

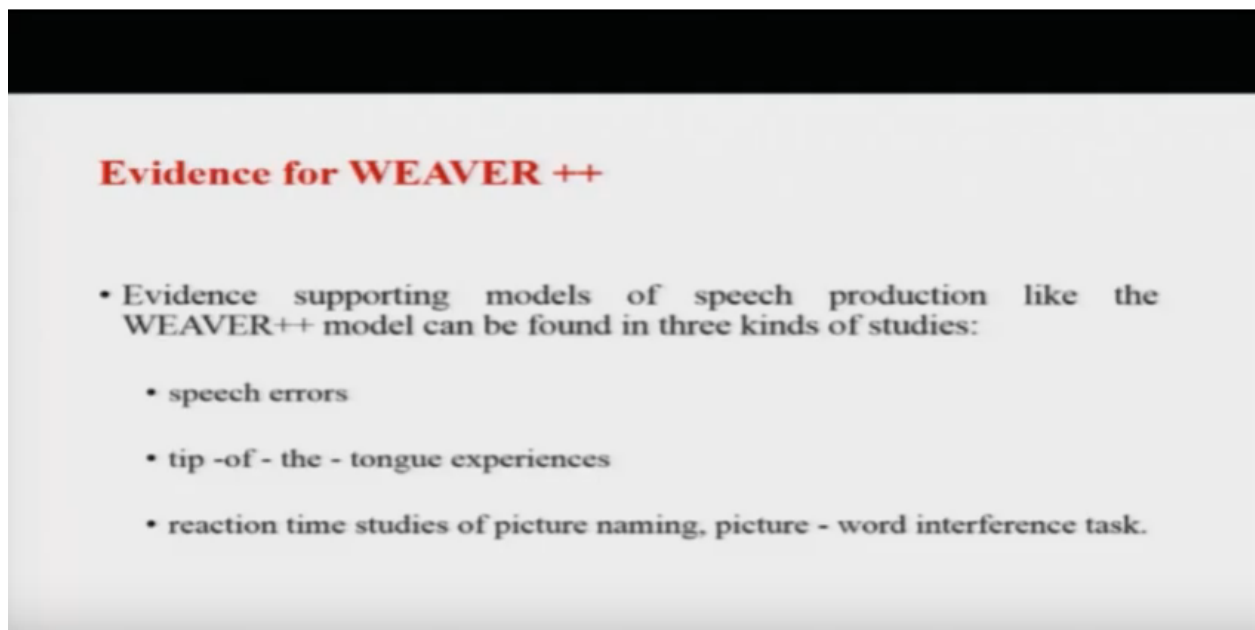
## **Lecture 12**

### **Speech production 2**

Hello and welcome to the course, introduction to the, 'Psychology of Language'. I am Dr. Ark Verma from IIT Kanpur and we are in the third week of the course. This week, we are talking about speech production and comprehension. In today's lecture, we'll continue talking about aspects of speech production, in the last lecture, if you saw I discovered in some detail the weaver plus, plus, plus model of speech production the weaver plus, plus model was given by, volume level and in around 90 96 97 this was a model with a kind of you know cows down the entire act of producing speech, say for example

starting from thinking of something to say, to finally saying it in the set of component processes. And we saw in adequate detail, in the last lecture how each of these mental processes create a sort of an you know, sequence and the sequence kind of becomes really instrumental, for us to understand how speech must be produced. So, you have processes like, conceptualization, formulation articulation and within from conceptualization to formulation you have a series of steps, from formulation to articulation you have a series of steps and again, those are the steps, which basically specify exactly, how the system in a very algorithmic sort of manner produces or becomes capable of producing speech. Today in this lecture, we will basically look at some of the evidences, that have been collected over a range, of years or the range of different kinds of paradigms, which kind of support, some of that,

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**Evidence for WEAVER ++**

- Evidence supporting models of speech production like the WEAVER++ model can be found in three kinds of studies:
  - speech errors
  - tip -of - the - tongue experiences
  - reaction time studies of picture naming, picture - word interference task.

Conceptualization of speech production the way William Levelt has done it and also say for example the way some of the other speech production theories have done. Okay? Our evidence is basically, will come from three kinds of study. So, we basically look at three kinds of phenomenon or three kinds of paradigm from, which we'll be drawing these evidence, major source of the evidence basically, when you really want to theorize about how speech is produced kind of comes from, the place where you kind of ask as to what kind of errors are people making, if you look at a speech output of an individual or of a set of individuals, for let us say, one hour or ten hours or 100 hours or 100,000 hours what kind of errors are you most likely to find out and basically, what are those errors going to signify, you know what do you get, if you say for example error type A, error type B versus error type C, what are each of these error types telling you about the speech production process. So, that is the process that we will engage in today a little bit and we try and see, where you know the source of these errors could be with respect to the levels

model of speech production. So, we will do that, the second is another very interesting, phenomena that happens with respect to speech production is the phenomena of, the tip of their tongue. Okay? You know a lot of times it happens say, for example if I ask you the name, of the very famous shop in your city, say for example you know could you tell me the city where the best sweets are sold. Okay? Awesome could you tell me the name of that shop, where in I can find the best clothes or say for example, a particular thing that I tell you ok where will I find the charger to this particular it's kind of mobile phone, something like that, a lot of frames obviously, using having good memory you can tell me. Okay? This is the shop this is the way to get to that shop, however sometimes in spite of having a good memory, you will probably, you know you could struggle, for telling the exact name of that place, so you could say. Okay? I remember this shop you know this shop is located. Right? Next to my school there is this you know nice, you know juice shop over there, there's also coffee shop the, shop basically is in blue in color and it has two syllables in its name you can tell me quite a few things, but you kind of stuck at that moment in time, with respect to giving me the exact name of the shop that is referred to as the tip of the tongue phenomena when you know everything about, the concept that you really need to talk about but somehow, the name becomes amusing cannot really take, the name of that very little concept and tell me this is also one kind of speech error, if you white if you want to call it. So, this is different class of phenomena altogether, but also this could be also diagnostic, of how the speech production process really happens. So, we have to talk a little bit about that as well and we have to see what kind of evidence can come from, you know looking at the tip of the tongue phenomena and to try and correlate that with the speech production model that you know Leavitt has laid out. Finally the evidence that we will examine will come from basically picture naming studies and something that is referred to as the picture word interference task, the picture naming studies, as I've been saying is basically really simply tasks, you know you're. So, you're shown a bunch of pictures and basically you know your task is to, you know you know name those pictures, one by one in a particular sequence. So, that is, that is something with you to do a picture of word interference task is you see a picture but there's a word written on that picture. And there can be a relationship between the word that is written and the picture that is drawn. And on the basis of that relationship between this world and the picture, it kind of has an impact on how you name the picture. Okay? Or say how you read the word. So, we basically see, some of these sources of evidence and you see how those evidences, match up, support not support, this whole concept of speech production, has been specified in the weaver plus, plus. So, let us let us move ahead let us start talking about speech errors, speech errors are a very interesting, category of errors, mental errors cognitive errors, whatever you call it but Sigmund Freud,

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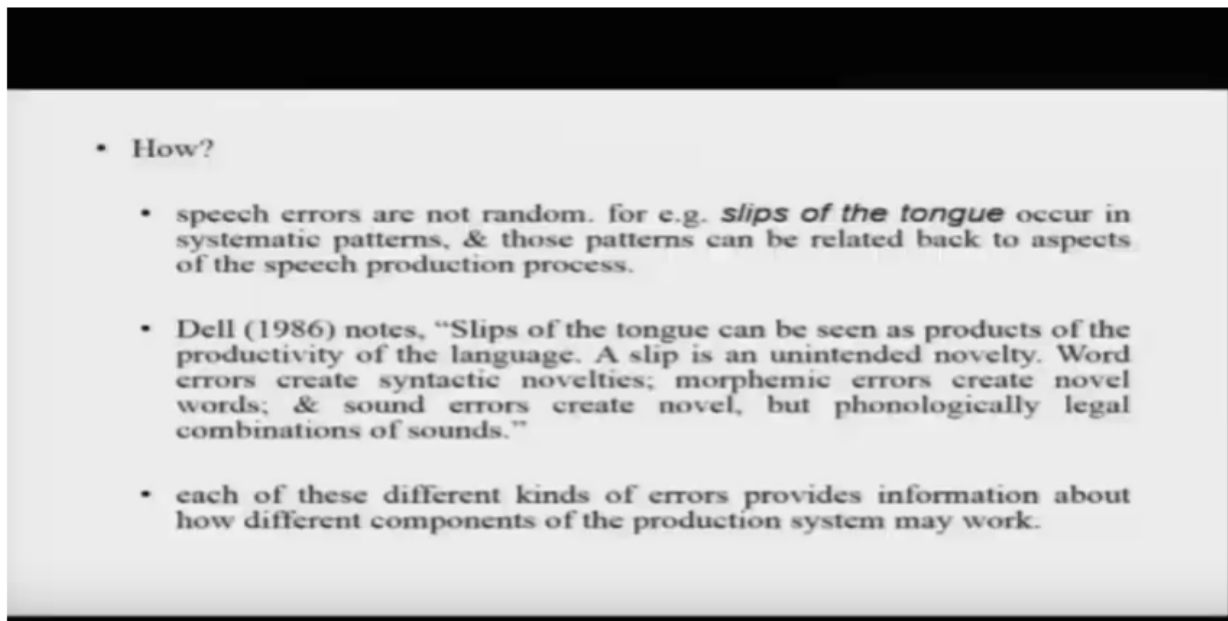
- **Speech Errors:**

- Freud viewed speech errors as a window into the unconscious mind; & believed that speech errors revealed our true inner thoughts - those that were suppressed in order to be polite.
- Modern psycholinguistic theories view speech errors as reflecting breakdowns in various components of the speech production process (Dell, 1986; Levelt et al., 1999).

From psychology, he had very interesting concept of basically looking at where speech errors might be coming from. And he believed that speech errors basically are a window to our unconscious mind he had a theory, I don't know if you're aware or you've done a course in psychology, but if simplified a very interesting theory, you know he kind of used to think, that most of our mental capability or the mind so, to speak, only a very small portion of that is available to as consciously a very large portion of, that mine is basically available, to us is rather unconscious and a part of that is subconscious. So, only the tip of the iceberg is what is available to, us while there is a very large iceberg below, the level of awareness. Now he basically believed, that speech errors basically are a window, to that unconscious that unconscious or that subconscious whatever you call it according to Sigmund Freud, stored a lot of the experiences that we have repressed from our you know, living memory, a lot of experience that we probably don't want to talk about, lot of experiences that probably, you know reflect a little bit of a guilt a little bit of a hate sort of scenario and you know similar things. So, he said that when people make speech errors or he believe that when people make speech errors, they make speech errors, which are diagnostic of what is wrong in their subconscious unconscious mind. Okay? I'm taking a rather stupid, example but suppose I have gone, to attend the funeral of one of, I know people, that I know about people, that I don't really you know like very much, I went there and I wanted to say, you know you know many con condolences for this and I really want you know my players have a diversity etcetera but because, my unconscious had a very negative feeling towards this person, I could end up saying many congratulations, for this you know something like that. And this is what Freud meant when he actually said, that you know these speech errors are a window to your unconscious mind and he believed the speech errors, basically reveal our true inner thoughts, you know those that we have suppressed, in order to basically live peacefully in this you know or coexist peacefully in this kind of society. Now that is one way and I don't know whether people really believe, in this a lot, now or not but modern science IQ linguistic theories, modern theories or

speech production and speech comprehension, really basically don't really you know don't really buy, into this a little bit you know quite a lot. Now basically, the belief now is that these speech errors, reflect breakdowns, in the various components of the speech production process and these components could be exactly as level to management or very different, but the idea is that the speech errors should be seen as you know, diagnostic of problems in the speech production process and nothing more than that. Okay? So, you had an idea you wanted to speak about something etc, etc the speech error we kind of fit in right, somewhere in this sequence of events, and not really necessarily in your unconscious mind or anything whatsoever. Okay? So, they say this is kind of a departure, from the initial idea of what speech errors were supposed to mean, but how does it really happen. So, let us look at this a little bit more closely, now you could imagine, that or you could kind of if you are confronted with the data, you will discover,

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the speech errors are not random, there are many kinds of speech errors we talk about, the speech errors are very systematic and they're systematically, in that sense they appear systematic in systematic fashion and they are in that sense diagnostic of what process that might be going on in your head, in this sequence of steps that are needed for speech production. So, let's take an example, say for example slips of tongue. Okay? Sometimes we, we the tongue slips and you kind of say something else, as compared to you know what you were intending to say. So, slips of tongue it has been observed, occur in very systematic patterns and those patterns, can be related back to aspects of the speech production process. So, Dell for example, knows the slips of tongue can be seen as products of the productivity of language, you know create new things all the time, a slip is an unintended novelty you want it to say something is what you said this it is also something that you have created, unintentionally but a novel thing, that did not probably exist in your speech say somebody coined the word selfie, they probably wanted to say something, but they coined this new word and this word has now become a very you know it's becoming a very fashionable term and it's

used a lot. Okay? So, word errors might create syntactic novelties, morphemic errors, create normal words and sound errors create novel, but phonologically legal, you know combinations of sound. So, all of this is legal all of this is real, but none of this is really untrue intended thoughts or something like it's just a process, you have to look at this as a simple process each of these different kinds of errors, these slips of tongue will provide information about how the different components, of the speech production process are really working and if something breaks down, you can kind of analyze the slips of tongue or any of these speech errors, to look at very exactly the breakdown really happen. Okay?

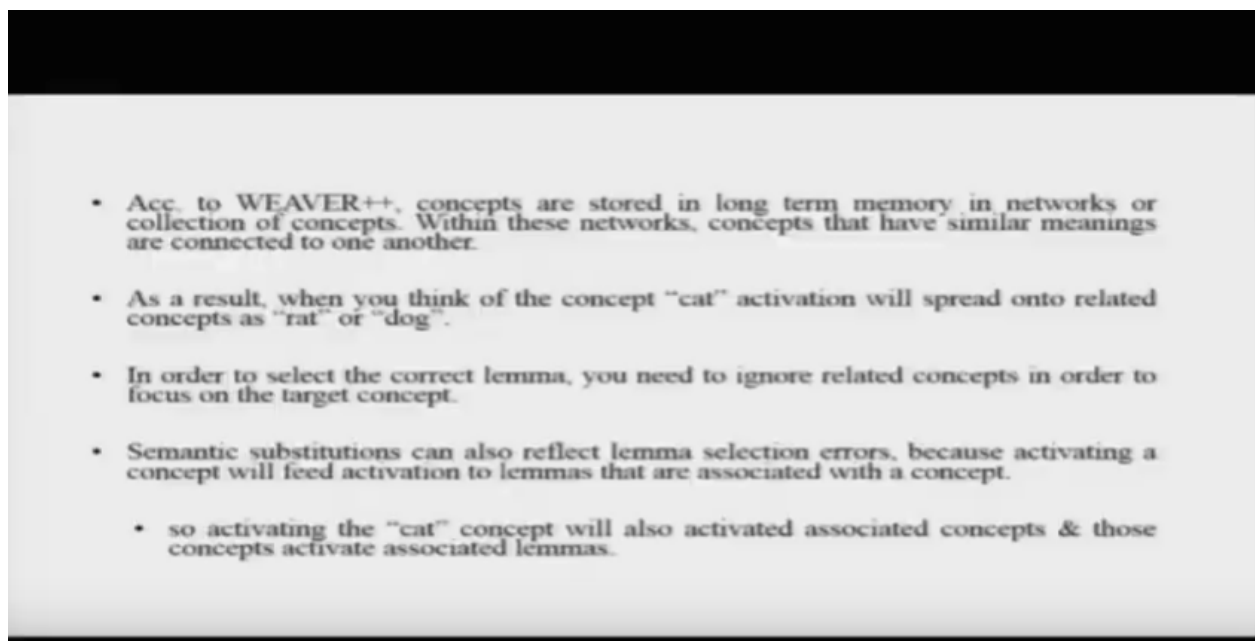
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- for e.g. people sometimes substitute one word for another when they are speaking. if people are placed under time pressure, and they are asked to name the picture of a cat, they might sometimes say rat or dog.
- this type of *semantic substitution* error likely reflects the conceptual preparation or lexical selection component of the speech production process.
- semantic substitutions could reflect conceptual preparation, if an individual mistakenly focuses on the wrong (non - linguistic) concept.
- alternatively, semantic substitutions can reflect the way non - linguistic concepts are related to one another & how the activation of concepts is tied to activation of lemmas (Dell et al., 1997; Levelt et al., 1999).

So, for example let's take an example sometimes people substitute one word for another. So, Union slips of tongue there is this error called, 'Semantic Substitution', so, people sometimes substitute one word for the another, when they are speaking, say for example if they're placed under a lot of pressure, you know time pressure or you're kind of going for an interview, you're kind of going to you know you're very afraid of talking to this person and you know there is time pressure as well and suppose say for example you are afraid for certain, reason you very nervous or you're you're not physically, completely Alright? You know in each of these scenarios, you can imagine they're sometimes you know, some kind of substitutions will happen, you wanted to say this word but you'll say something different, this is called, 'Substitution', no semantic substitution error, say for example you were going to talk about, the rat or you are or let us say a very simplistic ism your name you supposed to name the picture of a cat, but sometimes you name it as a rat oh this is another cat you know this how does this error really happen this error is, what is referred to as semantic substitution? What is semantic substitution? It basically, is when you replace the target word, with the same with another word, coming from the same semantic category or coming from or being very

closely semantically related to the target word, either ways this type of semantic substitution error, most likely reflects the conceptual preparation or lexical selection component, of the speech production process. So, if you have to guess, where the problem might have happened, is probably at the level of lexical selection you went on to select, the you know a lexical concept for cat ,but mistakenly selected the concept, for rat and then you finally, just said it everything else in the process remains error free. Okay? Semantic substitutions, can be thought , as reflecting, conceptual preparations or breakdown in conceptual preparations, if say for example an individual, has mistakenly focused on the wrong concept, somehow, some cue, something the mind is somewhere else, you know the mind wanders sometimes while you're doing important tasks and that's perfectly natural. Now alternatively also it is means it has been, proposed, that semantic substitutions can reflect the way, nonlinguistic components are related to each other and how the activation of those concepts is tied to the activation of lemmas. Now if you remember or say for example, I have not talked about in about this concept here in this course, but if you kind of have given a course on knowledge representation where I talk about basically, higher cognitive processes or even on memory, when I talk about semantic networks theory and there's this very interesting theory, which says that you know concepts in the mind are linked to each other, you know, different concepts, I created as nodes and how those concepts are linked to each other is by virtue of relationships so on and so, forth Okay? So, what might happen is that, to it, it might be the case, that there are these concepts which are related to each other in some sense and because you were kind of you know going to select one concept, by mistake you select a related concept a semantically, related concept. Okay?

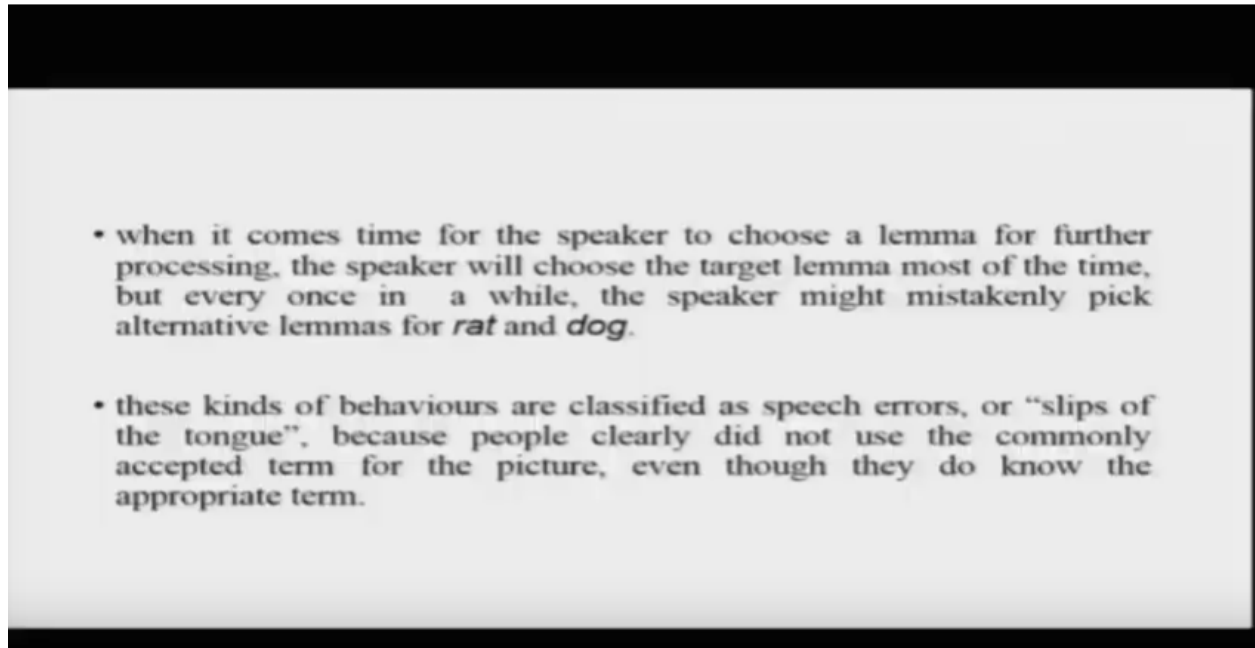
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So, weaver plus, plus says that maybe concepts are stored in the long term memory, in networks it's kind of boring from the Collins and Killian semantic networks model. So, it believes, that concepts are stored in the long term memory, in networks or collection of concepts, as collection of concepts, within these networks concepts, that have similar meanings, will be closer, together or connected to one other end concepts I have that that have very similar meanings will be further apart and probably also not even

collected, connected to each other, as a result what happens, is when you think of cat activation, might be spreading on, to other related concepts, say for example cat and dog and rat or say for example, cat and lion or tiger or you know these are also related, in these are also related, this is probably, by association this is by the and also these are also delayed cement idea so, that's Alright? In order to select the correct, lemma you needed to ignore the related concepts and focus on the target concept. Okay? Semantic substitutions basically, might be you know seen, as, reflecting, lemma selection errors, you wanted to select this particular lemma or the lemma for cat, but by mistake you have now said the lemma for let us say, a rat and then you eventually end up speaking rat, instead of speaking cat. So, this is where the semantics substitution error might come up. Okay? So, activating the cat concept, will have activated the Associated concepts, rat, dog feeling you know that dog, lion, tiger etcetera, etcetera and the lemma is associated ,with them those concepts will also have been activated and by mistake what really happens is you select the incorrect concept and incorrectly lemma there it when it comes.

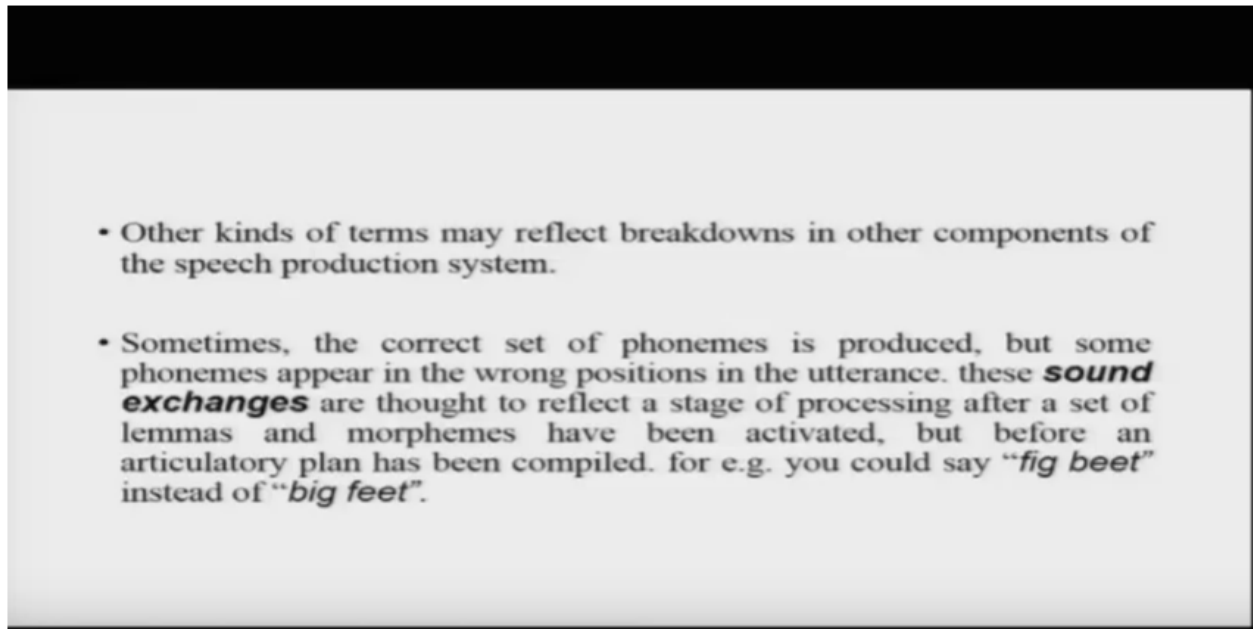
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So, this is exactly what's happening, when it comes for the time, of for the speaker to choose a lemma for further processing, the speaker will choose the target level most of the time, but every once in a while, in hurry, In nervousness in some kind of pressure, time pressure, whatever the speaker might mistakenly pick the alternative in lemma, for the rat or the dog and you might end up speaking, that these kind of behaviors are classified, as class silly speech errors or slips of the tongue because, people clearly did not, use the commonly associated term with that picture, even though, if you ask them they know the correct word it's not because, they don't know the picture, it's not because they, they intend it to you something else, it's just because by mistake, in that entire process something got mixed up and the output came out as wrong, that's, that's basically it.



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Now other kind of kinds of terms may reflect breakdowns, in components of the speech production system, this was from conceptual part. So, lexical concept etcetera, etcetera. Moving down, some kind of words that you might create as you might utter, as parts of your speech error, might be diagnostic of other kinds of processes breaking down. Let us look at that some of that example. So, there is a kind of error that we do which is called a, 'Sound Exchange Error'. Now what is the sound exchange suppose error, say for example you, have to say fig beet and you suddenly you have to say big feet sorry and you in your end up saying fig beet, now what has happened here, big feet, fig beet what have you done you've kind of exchanged, the first volume of the first syllable in a little bit. Okay? So, fig and beet which bird should we've been here, for should have been there and that would have been the correct, address but what you have done is if created a sound exchange, both syllables, the first phonemes have gotten exchange, this is probably, the error, at a point where you have where you are going to be coming up with the phonological word, maybe somewhere there maybe as a syllabication place, let us look at this a little bit more closely, this kind, you know there have been kind of experiments.

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- these kind of experiments can be elicited in the lab by putting experimental subjects under time pressure.
- for e.g. researchers set up the experiment so that the subjects get used to producing a specific pattern of sounds, & then they switch the pattern (Baars & Motley, 1974).
  - Subjects might be asked to say, *bid meek, bud muck & big men*, all of which have a /b/ in the first position in the first syllable and an /m/ in the first position in the second syllable.
  - The the pattern may be changed to saying *mad back, mud buck* etc.
  - About 10% of the time, subjects make an error and say *bad mack* or *bad back*.

That have these kind of errors, can be elicited in the lab, by putting experimental subjects under time pressure, you usually in our laps you call partisans we ask them to do particular tasks and they do those tasks, we measure the dependent variables of time, of reaction time inaccuracy that's what we do, for these kind of errors, if you can't elicit these kind of errors, you can get the participants to your lab, you can give them tasks say for example you can get them to name these forty pictures, in two minutes or name these 60 pictures in three minutes, something like you give them a very highly time pressure task and the pictures are coming and going for 100 milliseconds, 200 milliseconds, very little time for work to you know, for you to work with. So, how, how is the participants going to do? Obviously the part Simmons is going to make some errors, sometimes the errors could be of semantic kind, sometimes the errors could be basically sound exchanges you would know that. Okay? This is the space this is the place where this you know, error has happened. So, for example let's take a study example, if stress let's take him so, let's say you know subjects might, we also say bid make bad mug big men and similar things like that, where in the first syllable, is usually bah or let us say first phoneme in the first syllable is bah and then what you do is you make them practice, with this and then you change the pattern, you asked them to say something else, you ask them to say, say for example mad, mad back mad work Mad attack something anything like that. Now what has happened is initially, the first phoneme of the first syllable was ba, now the first one you are the first syllable is ma and if you were kind of doing these tasks one after the other and there is a lot of time pressure involved, sometimes the participants probably has little s ten bits of the participants time might make an error, by creating novelty is like bad Mack or bad back or mad by or something like that. Okay? This is where the sound exchange is really happening.

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- Sound exchange errors almost always occur when sounds are exchanged between words in the same phrase, & the vast majority involve movement of only a single phoneme from each word (Nootheboom, 1969).
- Also, sound exchanges almost always respect the positional constraint. i.e. when sounds trade places they almost always come from the same part of the word, usually the first phoneme.

So, sound exchange errors, also something to look at, with respect to the sound exchange errors, is that the sound exchange errors, almost always occur, when sounds are exchanged between words in the same phrase, usually you will not sound exchange the word first word from herein the first word from a sentence that you are going to speak two minutes after, usually the exchange will happen in the same place. So, big feet big be, in the same phrase. Okay? And the vast majority involves movement of only one single phoneme from each word. Okay? So, only one sound will move from here, to there and one sound is moving from here to there, also you will see another very important aspect is that, most of those most, of the time these sound exchanges, they sort of obey what is referred to as the positional constraint, what is the positional constraint? Sound from the first syllable of this word, goes and replaces the sound, from the first syllable of the another word. Okay? So, basically two phonemes, both were them in the first position in the first syllable, they get exchanged. So, big feet bar and fur were both first syllables, but both the first one sorry, this is also shown in dells, you know 1986 is production model and it says that the positional constraint reflects, the way individual,

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- In Dell (1986)'s production model, the positional constraint reflects the way individual phonemes are activated & inserted into frames (i.e. syllable length mental representations).
  - Acc. to the model, a number of frames can be activated at the same time, so when one is planning for *big feet*, one activates two syllable frames, and one activates the phonemes that need to be filled in these frames.
  - Each of these phonemes is marked with an order tag, which tells the production system about which phoneme comes first, which comes second and so on.

Phonemes are activated and inserted into frames, remember we were talking about how do you come up with a phonological word form, what was happening you activated these sounds you organize the sound syllable sized frames and you kind of also decided the order, there he remember in a strict left to right fashion. So, you kind of create a syllable size frame, this is the first syllable, this is the second syllable, this is the first sound of the first syllable, second sound of the first syllable, first round of the second syllable, for the second sound ,of the second syllable. Now you have a scenario where there are two first sounds, of both these syllables, two second sounds of both these syllables, what can happen here, both of them has the first time, both of them have the second time, according to Dells model number, of frames can you know can be activated at the same time. So, when one is planning for big feet, one activates two syllable frames, big feet and one activates the phonemes to be inserted in this room. So, burger, ferter, for two both are activated each of these phonemes is marked with an order, tag. So, this is as I was saying this is the first, syllable the first, first phoneme are the first syllable, second phoneme of the first syllable, first one even of the second syllable, second poem of the second, you give them order tags.

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- because two syllable frames are activated simultaneously & two phonemes that have “first” order tags are also activated simultaneously; sometimes the production system will confuse the two & select the wrong phoneme for each of two available first phoneme slots.
- normally, the activation levels of the two first phonemes will differ at different points in time; & so mistakes will be relatively rare. Though sometimes, if the activation levels of the two “first” phonemes are close enough, they will get reversed.
- Most errors respect the positional constraint, because the production system will not jam a phoneme with a “first” tag into the slot labeled “last” & vice versa.

Now because, two syllable frames are activated simultaneously and the two phonemes, that have the first order tags are also activated simultaneously sometimes, what would happen is the production system, mistakenly confuses the two and puts this one here and this one there, big fate becomes fig beet, normally the activation levels of the two first phonemes usually differs a little bit. So, you will not really make this error, I mean the percentage or the distribution of this error would probably be much less, but sometimes it could be because, of something else because your mind wandered because you were too nervous or too excited you kind of mix these two and created that kind of error, most errors obviously as I said respect the positional constraint because, the production system will not Jam of funny with the first tag, to a funny with the second tag. So, that's also because by the positional concern thing is kind of getting obeyed.

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- Finally, sometimes people also produced **word exchange errors**, when a word that should have appeared in one position is produced in a different position. for e.g. you might want to say, "My girlfriend plays the piano." but end up saying, "My piano plays the girlfriend."
- The majority of word exchange errors respect the *category constraint*, i.e. whenever two words participate in an exchange, they come from the same category.

Now this is this kind of a we've talked about semantic substitution, we've talked about, sound exchange, what is the third kind of exchange? Third kind of exchange could be when you kind of replace the entire word. So, you could do somewhat is referred to as, the word exchange here, what is the word exchange? Suppose you were to say my girlfriend plays a piano and you mistakenly said my piano plays the girlfriend you know, that's, that's entire word exchanges happening. Now the majority of word exchanges, it has been seen basically, you know obey, what is referred to as the category constraint? What is a category constraint if you have to so, to speak if you will ever by mistake unintentionally exchange two words, from the same, kind of, in the same sentence and the same phrase, you will exchange words from the same category. So, noun replaces, noun verb, the places about verb adjective replaces an adjective soon and so, forth.

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- Acc. to the *frame & slot* models (Garrett, 1975; Mackay, 1972), speech involves a degree of advance planning. Rather than planning a word at a time, we can lay out the frame for an entire clause or a sentence as we are looking for a particular set of words and the precise forms we need to produce those words.
- this frame consists of a set of slots, & each slot is labeled for the kind of word that has to appear there (e.g. noun, verb, adjective etc.).
- word exchange errors also happen when more than one candidate is activated simultaneously, more than one candidate has the same tag and the production system assigns the wrong candidate to an open slot.

Now according to the frame and slot models, you know these models would say that you create frames and then you kind of put in fill in stuff here, according to the frame and slot models, Garrett 90-95 make a speech, involves a degree of advanced planning. So, you do plan, a couple of sentences at least in advance, rather than planning a word at a time. And so, when you plan in advance, what you do is you lay out a frame, for an entire clause or an entire sentence, as we're looking for particular, set of words and the precise moment that you need to produce. So, you kind of you had this message, you had sentence you've kind of created a frame and activated it. Alright? So, this frame would consist for off a set of slots and each slot, will be leave it for the kind of word that appear. So, you have say for example you remember subject, object, verb, kind of thing. So, determiner, noun, verb, determiner, noun, something like that. You have this. First slot (**Hindi (26:09)**). So, you kind of create this into a slot and you've labeled each of these slots as to what kind of word is going to come here. Now word exchange errors, also happen when more than one candidate is activated simultaneously, more than one can it has the same tag. So, obviously if you haven't activated the entire sentence and the entire sentence, can have an you know a couple of nouns, three for nouns and you know the tag is also matching so, noun tag noun tag is a chance of a replacement happening. Okay? This is typically how they explain their word exchanges errors so, what exchange the errors might happen when more than one candidate is activated simultaneously also, when more than one candidate has the same tag and the production system by mistake, assigns the wrong candidate to an open slot or to a wrong position something like that Alright? So, this is about speech errors, we've talked about three kinds of errors, we've talked about sound exchanges semantic substitutions and lastly word exchange errors, let us move to the other body of evidence, the tip of the tongue, the tip of the tongue phenomena.

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- TOT experiences are taken as evidence for the distinction between semantic activation & phonological activation, that plays a role in all current accounts of speech production.
- But why view TOT experiences as evidence for the temporary failure of the phonological experiences?

A tip of the tongue is basically, as I was saying as I was telling, you earlier basically happens when you are trying to retrieve a word and you have a strong subjective impression of the word, that you know the word and you kind of can tell details about you are temporarily unable to consciously recall in pronounce the words. So, that's where ever you know a tip of the tongue phenomena will come in, according to contemporary production theories Dell or Levelt to states occur, when you have accessed the correct lemma, but you are unable to fully activate the phonological part. So, you know the lemma you know so, as I was saying you can tell us a number of details about that concept but probably not you know be able to generate the sound codes for that particular concept you know, I did that movie I wanted to see this actor, was there he is acted, in these this, this movies he his hair is like this his height is like this, he looks like this he talks like this but I don't remember the name of the actor, that is where the tip of the foreign tongue is happening you have the entire conceptual knowledge there, but you what you don't have is the phonological form, basically, to back this knowledge. Now tip of the techniques experience, taken as evidence for the distinction, between semantic activation and phonological activity, that's a very interesting point to be noted here, this kind of error tells us that semantic activation, the point in lemma selection and after words are probably two different parts altogether. So, all of this is one all of this is another. Okay? But invite TOT experiences, you know why should we view TOT experiences as evidence, for the temporary failure of phonological experiences, let us see why should we take duty as an evidence for the failure of phonological activation, let us look into more detail.

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- a more basic point to understand however, is that how scientists study TOT?
- sometimes researchers ask people to carry around a diary & record all of their TOT experiences in a given period of time. these kinds of studies indicate that people experience TOTs about once twice a week, with the frequency of TOT experiences increasing as people get older.
- another way to induce TOT experiences is to provide people with the definitions of rare, but familiar words.

Now a more basic more basic round if you look a bit more deeply to the TOT phenomena is basically you first need to understand how TOT is studied. So, sometimes what happens is researchers will ask people to carry around a diary and record all kinds of TOT's that happen with them, this was what I was planning to recall this is how you know the question came this is how I could not do it and I took so, much time in coming back with this word something like that. Okay? So, these kind of studies basically will indicate that people experience, your TOT is about once twice a week with the frequency of the TOT experiences increasing as people get older, as your memory starts failing you, you probably have more TOT experiences as compared to when you are much younger. Okay? Another way to induce experiences is to provide people with definitions of rare but familiar words. Okay? So, you can kind of elicit something like that. So, you know the device that is used to take a picture, of you know of a very small organism, so, I'm talking about a microscope or something. So, but again the frequency of micro scope is, is much lower. So, you will take some time to activate that you know so I again kind, of try and elicit the to phenomena this way.

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- this method of measuring TOT experiences is called *prospecting*. by asking about detailed aspects of the experience, researchers can figure out how much information people have about the target word. for e.g. can they think of any sounds of the word? how many syllables? etc.

Now this method the method they are saying you define these experiencing elicits sort of a TOT in people, now this method of measuring TOT experiences is called, 'Prospecting'. So, by asking about detailed aspects of the experience, researchers can figure out how much information do you really know about the target word. Okay? For example can they think of any sounds, that makeup the word how many syllables what other information about that particular concept is available to you.

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Now if you look at that, TOT experiences do not really reflect failures of semantic activation so, people will usually be able to tell you if you ask semantic questions about the concept. Okay? So, mostly people are who are experiencing TOT are able to predict accurately, how likely is it that they will be able to name the word in some time. So, they know they are reasonably sure that I know this word it's just not coming to me right away let us finish our coffee and while we are walking back I will tell you about it and in the in the back of their head they're kind of you know working very hard to remember that.

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- TOT experiences do not reflect failures of semantic activation or lemma retrieval because people who are experiencing a TOT are able to predict accurately how likely is that they will be able to come up with the correct word in the near future (Nelson, 1984).
- If the correct meaning were not activated much of the time during the TOT experience, then people would not be able to predict their own successful retrieval of the target word.

If the correct meaning, were not activated much of the time during the TOT experience, you know how would people be able to be predict that they will be able to tell, us the meaning in that little time. So, that aspect is there further can people activate any phonological information,

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- further, can people activate any phonological information at all during a TOT episode?
  - evidence suggests that they do. people who are experiencing a TOT state are likely to report the correct number of syllables in the (temporarily inaccessible) word; they are also likely to correctly report the first phoneme in the word & when asked to produce similar words to the target, they mostly come up with words that sound like the target word (Lovelace, 1987).

At all during a TOT episode, let us check do we do they activate any phonological information, at all or nothing, let's see evidence it is that they do people who are experiencing a TOT aced state are likely to report at least the correct number of syllables, in that temporarily inactivated word, they are also likely to report the first phoneme in the word, if you really probe them you know per se start of the item you know I remember completely, it has two words it has these many syllables, I remember the, the name starts with pure with P or ba, I don't remember it. So, people have that kind of information available as well. Okay?

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- people experiencing TOT are more likely to accurately report the first & the last letters in the target word & less likely to accurately report letters from the middle, suggesting that substantial information about the overall word form as well as its component sounds are activated during the TOT experience.
- the likelihood of a TOT experience may reflect the strength of the relationship between the conceptual, lemma & phonological levels of representation.
- words that we encounter infrequently are more likely to produce TOT experiences than words that we encounter more frequently.

Again sometimes come up with similar words bad, bad had something but exactly I don't really remember. Now moving further people experiencing, tip of the tongue are more likely to accurately report the first and the last letters as well so, not only the first one e the spelling is also will be the likelihood of the so, suggesting that substantial information about the overall word form, as well as its component sounds are activated during the TOT experience. So, it kind of says that not only semantic but a lot of phonological information is available as well, to the person who is experiencing the TOT State. Okay? So, the likelihood of a TOT experience may then reflect the strength of the relationship between the conceptual, the lemma and the phonological levels of representation. Okay? There is it that this thing is broken. Okay? Words that we encounter infrequently are more likely to produce TOT's experiences than words that we are counting frequently. So, if this link, between these three concepts are very strong and very much then you have been saying this again and again practicing this by talking about the concept in different conversations, then it is less likely that you will experience a TOT strain, but say for example conceptually you know that but you've not said that word or talked about that topic to somebody you know suppose, say for example you're a big fan of say, Harry Potter movies and there there's not really a Harry Potter movie that has come out, recently and people probably I would have seen that sometime back, but suppose the conversation kind of goes towards their side, you know it conceptually but the link between the conceptual and the lemma or the conceptual in the for a logical part it's kind of slightly weak. So, you take a little bit of a time in coming back with that word that is probably, what the TOT experience you know denotes for us. so, that was that we talked about speech errors we talked a little bit about the TOT phenomena, let us move to this other class of evidences that, we were talking about the picture naming tasks and the picture of word interference tasks, let us look that look at that a little bit more.

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### **Picture – naming and picture – word interference studies**

- picture naming studies provide evidence about speech production because they offer a window into a very basic aspect of speech: i.e.
  - How does one find the word needed to express a concept? &
  - How does one activate the sounds that make up the word?

Now the picture naming studies as I have been saying they provide evidence about speech production because, they offer a window into a very basic concept of speech, what is this very basic to speech? How do we find the words need to express a concept, when you are showing me a picture of a banana and apple or an orange how do I from this picture move to the sound for orange or how do I from this picture move to the sound of the banana how am I making this link possible. Okay? And how do I once I have access that sound how do I activate the sound that makes up that or something like that. Okay? So, these are all the questions,

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- Early studies in picture recognition & picture naming showed that people activate different concepts at about the same speed, but concepts that were used less frequently in speech or writing, took longer response times (Oldfield & Wingfield, 1965).
- In these experiments, participants looked at the picture and performed one of two tasks:
  - in one task they simply stated whether they had seen the object before (recognition test)
  - in another task, they named the object in the picture.

That you know we will talk about in this section. So, early studies in picture recognition and picture naming have shown that people activate different concepts, about at about the same speed but concepts that were used less frequently, in speech or in writing, took longer response times obviously things that have you have been coming across, in your daily life frequently will be easier to activate as compared to things that you've kind of rarely come across. Okay? That's that's intuitively understood, now in these experiments the picture experiment that is participles look at pictures and the found one of the two tasks, inventors they simply stated whether they had seen the objects before. So, tell me whether you've seen this picture earlier or not just a sort of a you know familiarity check recognition check in another task they have to name the picture. So, not only tell me this or now you just name it as well, now they found very small differences in the amount of time it took people to recognize less familiar versus more familiar objects, but they found larger differences when they were asked to nameless familiar as compared to more familiar objects. So, they found that they were big naming you know big, naming time differences when you are asking to compare these two things. Okay? Less familiar versus more familiar, objects because you don't have so, much practice with creating the sound so, you remember I'm talking about the phone and the frequency inheritance effect you know the but example. So, because you need to have that practice with creating those songs again and again as well no because, of the amount of time it

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- there were very small differences in the amount of time it took people to recognise less familiar versus more familiar objects.
- there were much larger differences in the time it took people to name less familiar versus more familiar objects.
- Thus, the amount of time it takes people to plan a spoken response appears to be affected more by how often they produce the collection of sounds that labels a concept, and less by how often they think about a specific concept.

Takes for people to plan, spoken response it appears to be affected somehow by how, often they produce the collection of sounds that labels a concept, less often by how they think about this you might know about particular things, but you don't you lost practice in speaking that out so, that is kind of where this time is coming up. Okay?

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- Additional research addresses how concepts are organised and how they are related to one another in long term memory.
- the way concepts are organised can affect how easy or difficult it is to retrieve the specific concept needed in a particular situation.
  - Do you activate just the concept you need, right when you need it? or
  - Do you need to sift through a set of activated concepts before you select the one you need?

Moving to another research, additional research basically, additional research addresses how concepts are organized and how they are related to one another in long term memory, the way concepts are organized can affect, how easy or difficult it is to retrieve those specific concepts that are needed in a particular situation. So, what do you do so, there are two questions do you activate just the concept you need or you also activate the related concepts, do you need to sift through a set of related concepts before you select the ones you need. So, both of the questions can be asked.

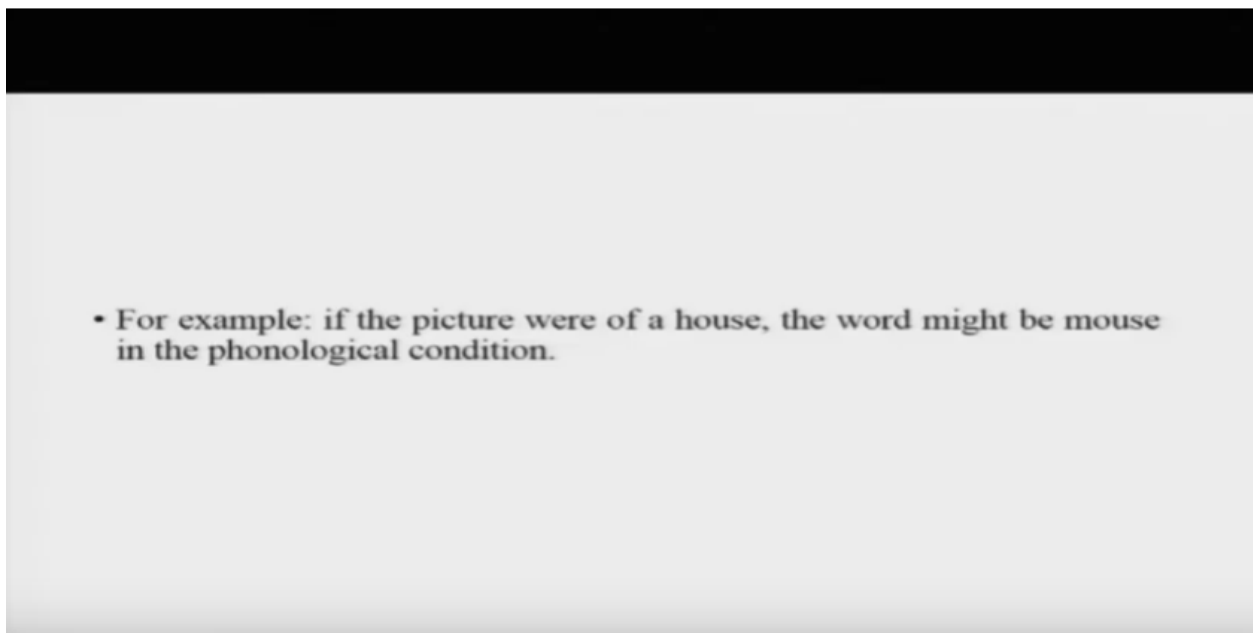
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- Picture - naming research suggests that concepts do compete with each other for selection during the process of speech production (Dell et al., 1997; Griffin & Ferreira, 2006).
- In experiments, that used the *picture - word interference task*, participants look at the pictures that have words printed on top of them.
- Experimenters can manipulate the relationship between the picture & the word:
  - identity condition, semantic condition & the phonological condition.



Now picture naming research suggests that concepts do compete with each other, for selection during the process of speech production. So, when you are kind of going to name the picture of a cat you might also be competing with the names of the rat and the dog in the tiger and the leopard and so on. Okay? In experiments that use the picture of word interference task this is what is kind of tapped. Okay? So, what happens is part let's look at the pictures and pictures have these words, printed on top of them and they have to name the picture aloud Alright? But experimenters, can very cleverly manipulate the relationship between the picture and the word on top of it and on the basis of this relationship manipulation, they can kind of see some of the interesting effects that kind of come up in naming you know there can be a few conditions, say for example picture of a cat with a word cat original on it. So, this is identity condition very fast not a problem, semantically related condition, picture of a cat and rat picture of a cat and lion semantically if semantically matching is there or semantically no matching is there you will see difference in naming times, phonological condition picture of a cat and phonologically similar words, say for example hat or something like that, you know which is phonologically similar maybe semantically not really very similar you see you see a different effect happening here.

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So, again as I was saying if the picture of another example, is the picture of a house were there word might be mouse in the phonological condition, the word might be home in the same and delineate condition, what mode can be possible.

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- The question that these kinds of studies attempt to answer is:
  - How will presentation of a potentially competing stimulus affect access to & production of the picture name?
- In general, the *semantic condition* produces interference effects: i.e. people are slower to name pictures when the overlapping word has a meaning similar to the object in picture (Cutting & Ferreira, 1999).
- However, when the overlapping word has a similar sounding name to the picture, people name the object in the picture faster.

Now the question these kind of studies have attempted to answer is that how is the presentation of a potentially competing stimulus, going to affect the you know access to and production of the picture name, how does this word, interfere or facilitate naming of the picture that's basically the question. Now as I said in the semantic condition, you could see in differences what is the semantic condition, it has been found, that people are slower to name pictures when the overlapping word has a semantically you know is semantically associated or has a meaning similar to that of the objects in the picture. So, if it's semantically similar, you get slowed down because you're kind of the competition is too much from the conceptualize if you face both words probably are a receiving adequate input and the combination is rather high to handle, however when the overlapping word has a similar sounding in the people similar sounding, name to the picture people have been found to name the picture faster. So, there could be facilitation, the sound so, there is no combination on the semantic level but while they were kind of coming up with the phonological word, both of them kind of coincide and you know you sort of double the double the amount of activation needed for their sounds and then you kind of do it a little bit faster. So, semantic condition a little bit of interference phonological condition a little bit of facilitation SC.

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• So,

- because the semantic relationship between the word & the picture produces one pattern, while the phonological relationship between the word & the picture produces another pattern, picture - word interference studies reinforce the distinction between conceptual/semantic activation processes and phonological encoding processes in speech production.
- in that, these two processes seem to be controlled by semi - independent processors.

Finally because the semantic relationship, between the word and the picture produces one kind of pattern, while the phonological relationship between the word and the picture produces another kind of pattern, it can be observed that picture were in the finished it can be observed that there is a distinction between the conceptual and semantic activation processes, was the phonological activation processes in picture naming or speech production. So, to speak remember we kind of saw this that this was happening in the semantic substitution errors, also so you see at least from two places you're coming up with evidences that say that semantic part of picture naming, versus phonological part of picture naming or speech production more generally are kind of happening at different places are kind of sort of different sets of processes together. So, in that these two processes seem to be controlled as the conclusion seemed to be controlled by semi independent processors. Okay?

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## References

- Traxler, M.J. (2011). *Introduction to Psycholinguistics: Understanding Language Science*. Wiley – Blackwell.

I think that should be it for today's lecture. We have talked about the three kinds of evidences and we have talked a little bit about, how these evidences, can tell us about, how the speech production process is really planning out. Thank you so much.