you cannot keep anything else, anything extra.

So, we are not looking at this aspect at this time if time permits, I will show you some of the things. In fact, you should be aware of this thing that one of the goals of modern science which includes modern engineering is to come up with a device which can function as the human mind. And efforts are on to come up with the device in terms of computer scientists have come a long way. You can see 10 years behind and you can realize. Every next week devices change. If we are talking about a phone it gets outdated every next week.

We did not have computers, we did not have computers which will fit in this room with the memory 20 years ago as much as we have in an I-phone now. Am I making sense?

So, there has been a lot that has changed but the efforts are on what has not happened is we do not have a device which works like the human mind. In fact, a lot of devices that we know can do multi-tasking now is also the effort of the replicating function of the human mind. That human mind can do multi-tasking.

So, we by saying anything we are not trivializing efforts that are gone in and the achievements that have been established so far. But what we are saying is that we yet do not have a device which functions like the human mind. Which we do not know simple things. We do not even know the capacity of the human mind. We do not know the processing ability of the human mind. There is no way to measure how what I told you works. That what happens in the human mind that in a fraction of a moment you can tell this word does not belong to my language, it is that fast.

So, there are lots of things that we know, there are lots of things that we know, and we do not know. The reason I started talking about that device is the study of language has a huge role to play in it. In fact, the study of language gives us a window to the functioning of the human mind. How does it really work? And can that be, can that be translated into electrical signals in the form of a machine? Can we have an artificial language for a machine to understand which can make it work the way the human mind works with respect to natural language?

These are the new frontiers and challenges of modern science and engineering is no new challenge, it has been on for the last half a century. It will continue as long as it is achieved and we do not know, it is hard to predict right now. But these things have a huge role to play in that. So, coming back I only wanted you to know before we stop, you have a different class at this time. So, we want to stop now that from the behaviorist hypothesis the role of the human mind was missing.

The innateness hypothesis incorporates that role and it takes care of the fact that why does it happen that we can, we also know the things that we have not heard before. Why do we not speak all the languages of the world if we have all the rules in our minds? You are absolutely right the role of the natural environment is very important.

The fact that we do not get input from all the languages of the world is what is responsible for us not speaking all the languages.

In fact, the capacity and memory are so much that hypothetically speaking if you can provide input to the human mind from all the languages of the world. It will speak all the languages of the world. You will be able to speak. Now, this is too far too big a hypothesis because we know that there is no place on this earth which speaks all the languages of the world at a time. A child growing up in any place in the matter of 5 years or 6 years will not be able to go through all the languages of the world. Will not be able to receive input in all the languages of the world. Therefore, we do not speak all the languages of the world.

However, hypothetically speaking if provided those inputs we will be able to speak. Get this point? So, these things may sound a little bit too stipulative, a little bit too hypothetical, nonetheless, they take care of the claims that they are making.

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Universal Grammar

- "UG consists of a set of innate, abstract, linguistic principles which govern what is possible in human language" (Larsen-Freeman & Long, p. 230).

- Principles cluster around "parameters" – sets of properties of a language that vary in certain restricted ways.

Knowledge of Language

- Knowledge of Language grows in human mind.
- KoL consists of the underlying rules that we know but we do not know that we know them.
- These underlying rules help generative mechanism of a native speaker speak unheard of sentences and enable them separate grammatical sentences from ungrammatical ones.

More on the role of universal grammar and what we mean by knowledge of language next time when we meet. Thank you.