Memory

Prof. Manish Kumar Asthana
Department of Psychology
Indian Institute of Technology Roorkee

Lecture - 24
Semantic and Lexical Memory- II

Hello, I welcome you all to the lecture series on memory. Today, we will extend our lecture on semantic and lexical memory. In the previous lecture, we discussed the hierarchical network model, the association network activation, and semantic priming. In this lecture, we are going to understand the nature of priming and how the information and following the lexical processes may sometimes be tricky and confusing and might result in a different outcome. In this experiment, Bartlett in 1932 did a very simple study which was conducted via a telephone game.

In a telephone game, a few individuals sit in a circle and then they pass one piece of information to the other. So this is a group of friends who are sitting here together and then they just pass a piece of information to the other. So Bartlett did a very simple study. He just asked one student to play music and to another student, he said to read a Native American folklore story that was given to this student. After the story was given to this student, he was asked to transfer or share this story with another kid.

The other student was then instructed to share it with another student. Then the other student, and this process continued on and on until the final student. The final student was then asked to recall the story. So one student read the story derived from the Native American folklore and moved further down the line.

Sometimes, after hearing the story, a student was asked to tell another student the story, who then had to tell the story to another person. So it moved on and on and on. After several such retellings, the final student had to write down, not only the recalling of the story, but this recalling of the story, he had to write down on the sheet of paper. What he found was that there were certain changes which participants made in the original story.

So the original Native American folklore was being changed into some other form. And this change in the form of the story from the original was more consistent with the schema for the British culture. So this reflected, Bartlett understood that the change in the story, the transformation in the story which had happened in the Native American story, was because of the schema of these British college students. These British college

students had certain notions, had certain understandings about the world in their context. As a result, they started to

replace the items, replace the attributes of the story with the British culture schema. And such transition, such transformation can be expected, and that is why Bartlett suggested that this reconstruction of the event is happening because of their schema. The same experiment, the telephone game, can be done in our culture as well. In our society as well, and we may expect similar changes. In the Native American story, we may find our Rajputs and our great warriors being placed in.

So such integration is happening because of the schema. Such change It was being addressed in several forms, and Bartlett's findings laid the foundation to understand how these mental lexicons play a role in our understanding. So the question arises: this mental dictionary, which we discussed earlier, the mental repository that we have, how large could it be? And as I said earlier, from context to context, from individual to individual, this mental dictionary may vary.

So we usually produce three to four words per second. And in order to speak, we must be able to do the following tasks. We have to rapidly access our lexical memory. And this lexical memory should be readily available to us, and how this lexical memory will be readily available to us is when the working memory is connected to the long-term memory so that the information stored here can be directly passed into the working memory.

And when the lexical memory retrieves or requires information, when we need a word, the larger the working memory is, the larger the capacity of the lexical memory will be. And the larger the working memory capacity is, the more rapidly access to lexical work, changing, transformation, and exchange can happen. We can rapidly choose the right and correct word. The approximate right selection of the right word is one lakh. One lakh, approximately one lakh words are there in our mental dictionary.

Here, in our long-term memory, approximately one lakh words are stored. How are these one lakh words residing in our mental lexicon? Through association, through the hierarchical network model, which we discussed earlier in detail. So, when we are storing information, we are storing it in association. And that is why, previously, we also discussed that the pharmacological method or high-intensity ECT method results in amnesia because they are firing these networks.

They are inhibiting these networks. And if any one node is affected, then the network or the nodes associated with this particular node will also be gone. So, this access to one lakh words depends on rehearsal, retrieval, encoding, storage, and association. Now, representation is a space that stores our basic knowledge of the grammar rules of our language, syntax rules.

In this representation of space, if the grammar rules are being followed, people have basic knowledge. But if the non-grammar rules are there, then this representation of space may not register information. So, when we are talking about information storage related to grammar rules, this representation of space gives us insight. Now, let us talk about Some more ideas.

Now, when we talk about language entities, when we talk about language entities, then both lexical and non-lexical come. And when we are talking about lexical and non-lexical, then we have to understand that the smallest meaningful sound is a phoneme. The smallest meaningful word is a morpheme. The smallest meaningful graphical representation is a grapheme. And this grapheme also indicates and gives us a lot of insight.

The moment I draw this graphical representation or the moment I draw a graphical representation like this. So, this does not require a lexical root. This doesn't require a grammar rule. Without grammar, you can't do it, and that is why I recommend you to also see the dual root cascade model. The dual root cascade model teaches us about the lexical pathway and the non-lexical pathway.

This understanding of lexical and non-lexical pathways is that in certain instances, we need the grammar rule to understand the information, but in many cases, we don't need the grammar rule to understand the scenario. It could be quick, it could be rapid, it could be simple. When you see a snake, we understand its threat, and we run. We don't stand and discuss the grammar rule and principle. That is a representation.

We have learned. So, most models of lexical memory focus on three levels of representation. As we have been talking about the representational space, this representational space is giving aid and considering the grammar principle or grammar rule. Here are the three representations. Meaning.

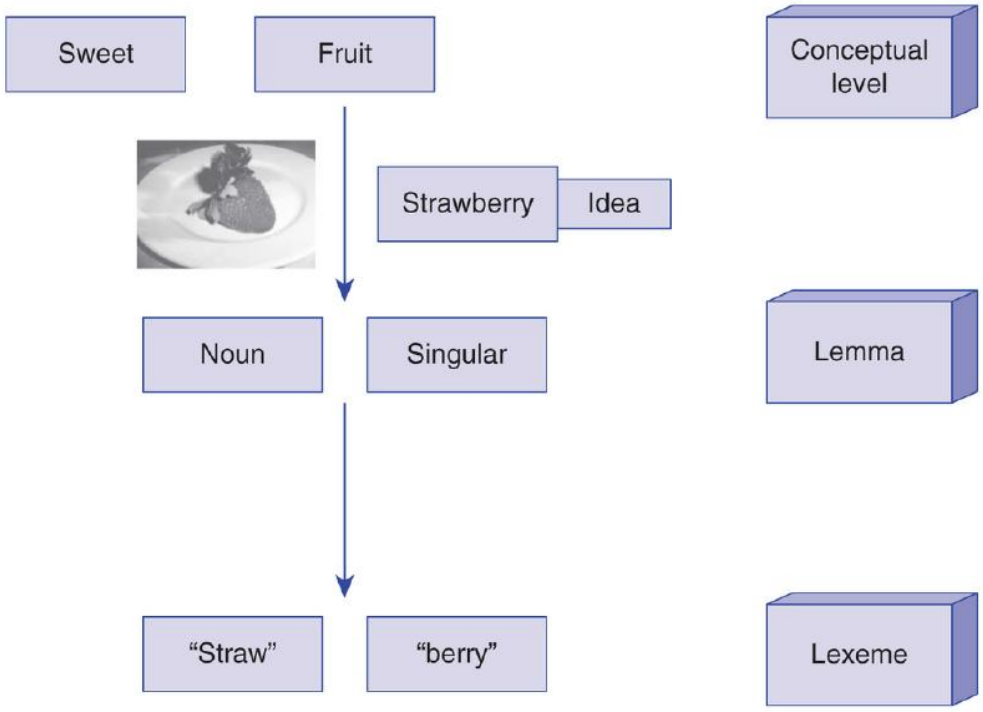
Muffin. What is the meaning of it? Syntax. Grammar rule. Lexical root.

Lexical processes. Phonological. Phoneme. But phoneme also, meaningful sound. Ma.

Ka. Ba. Tha. Ta. Ta.

And then, when we talk about such things, we say that our semantic memory system is having meaningful information which carries and relates concepts and ideas from one association to another. So if you see here, we have a strawberry on a plate. This strawberry on a plate is sweet, and it's a fruit. This is the association.

This fruit, what is this fruit? This fruit is a strawberry. And then, if you split the sound of this strawberry into two different words, both are nouns, and both are singular. It could be straws or it could be berries. Then it would be plural.



Source: Schwartz (2018)

And it could have been strawberries, just like a strawberry, in its singular form. So, what is happening here? We are having an association. This is the conceptual level, the concept we are having about a fruit. And then we are trying to look at the lexical root, the grammar rule, the grammar principle, lima.

Which is saying a hypothetical entity containing only semantic and syntactical information, meaningful information, what is this object, and the grammar rule. Then lexeme, the knowledge or the representation about the word itself, the sound, straw,

berry. So, this is how the language is trying to assist the lexical memory, and this lexical memory is actually a form of semantic memory. So, a semantic memory where we are talking about the meaningful information is there. Knowledge of the word is there.

This lexical memory is talking about the grammar rule, grammar principle, grammar entities playing a role in the formation of the memory. Let us discuss the lexical retrieval process. The lexical retrieval process talks about the syntactical rule, grammatical rule where the language is playing a role in assessing the memory to retrieve the information. So, if we are taking an example of what is the word that means the second-to-last item on any list. This sentence itself is providing us a cue and information about what that word could be.

So, if we have to identify a word just by reading this sentence, then we have to first parse the sentence into two halves. The first part should be the second-to-last item. The second-to-last item on what? On any list. So, this is a very generic term which means a generic word.

It would be there. So first, we come to the semantic level, such as towards the end part, towards the end of what part of the list. So, providing meaning to this information gives us an insight into what that word or what that context could be, and as a result, the retrieval process gets aided with the help of the semantic information. Now, the retrieval of the lemma, which is the entity of semantic and syntactical information, is suggesting that grammatically which word is going to fit here, and meaningfully which word is going to fit here. Syntax is the rules of grammar.

The word can be a noun, pronoun, adjective, adverb, and etc. So, moving from lemma, we move to lexeme, the sound, the sound of the word, and the sound of the word has what is the nature of the sound, what is the meaningful sound in that particular word. So, when we are looking for a word which is talking about towards the end and part of the The word that comes to our mind is penultimate.

The same lexical retrieval can also be referred to or considered and can be understood with an example such as a black-striped animal. A black-striped animal which is a carnivore. So then we have to look into the animals that have black stripes. Now we have a zebra which has black stripes. We have a tiger which has black stripes.

But we know that between the two, one is a herbivore and the other is a carnivore. So when we are talking about semantics, syntax, retrieval of lexemes, then an effort is

required to pronounce a sound also, like penultimate, tiger. So this brings us to the phonological entry where the phonological entry is sent to the motor system so that the answer can be articulated. Production of speech, production of words can occur.

So this lexical retrieval process should be helpful with memory, in the memory process. Now, we have seen that frequency, familiarity, and dominance may be helpful in such scenarios. Moving from the lexical retrieval process, while retrieving the information, an error also occurs. The error occurs because of word exchange or sound substitution.

So, how the word is exchanged, which is resulting in an error. So, when we talk about the sandal, sandals, instead of saying sandals, we say heels. Where are your heels? Now, this word exchange error, what happened is that we have exchanged the word. Instead of using sandal, we are using the word heels.

Similar meaning for another word. Another aspect, another example is, could be like water, pani, agua, Wasar. All are different words in different languages. So while producing, while making a speech, an individual can make such an error.

Regardless of how the word is sounding. Because here we are talking about the meaning. So sandal is being replaced with heel. Another such word exchange error can be seen in multilinguals quite often because they have more, their mental dictionary, their repository is bigger than the normal individuals.

Another is sound substitution. Sound substitution occurs when a similar but incorrect phonological structure is retrieved. So the word that is retrieved has no connection to the desired word. So we see the tiger and we have to produce 'tiger.' The target is 'tiger.'

But what do we do? We produce 'tirade.' The same sound substitution can be seen in 'hit' and 'hot.' The sound substitution is happening. So, speech errors can happen because of these two reasons.

Let me summarize what we have studied. Reconstruction of events. Reconstruction of events: Bartlett's 1932 simple experiment gave us insight that the schema from the cultural aspect, the schema from the cultural context, plays a major role. The storytelling task from one person to another changes over the course of time. The reconstruction of the event seems to be manipulated, seems to be changed, transformed because of the schema from a different culture.

Another thing that we have learned in this lecture is access to the lexical memory. How can we access the lexical memory? With ease and with difficulty. We have understood that the lexical memory requires support from semantic memory. One more thing we have to understand is that semantic memory is the knowledge of words.

So it is a big repository. However, lexical memory follows a lexical route, lexical access, and lexical processes. So the consolidation of information or experience related to lexical information will be limited. And this lexical memory could be a subset of semantic memory. We even tried to understand the role of language and lexical memory.

They are interlinked. The rules that are applied in language, such as grammar rules, are helpful in lexical memory. And that is why when researchers are working in the lexical memory area, they have to ensure several aspects. The novelty of the word, familiarity, frequency, dominance, emotional words, negative words, positive words. We know that in some contexts, negative words have better retrieval than positive words.

In another context, positive words seem to have better retrieval than negative words. The lexical retrieval process suggests to us the role of Lexi, the role of Lemma, and how they assist an individual in the retrieval process. When we are trying to retrieve a word, when the task and the goal is to retrieve a word, a tiger, a penultimate, then how the lexical root, the lexical axis, is trying to aid in such retrieval. That is what we studied.

And in the end, we studied speech errors. The errors which are happening due to speech processes. First thing, word exchange error. Where the words are being exchanged; instead of sandals, I said heel. And a similar example is that in a house, when while calling our, if you have an elder sister and a younger sister, while calling your elder sister, you make a word exchange error and you call your younger sister.

And in another aspect is the sound substitution, where we were talking about the tiger and But the production is Tirade. Let us end this section here. And in the next section, we are going to start with forgetting. Thank you.