

Introduction to Psychology
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Lecture - 22
Memory Forgetting

Now that we are on the last topic, today our focus would be not in terms of how much we succeed recollecting from our memory storage rather we would focus upon the failure in the attempt to retrieve information from the memory that is our focus would primarily be today on Forgetting. We will try to make out why people forget, how much they forget, and issues like this.

But before we come to what and why and how much, let us understand one thing and accept one thing that forgetting is one of the most useful attributes that you can visualize for human memory system. One way of looking at it could of course be that basically the message that has been transferred to the long term memory for certain reasons you have not been able to recollect it which results into forgetting.

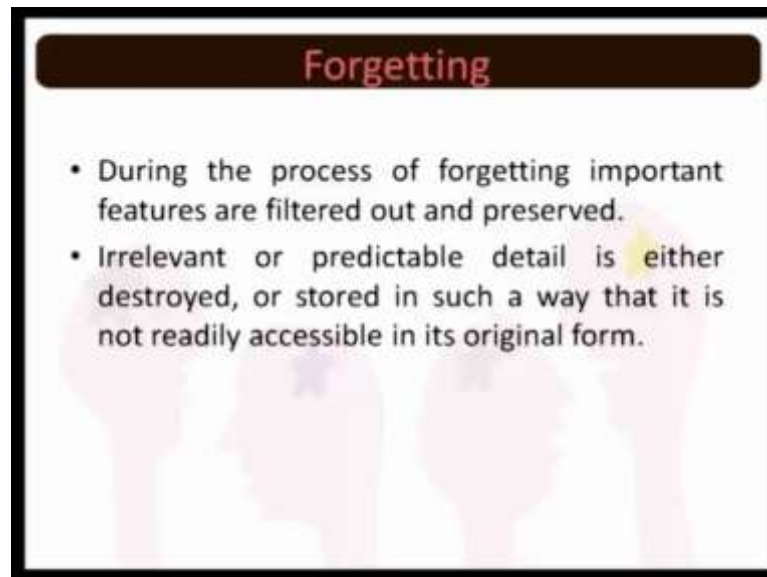
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But there are obvious benefits attached to it. The most important thing that the emotional pain and grief, they get softened after a passage of time. You must have heard the proverb time that time heals all wounds. So what time does to the wounds? It basically helps you forget what you call the emotional balancing, the magnitude of the grief

gradually gets softened enough. Also forgetting might also represent the distortion of recollection of the past. The truth was something else and you narrate something else, which is completely devoid of the reality. But accepting all these things we must understand the value of forgetting.

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Now, during the process of forgetting, important features are either filtered out or there could be a possibility that they are preserved. Right now we will also refer to one fact that many a times you forget involuntarily and many a times, you forget because you want to forget that thing. Now things which are irrelevant to us or details which are predictable they are either destroyed or they are stored in such a way that it is not readily accessible in its original form. And therefore, when we try to retrieve the information we commit certain error. And this is what people consider that this is forgetting, you have you not been successfully able to re-call what you are supposed to at this point in time. Therefore, it is called forgetting.

There are series of theories which explains why people forget. Let us talk about the dominant theory which tries to explain the process of forgetting. First and the most important theory is the Theory of Decay.

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Now, basically what theory of decay says is that you remember we talked about the fact that there are concepts which are remembered as nodes of information and then there are networks in these nodes. Now when similar type of events are repeated, similar information is given to you time and again, with repetition the memory traces they become very strong. Now think of a situation where you learnt something you memorized it, but then you did not get a chance to repeat it. So what would happen then, the associative bond that is formed that becomes weaker enough and the weaker the bond becomes higher are the chances that you will forget the information.

So, in all cases where associative bonds are weakened with the passage of time and because forgetting functions as a one of the functions of time therefore we will usually forget those information after lapse of certain period of time. This is what is called as Theory of Decay. Time has passed you did not get a chance to repeat the information and therefore the bond that was formed the memory trace that was formed that trace becomes weak enough to be recollected. This is Theory of Decay.

The other interesting theory which explains forgetting is the interference theory. Now interference you can very easily make out. Two things which interferes which overlaps. Now interference could be of two types. You remember when we were talking about transfer of learning at that time also we said that there is a possibility that things which are learnt previously might interfere with the learning of the new task. This was one

possibility. And the other possibilities were the newly learnt thing, it does not allow you to perform things appropriately.

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Similar type of situation comes up in case of interference theory also. There are two types of interferences; it could be retroactive or it could be proactive. Now proactive interference would be a situation, where newly learnt information it prevents retrieval of the previously stored information. So, I have learnt something in the past, I have learnt something very recently, and the newly learnt information does not allow me to recollect what I had already memorized in the past. So, earlier the stack that is with me in my long term storage that I am not able to extract out, because of the interference that is created by the newly learnt information. This is called Retroactive Interference.

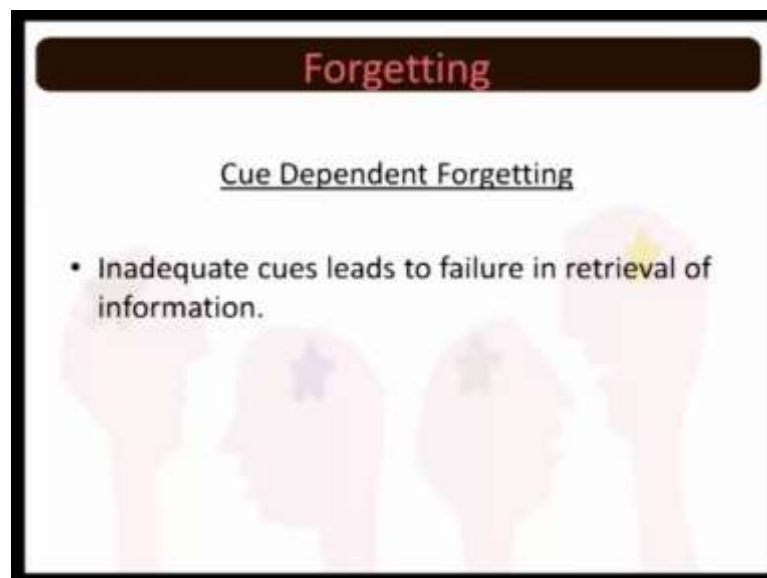
The reverse of it would be proactive interference. Proactive interference would mean that the previously learnt information that interferes with the newly learnt interference. I already have something in my stack; I have some already stored something in my long term memory, now I learn a new thing, I memorize it. When I try to recollect the newly learnt information I somehow extract the old information. So, what is happening actually, the previously memorized content that interferes with the process of recollection of the new information. This is called Proactive Interference.

Now interference theory says that either the interference is proactive or retroactive, but the fact remains whatever is that desired information that you want to extract out, that

information you are not able to because of this competition between the old and the new information. And therefore, you commit an error in terms of accuracy of recall of the content and therefore it is a kind of a sort of forgetting.

The third theory which also has to do with how we store information in long term, you remember we discussed that in long term one of the important strategies is to provide appropriate cue to the information, giving a good file name which will help you which will ease the process of search whenever you have to do so in the future. Now if there is a problem with giving appropriate cue and therefore, if because of the inadequate cue you are not able to retrieve the information then this is called Cue Dependent Forgetting.

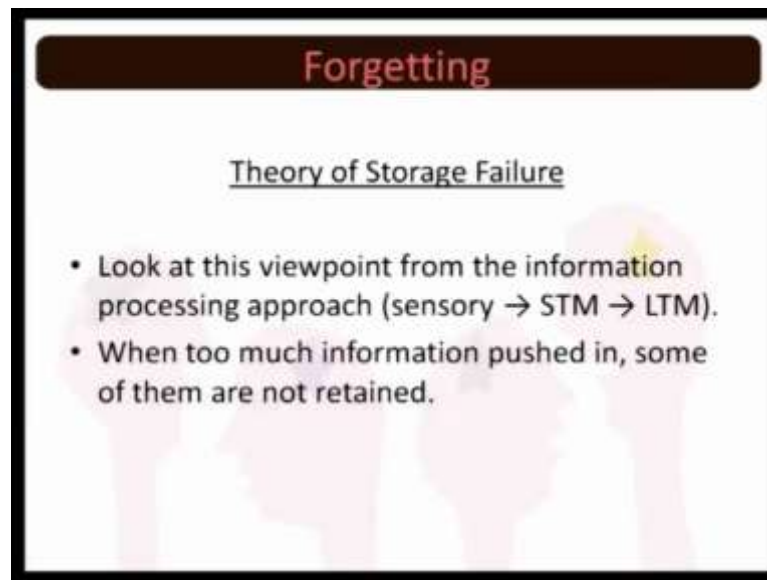
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You basically did not provide the sufficient cue the adequate cue and because of this inadequacy you are not able to recollect the information. This is cue dependent forgetting. So, this is the third theory which tries to explain why we forget.

And fourth theory is basically talking about the overall failure of the storage system. Now this theory basically looks at the information processing approach.

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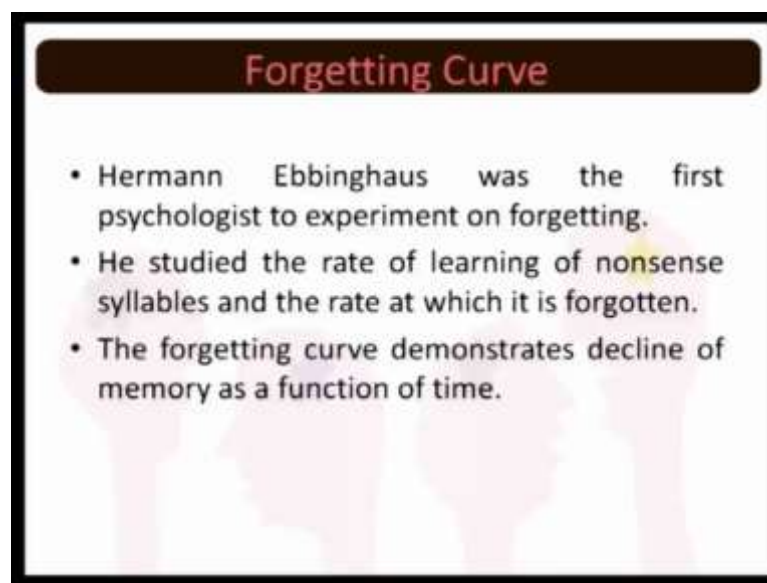
This is the view point, it says that from sensory to short term to long term this is how the memory moves. And it is long term where the information is stored. Now how much of information is pushed in, and how much of it can actually be retained, that is a matter. So, somewhere you can visualize this theory in little symbolic order. Say for instance you have attached a pen-drive or an external drive or SD card in a system and then you realize that it says that your external device, your pen drive or your SD drive has this capacity, say for instance it has one tb that is a size. Now that the external drive can store information only up to one tb. The moment you are about to reach that level it starts giving you a signal that, fine only these many bytes of information can be stored more because you have gone for an optimal usage of this external storage device. So, theory of a storage failure actually banks on this very hypothesis that the information that is supposed to be retained is dependent somehow on the overall capacity. Now remember one thing we discussed in long term storage, that the ultimate capacity of long term memory system is not known. All we know is that based on personal significance and based on the other relevant information most of the things are retained with us.

So, certain things that we know that it is extremely useful to us, we will always recollect it, we will always store it, and will never commit error in terms of recollecting it back, whereas certain types of information might not be significant after passage of certain period of time. Say for instance you memorized the poem because it was one of the expected questions in your examination. You know that this was just a poem which was

basically memorized only to serve you the purpose of successfully scoring in your examination and therefore the chances of further forgetting it is very high.

If you recollect now when you memorize questions from your notebook, you even remember where the teacher had put a red mark, where did you turn the page, the commas, the full stop, most of these feature you remember. And within a certain period of time, just within few days you start forgetting these traces and little later you do not even remember any of those things. Now all these theories can be used to explain it. Decay explains the process from one point of view, cue dependent forgetting explains it from a different point of view, storage system explains it from a different point of view, and the interference theory explains it is from a different point of view. But all these four theories basically explain why people forget.

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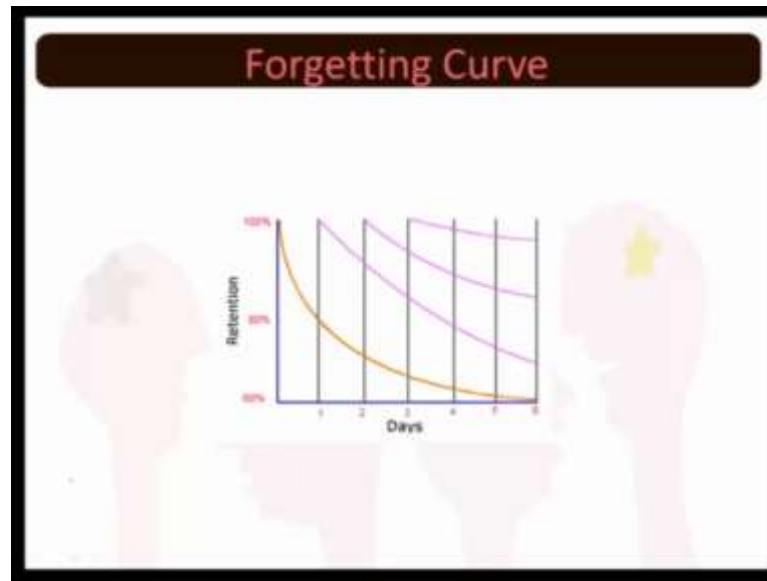


Forgetting Curve

- Hermann Ebbinghaus was the first psychologist to experiment on forgetting.
- He studied the rate of learning of nonsense syllables and the rate at which it is forgotten.
- The forgetting curve demonstrates decline of memory as a function of time.

Let us now come across one of the examples. Let us first understand that Hermann Ebbinghaus was the first psychologist who conducted experiments on forgetting. And he basically what he did was he again use the nonsense syllables tried to see how much people forget over a period of time. So, forgetting was actually experimentally verified in terms of decline of memory as a function of time.

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Now, this is the curve what is called as forgetting curve and Ebbinghaus came forward with this very curve. Basically what he did was that on y axis he had retention and on x axis was the number of days. How much of information is stored or how much of information is lost? Remember he was using nonsense syllabus for his studies.

So, meaningfulness was already taken care of. All the items that were supposed to be memorized did not carry any meaning. Now of all these now meaning devoid information, how much of loss takes place actually and this is what Ebbinghaus was trying to study.

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| Forgetting Curve | |
|----------------------------------|-----------------------|
| • Findings of Hermann Ebbinghaus | |
| % of forgetting | After lapse of (time) |
| 47% | 20 minutes |
| 53% | 60 minutes |
| 56% | 9 hours |
| 66% | 1 day |
| 72% | 2 days |
| 75% | 7 days |
| 79% | 1 month |

What he found was that after lapse of around 20 minutes human beings there have loss of 47 percent of information. After 1 hour 53 percent loss of information, after 9 hours we have 56 percent of loss. After 1 day we have 66 percent, 2 days 72 percent, 7 days 75 percent and after 1 month we have loss of 79 percent of information. Now if you look at this curve you will realize very interesting phenomena; the loss in the first few minutes is very high and gradually it starts stabilizing.

So, from 1 hour, that is 60 minutes to 9 hours you just have an addition of 3 percent of loss, whereas in the first 20 minutes you have a massive down fall, 47 percent of information is lost. 20 to 60 minutes you have a 40 minutes gap, but then the information lost is very little, just 6 percent more, 3 percent in 9 hours and 10 percent when you cover one full day 24 hours. So, that way you realize that there is not much of a loss. And again the loss of information at the end of the second day is 72 percent, whereas loss of information on the 7th days 75 percent only.

So, in 5 days you lose only 3 percent of information. This basically gives us a feel that actually what happens in the case of human being is that in the initial phase we have a drastic loss of information and this loss gradually starts getting stabilized. And by that time we complete 7 days, 1 week period, we realize that the information is by and large stable now. Little bit of loss is there, but it is still stable in nature.

So with this we come to an end to whatever we had to talk with respect to forgetting. But because we are talking about Ebbinghaus, so let us understand one thing, Ebbinghaus also gave a formula to understand how much we save in the process of retention. Therefore, it is called a method of Relearning or Saving Method.

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Saving/ Relearning Method

- Ebbinghaus used saving method as a measure of retention.

$$\frac{\text{Time taken in original learning} - \text{Time taken in new learning}}{\text{Time taken in original learning}} \times 100$$

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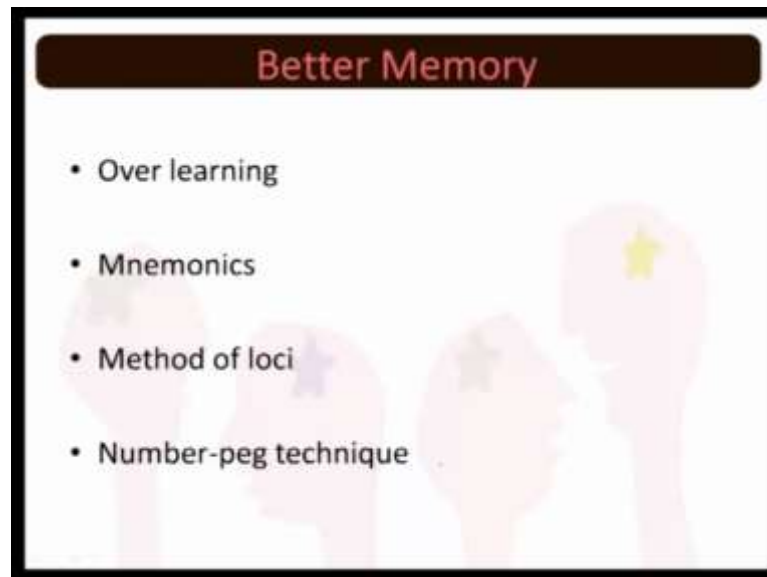
So, what he said was that the time that you take in original learning minus the time taken in the new learning. You have learnt the information, memorized it, now it is lost you are again trying to memorize it. So, time take originally and time taken in the next attempt divided by the time taken in the original learning and you multiply it by 100 and he said this is what called as Ebbinghaus Saving Method. Because it is realized that you save lot of time; you remember even in leaning when we were talking about extension and when we referred to spontaneous recovery, there also we had discussed that once the extension takes place the process of spontaneous recovery is very fast even if the animal took say a series of trials to learn the information originally.

Subsequent learning takes very few attempts so is the case with the memory. And therefore the time taken in the next phase is different from the time taken a originally to memorize the information, and this is what is Ebbinghaus contribution to the process of forgetting.

So, what have we discussed till now, we have tried to understand the process of memory, we have try to succinctly now understand the process of forgetting. Now realizing the

importance of memory and also of course accepting the beauty of forgetting, all of us would always visualize of situation where the overall capacity of the individual to memorize things should multiply should increase. So, what are the tips for better memory? Let us discuss it very succinctly.

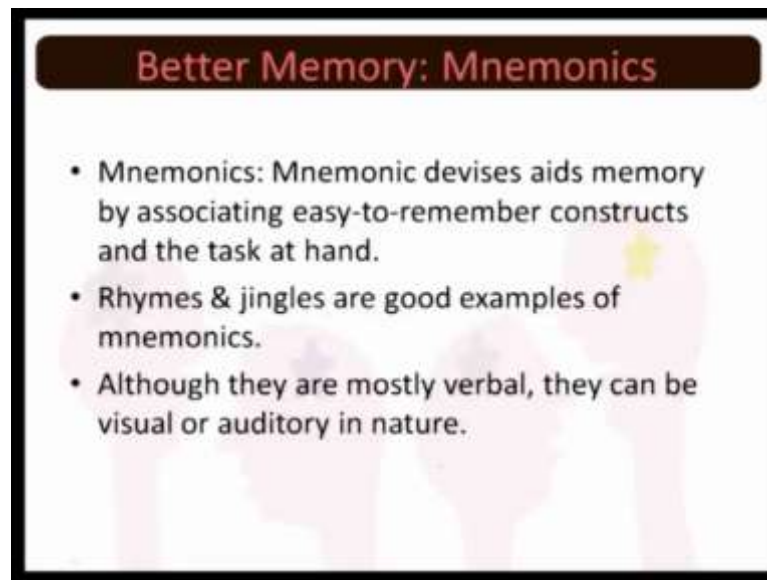
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Four options can be thought of, either you over learn or you use three other techniques; the method of mnemonics, the method of locus, and the number-peg technique. So, very succinctly in next couple of minutes, we will discuss methods which can enhance your memory and you can try it out.

Now, the process of over learning, basically means that you keep on keep on keep on repeating it to an extent that the whole process becomes automated. So, it is nothing but doing it several times, several times. So you over learned the thing, because you repeat it several times therefore automatically the information becomes much more automated, the whole process of recollection is automated. This is the method of over learning. But remember over learning is too tedious and approach, let us think of the other intelligent options.

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Mnemonics is another interesting method. Mnemonic devices they basically aid our memory by associating easy to remember constructs and the task at hand. The best examples of mnemonics are rhymes and jingles. I cannot give you very good example other than repetition of a rhyme, but I can share one interesting experience with you. During my student days I had a friend in philosophy and he would memorize the entire book just by attaching it, and what you call putting and fitting the theories hardcore philosophical view points and theories into nursery rhymes.

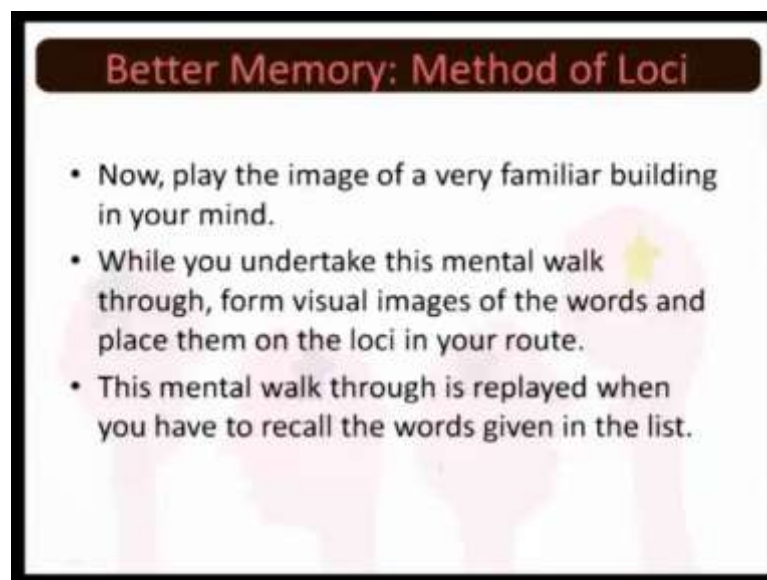
So, if you remember jingle bear jingle bear jingle all the well, all you do is that big big theories would be now put into such rhymes and he would just recollect the rhyme because he already had memorized it. And now big theories can be retrieved using a those cues. Although, rhymes and jingles are mostly verbal, you can think of visual and auditory formats of rhymes and jingles. We saw this very example. Now at that time we were looking at this very example with respect to how the mother recollects the episode of how her child used to sing this very song. But now let us replay the same video and see how the child learns the rhymes.

Look at the clip to see an actual attempt by a child to memorize a poem. Now two methods we have discussed, now either you over learn or you have already memorized some rhymes and jingles. So, you convert the new information into rhymes and jingles you embed it over the existing rhymes and jingles and you will have a better memory.

The third format that can again enhance your capacity to store information is method of locus. Now what happens here is that you have already a memorized space, say for instance, your college building, your school building, your office, so you have a walk through you know where to enter, how to move, how does the corridor move ahead, what leads to where and so for. And now once you have the memory of the space, all you have to do is that you associate it to the new information that you are supposed to memorize.

Say for example, if you have a list of words with you, that you have to memorize all you have to do is that you associate it with the space that you have already memorized. Now the prominent places in the building; the gate, the corridor, the first door, the brown door, the green door likewise.

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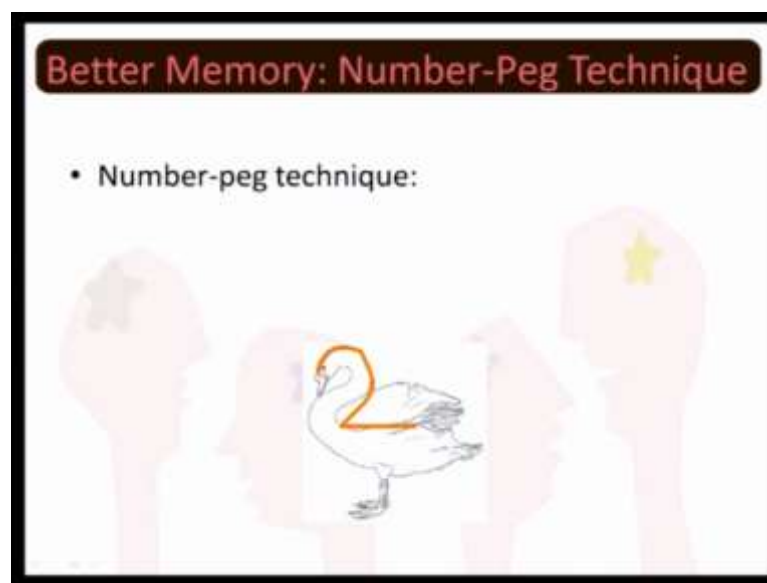


So all you do is that you now undertake a mental walk through and when you take the mental walk through you form the visual image of the world and all you have to do is that in that very mental walk through you keep on locating these words, their visual images, so that next time when you have to recollect all you have to do is it we have to just walk through that very space. And in this process of mental walk through the second time, the moment you see the main gate, you remember what was the word; green gate, brown gate, the left turn, the right turn whatever significant land marks that you have identified, all those significant land marks on a mental walk through is now associated with the visual image of the walk and that would help you a lot. In fact, the person who

holds the Guinness book of records for the best memory ability. If you see him performing in the experiment all he does is that he uses this very technique.

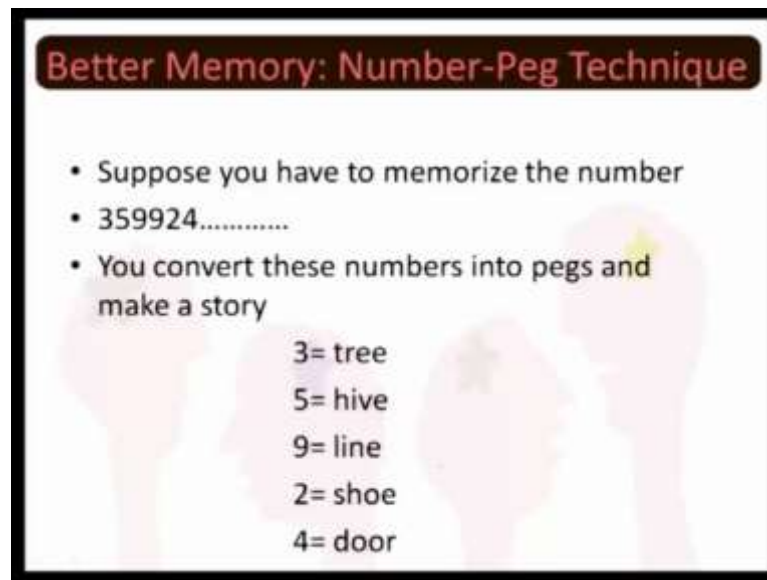
And the last method that can be used to increase memory is what is called as Number-Peg Technique. Now number-peg technique is a very interesting technique. You have information given to you and this whole piece of information all you have to do is that you have to convert it into number. Those numbers are then further linked in the form of a story and then you memorize the story you remember the whole information.

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Look at your screen you see a swan and then you can now make out that there is an actual mental image that you already carry and that mental image now you have convert into two. So likewise, all forms that you have already with you in your memory system, you can convert them into numbers. And more rhyming you make it the better you would succeed. Now let us take an example I will ask you to memorize a number.

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Better Memory: Number-Peg Technique

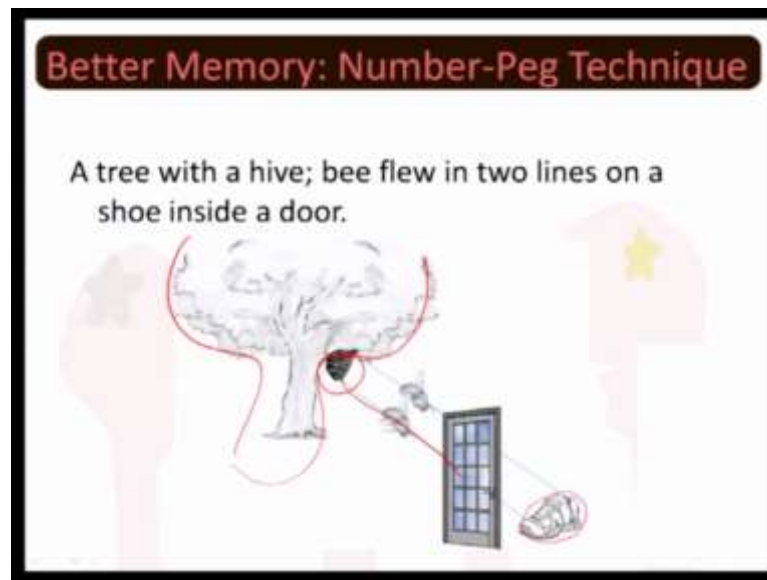
- Suppose you have to memorize the number
- 359924.....
- You convert these numbers into pegs and make a story

3= tree
5= hive
9= line
2= shoe
4= door

And the number is 359924; This is a number that you have to memorize. And this might now continue you remember we had done this exercise when we were going through chunking, where we said that you break the information in the chunks of 3 or in the chunks of 4 and this is how you enhance the capability of your short term storage. Right now we are talking about number-peg technique and imagine that this is the number that is given to you and you are told that you have to memorize it; 359924 and this might continue.

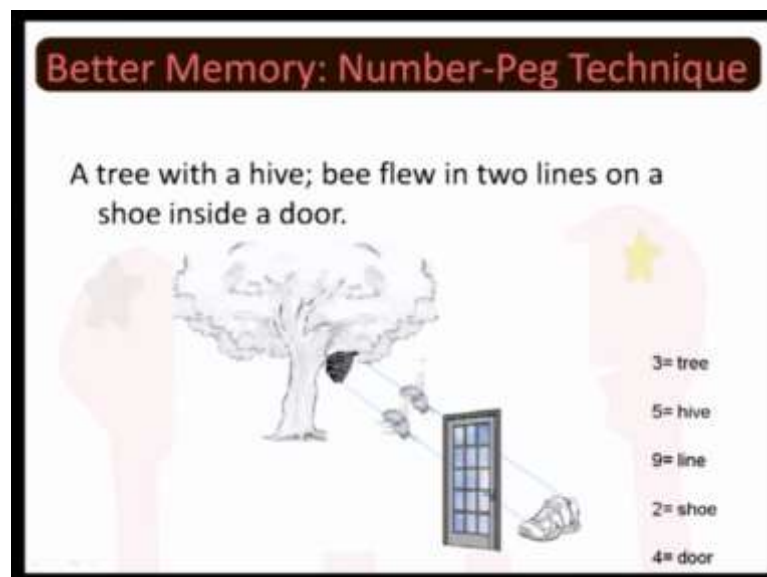
Now, convert these numbers into pegs and then construct a story. So, 3, the rhyming word would be tree, 5 the rhyming word would be hive, 9 line, 2 shoe, 4 door. So, these are basically the rhyming words and what you do now is that you simply now convert this numbers into pegs and then you make a story.

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Now, you look at this image 3 tree. So, all you do is that you have now made a tree here. So, this is 3, 5 is a hive, 9 is line, 2 is shoe and then 4 is door.

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So, let us again now look at this story. The number that was given to us was this 359924. So, 3 was tree, so you have made a tree, 5 was, hive you have added a hive to the tree, because there was double 9 therefore you have drawn two lines. And all you are now visualizing it that from a tree, two bees from the hives they are entering through the door

and then going to the shoe. So, a tree with the hive bee flew in two lines on a shoe inside a door.

So, all you have to memorize, it is very easy to visualize a tree with a hive 2 bees following a straight line entering through a door and there entering into a shoe. This is called number-peg technique. A bigger chunk of information, what you do is these numbers are converted into pegs and these pegs are further attached together to convert into a story. This creates a mental image which in turn will help you recollect the number very fast. So, this is called Number-Peg Technique.

And with this we have come to an end to our discussion on the topic memory. Just to summarize, we talked about the three structures of memory; the sensory, short term, and long term memory. And in long term of course we devoted too much of time to understand different formats of long term storage. Semantic memory, we talked about episodic memory, there also we classified, that I witness and flashbulb could be to such important different distinct type of memories. And then we came to the procedural aspect of the life that we memorize saying that memory can be divided into procedural and declarative memory what is also called as explicit and implicit aspects of memory. And then we talked about forgetting.

And now we are finally concluding our discussion on memory trying to understand that there are possible techniques of enhancing the overall ability of an individual to store more and more information using intelligent techniques, such as method of locus or number-peg technique. When we meet next we will be talking about a new concept. And that new concept would be emotion.

So, we started with sensation, perception, learning, and memory. And now we would be coming to the one of the most significant attributes of human beings, that is human emotion. That will be our next series of lectures.

Key words - forgetting, theories of forgetting, forgetting curve, mnemonics, number-peg technique, method of loci