Memory

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Lecture - 36
Metamemory

Hello, I welcome you all to the lecture series of Memory. As we discussed in the previous lecture about eyewitness testimony in detail, today we are going to discuss metamemory in that context. Metamemory refers to the judgments made about a memory. It's a memory of memory. In previous lectures, we have addressed some of these aspects and topics.

So this will be revisiting the metamemory concepts and ideas. When we talk about metamemory, we are talking about the monitoring of memory's own content. How aware are we of our own information? How much do we remember? How much do we recall?

Or can we recall? So the feeling of knowing judgments, the tip-of-the-tongue phenomenon, where we know the information and it is there on the tip, which requires extra effort, which requires further effort to retrieve it. The third aspect of metamemory is about the confidence judgment. How confidently we answer, how confidently we provide information, depends on our metamemory. Metamemory is a whole part where memory is a subset of it.

Metamemory ensures or provides constant support to the memory system. Metamemory collects information from long-term memory and provides information to the memory. So, if you draw the working memory and LTM, metamemory ensures how much transfer can happen with ease from long-term memory to working memory. In this aspect of metamemory, source judgment and remembering the judgment are important aspects. What is the source of information?

Where is it coming from? How accurate is it? How reliable is it? The source of information could be. So, as we talk about metamemory monitoring the memory system—where the information is, where it resides, how much we have acquired, how much has been stored, and how much retrieval one can make.

Retrieval depends on acquisition and retention. If acquisition and retention have not occurred, retrieval will not happen. Please note that acquisition and coding can be used interchangeably in this entire lecture series on memory, and retention and storage have

also been used interchangeably. But these are the three levels of memory processes. So, monitoring occurs whenever we take measures of our mental state.

Whenever we try to capture or evaluate, how much do we know? Even in the case of problem-solving, monitoring is an important aspect. Progress monitoring: how much progress one has made? This constant monitoring provides feedback for the next action. How much action, how many sub-goals one has achieved to reach the goal.

So when one is certain that one cannot recall the name of the president of Kazakhstan, this is monitoring. One is very certain. What is the capital of Uttar Pradesh? Such information, such monitoring, an individual does from time to time. In the case of problem-solving, if it is progress monitoring, if it is a healthy learning method, if it is mean analysis, the person is doing nothing.

He is trying to solve the problem. Now the question arises: How accurate is this monitoring? If it is accurate, then the chances of error will be less. If it is very accurate, metamemory has been a great aid to the memory system.

So when we think we know something and we do not do it, we do not know it. When we think we know something, we do know it. And when we think we do not know something, we indeed do not know it. This is the monitoring accuracy.

Do we know the color of an apple? Do we know the color of a buffalo? Do we know how many fingers a human being has? This is monitoring accuracy. What is perception?

What is sensation? We know something, and we do not know something. The important aspect here is how a person, an individual, can regulate this memory system. The aspect of metamemory, the aspect of monitoring, The aspect of self-regulation are all emerging novel topics.

Researchers have been doing it for the last several decades, but now modern technology and modern tools have provided an aid to relook, to revisit these aspects, these ideas, these concepts with a whole new set of parameters. So when we talk about self-regulation in memory, the ability to control one's behavior—not only the behavior but also the emotions one is feeling or going through and the thoughts and the pursuit of long-term goals. It is an important aspect of human behavior. We have seen that a person who can self-regulate his or her behavior, emotions, or thoughts can cope with negative scenarios, negative situations, and unpleasant moments easily.

And these individuals seem to be more controlled and more relaxed under stressful situations and conditions. These individuals know how to balance personal and professional life. So the self-regulation method has provided individuals with the ability to control, modulate, and regulate their behavior, emotions, thoughts, etc. This self-regulation method directed at memory is called metacognitive control. We are controlling our cognitive system.

So cognition of cognition—metacognition. Just like the memory system. And here, self-regulation is ensuring how metacognitive control can be achieved. The process uses the output of monitoring to inform the decisions made about learning and remembering. How much a person has learned and how much a person remembers?

This is providing an insight of metacognitive control. If the information learned is equal to information remembered, then the metacognitive control is good, strong, robust. But if the amount of information learned is way more than the amount is remembered, then the better cognitive control is weak, poor. For instance, a person is experiencing tip of the tongue may decide to spend more time trying to answer without looking it up. He is ensuring that he knows the answer.

So he is not looking at the answer. He is putting an effort more and more that it is there in my tongue. I know the information. So I don't need an assistance or aid. This control, this metacognitive control involves the behavior where one is engaging

into the ensured learning. Where one is learning and ensuring that the learning is in a sequential task. That is why earlier we have discussed also that memory prefers a sequential task. Human memory, why does it prefer sequential task? Because it is less effortive, less cognitive load is there, less mental load is there.

So think of cooking a special dinner, and you are confident that you have a recipe memorized. You are doing constant memorization. You are monitoring it. Do I have all the necessary ingredients for the recipe? Am I missing any ingredients for the recipe?

And you constantly do the monitoring. Again and again. And suddenly you monitor that, oh, you do not have an onion. So you go to the market and buy an onion. When you reach home, you realize, oh, the oil is also missing.

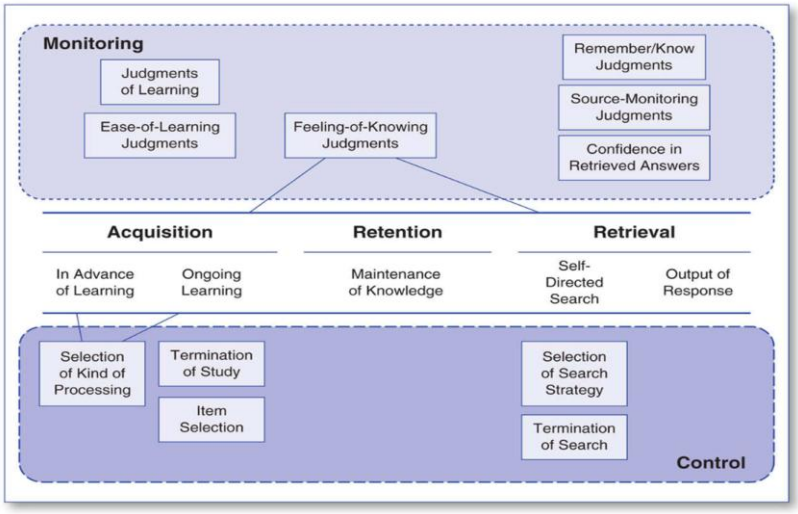
But what type of oil? Refined oil? Mustard oil? Or butter? Then you do the monitoring again.

After doing the monitoring, you ensure that this is what is required. I will go and buy the mustard oil because the cooking has to be done in mustard oil rather than peanut oil, coconut oil, butter, etc. So once such monitoring is done and the ingredient has been collected, this is the control behavior. This is the monitoring. So once an individual is doing the monitoring, he or she is essentially performing the control behavior.

If we are uncertain about remembering the recipe, we will look into the cookbook on the bookshelf. So, the monitoring is there, and monitoring ensures that you will remember the recipe. If there is no remembrance, in that case, you will refer to the book. If remembering is there, then you do the rehearsal. Again and again, am I correct?

You recall. So, metamemory at various stages of memory processing. Memory processing, as we have discussed, involves acquisition, retention, and retrieval. One should not be confused that acquisition is the same as encoding, retention is the same as storage, and then retrieval. So, like the memory system, metamemory is also divided into acquisition, retention, and retrieval.

It is the same system. During encoding, two kinds of metamemory judgments are made. Metamemory is making a judgment. What judgment is it making? It is making the judgment of ease of learning.



Source: Adapted from Dunlosky, J., Serra, M., & Baker, J. M. C. (2007) Metameory applied. Handbook of Applied Cognition (2nd ed., pp. 137-159) New York: John Wiley & Sons.

Easy learning. If the information to be learned is ambiguous or complex in nature, the learning will be delayed. So, estimate in advance of learning and studying an item how likely it will be remembered and how difficult it will be to learn. So, metamemory is making a judgment about the ease of learning. The information that has to be learned and remembered should be easy.

Then, the judgment of learning during a study determines whether the item has been learned already or not. So, the judgment has to be made. Whatever the person or subject is trying to learn, has he or she learned it or not? So, if you see this, two processes—monitoring and control—both these systems, monitoring, which is doing constant monitoring, judgment of learning, ease of learning, and then feeling of knowing the judgment, what has to be decided. Then, remember source monitoring and confidence in the retrieved answer.

Whatever we have retrieved is correct and accurate. One can rely on it. So this type of monitoring process provides insight or helps in the acquisition process. When people are learning and coding the information, retention, maintenance of information or knowledge, storage, and then retrieval. The control system, on the other hand, is responsible for the selection of search strategy.

How does it have to be selected? Are you relying on your memory system or depending on an external system? While cooking or making a new recipe, do you need a cookbook? And then, if you know the recipe, you terminate the search. No, I don't need the book.

I can cook because I remember the recipe. The ingredients that I need—I know all those things by heart, and I can acquire all those ingredients. For that, I don't need any assistance. Termination of study, item selection—when the study has to be terminated and what items have to be selected at the time of encoding. When a person is going to cook, which items does the person have to collect?

The cooking items, the food items relevant to the particular recipe. Selection of the kind of processing. Both systems, if you see in the control system, limited functions are there, with less flexibility. Here, more functions are there, and more flexibility is present. As a result, their input to acquisition, retention, and retrieval in both relations is varying.

But both of these systems are providing information to the memory processes. So, memory processes at various stages of memory processing. How does memory work? So during retention, people can make a feeling of knowing the judgment on recalled items.

I know the information based on the unrecalled items, the items which they haven't recalled, but they say, 'I know, I know the information, but at the moment, I cannot recall those items.' Tip of the tongue state or tip of the tongue phenomenon. are feelings that an unrecalled item will be recalled soon. I just need more time for that retrieval. So this is during retention, maintenance of the learned information, maintenance of the learned knowledge.

What is happening at the retrieval stage? At the retrieval stage, after an item has been retrieved, The person can make a variety of metamemory judgments. What variety of metamemory judgments can they make? Including the retrospective confidence judgment.

Which are estimations that the retrieved answer is indeed correct. So, the judgment one is going to make is an accurate one. So, metamemory at various stages of memory processing. So the three stages, what is happening at the retention? How is memory working?

So when you are storing it, when you are the maintainer of knowledge, this maintainer of knowledge, people feel knowing the judgment on the unrecalled items. The items which they haven't recalled yet, but they have a feeling that it is going to be recalled. And it is there on the tip of the tongue. So if you can see in this cartoon, how much for just the tip of the tongue? What do I know the answer?

It's, oh, I almost had it. I'm so close. It's all there. Now this sarcasm, this sarcasm indicating that though you haven't required it, but it is there. It is there in your metamemory.

but from metamemory to memory it may take time and that is what we are discussing here what is happening at the retrieval after an item has been retrieved the person can make a variety of metamemory judgments including a retrospective confidence judgment that whatever the judgment of an individual is going to make or has received retrieved is indeed correct. What could be the theories underlying this metamemory concept and ideas? A direct theory, a direct access theory and then indirect or influential theory.

The word itself is indicating one is where you can directly access the information and then you can directly access the information, the strength of the stored memory. When you are retrieving it from the stored memory directly, The strength and accuracy will be

very very robust and strong. The judgments we make based on the process allows us to remember in the first place. This measures the strength of the strong memory.

In direct, the variety of cues, heuristics, sub goals to estimate the strength of an item. When you are initially straight to the goal state, you are making 20 sub-goals or you require more cues. Those things are becoming indirect in nature and that is indicating the strength of the item in the memory and that cannot be investigated directly. Because so many sub-goals are there, so one has to depend on these sub-goals. So we may use information about the general topic.

Queue familiarity. Are you familiar with the queue? Retrieval of related information. Now once somebody says that someone is there and ice cream I like most. What ice cream I like most?

I have to provide you some more queues. fruity taste, vegetable taste, flower taste, color, brown, purple, green, red, yellow. So that the retrieval becomes easier and the partial information about the target can be done easily. So partial information can be done easily. The information which has been provided partially related to the target, it helps and makes it easy to the individual to retrieve the target or to retrieve the information about the target.

So the two theories directly deal with metamemory. One is the direct access memory, and then the indirect access memory. Indirect access memory talks about the Q familiarity, the information related to the item or the retrieval. But in the direct access, we just talk about the strength of the stored memory.

So what have we learned in this session? We learned in this session about metamemory, the memory of a memory system, the crucial concepts and ideas related to monitoring, how monitoring ensures that the acquisition, retention, and retrieval will be good, and if the acquisition and retention are robust, then only the retrieval will happen effectively. We also studied the metacognitive control, the control system. The control system provides less flexibility and limited functions,

but the access to the retrieval or retrieved information is very accurate. Better than the monitoring system. We looked into the diagram, a cartoon. We will learn about the monitoring system and the control system. We learned that the monitoring system is highly flexible with more functions and more functionalities.

The control system is less flexible and has fewer functions. But when we talk about the retrieval of information in the control system, the retrieved information will indeed be more accurate and reliable than in the monitoring system. We even discussed metamemory in memory processing. The level of retention, the level of retrieval, And its role.

And finally, in this lecture, we also studied the theories related to metamemory. There are two theories. One is the direct theory. Another is the indirect or influential theory. The direct theory refers to direct access to information.

It ensures how strong the stored information is. If the stored information is very strong, robust, and direct, people will retrieve it more easily with high accuracy. However, the indirect access provides information. What is cue familiarity? The participant or individual subject is familiar with the cues.

If yes, the retrieval will be fast and accurate. If the individual is not familiar with the cue, then accuracy cannot be guaranteed. The chances of inaccuracy will increase. Human error may occur. Is the information related to the retrieved information, the information provided, relevant to the retrieved information?

If yes, then the retrieval will happen accurately. But if the provided information is unrelated to the retrieval, then inaccuracy may occur. With this, I conclude this lecture. In the next lecture, we will continue discussing the concepts of memory. Thank you.