Introduction to Cognitive Psychology
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Lecture – 10
Memory: Yes I Remember or Wait I Know

Hello friends. In today's lecture, we will introduce a new topic which is called Memory. So, continue from what we learn in the last classes, perception, attention, the next step into any cognitive process is memory.

So, what is memory? I have given definition of it, not kind of a definition but I have given what memory comprise of in the title of this slides. So, it says a memory is something which is equivalent to knowing something or remembering something. And this is very cleverly put here because one of the debates in memory is something call the know or remember, debate which is debate about how long term memory stores things or what is the way in which long term memory processes information.

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So, what is memory? Before we going to explaining what memory is, I have some funny cartoons here for you to look at which will give you some idea or which will slightly entertain you into understanding what memories. And so, you can see on the right hand of your slide, a person who is into a chamber of a therapist and therapist asks something about A this therapist is doing psychotherapy is doing asks something about whether he

remembers the person who is the patient remembers the therapist or not. And, patient denies it and the therapy is only worries whether he remembers the therapy because if he does not remember the therapist and no amount of money is what comes out of the pocket of the person and therapy we basically means that the therapist does not get paid.

And so, in a very brief way this is what memory and comprises off on the right hand side you see another interesting figure interesting cartoon which tells you a little bit about what memory is and so, this is demonstration of the famous remember no para 9 by an anvil telving and what this says is that the person question is asking the cat whether the cat remembers, what she saw was mouse or whether she knows what she whether it was a mouse or not and so, this distinction between remembering and knowing something and remembering something is a famous debate in memory studies and we will take up this debate when we come to the section on long term memory.

So, let us start with understanding what memory is. So, let me put a question to you do you remember the last ball which was hit for a 6 in the 2011 cricket world cup and as soon as I put this question to you most people do remember because it was a proud movement for India, India won the world cup in cricket in 2011 and the last ball was Mahendra Singh Dhoni hitting a 6 to win the world cup and so, when I ask you this question, many information comes in front of you like the process that I am doing it right.

Now, when I am trying to tell you what happened on that day is actually memory. So, mostly the way we look at memory the way most lay persons look at memory the concept of memory is about retrieval. So, memory is a process of retrieval and when we say do you remember something or do you think, you know something these are all facts about memory. So, then the main idea about memory or the main the main feature of memory is retrieval

So, how do we define memory, now think about the first day you came to your present college where ever you are studying you came to the college you made lot of new friends, you did a lot of things and when I ask you to remember the first day that you came to your college several experience says will be competing with each other to come to your consciousness to come to your mind and these ideas or these facts which are

competing with each other is what is called memory as of memory is that particular thing.

Or memory is that particular feature of cognation which brings to mind or which focuses on or puts into consciousness information which has been learnt before and the information that has been learnt before has passed has already passed to 2 important cognitive stages which is the first stage of perception where information is coded on or information is processed from raw stimuli to this to the process of sensation and perception and the next stage where attention another cognitive process is applied on to the raw information which comes up to perception and then whatever is to be remembered or whatever has to be stored is put on to the focus.

So, then memory is the process of basically storing something and retrieving it. So, [because/before] before you retrieve something it has to be stored somewhere and so, another dimension on another fact that can be added to memory is the storage fact. So, basically speaking then memory in general lame and is a process of storing something of retrieving something and we add one more feature to it which is basically call to process something. So, basically encoding something storing something and retrieving it back is what is called memory in very generic terms.

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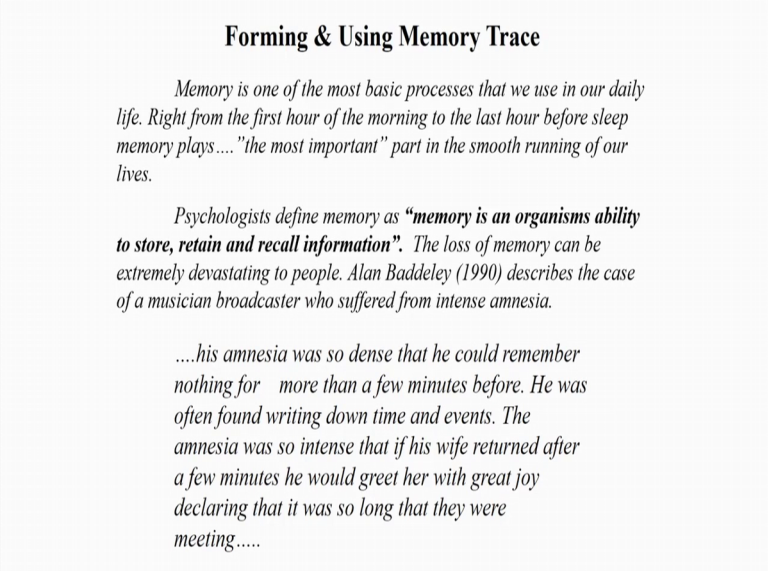

So, the definition in a slide would say that it is memory is a most basic process which is used in our daily life and right from the time that you wake up to the time that you go to

bed you do a lot of things, you undergo a lot of acts you undertake a lot of work and most of this work requires you to excess information from your mental storage and dismantle storage the process of storing and process of retrieving information from your mental storage is what is called memory now the question is why is memory needed. So, as we saw memory is a 3 fact process it starts with encoding leads to storage and it further leads to something called retrieval of information from the store where you where people store it.

So, why is memory needed at all what is the reason why memory is needed. And, so the appreciation of memory the real regard for memory will not come to anyone until and unless he sees someone or a person see someone who has no memory. And, so people who do not have memory are called Amnics. So, you have something called amnesia a disorder of memory where people cannot or are not able to remember anything and there are 2 types of amnesia to look at one is called the retrograde and that is called anterograde in which both of these amnesias focus on the fact that in one of eight you people are not able to form present memories which basically means a not able to form memories of whatever is happening right now and in retrograde amnesia people not able to retrieve memory from the mental store.

So, in one case there is encoding failure. So, people are not able to form memory in the other case they are not able to retrieve memory. And, so until and unless you come or you see a person who has no memory the appreciation of memory is very difficult I am saying this because memory is something which most people take for granted it is there. And, so we do not appreciate it anymore till the point of time that it goes away and so, a beautiful case study is defined by Allen Bradley of a person called Clive wearing who had no STM, no short term memory, we basically mean that he had a type of amnesia in which this person was not able to form memory of to encode something new.

And so, this persons amnesia Allen Bradley goes on to save a students at even if you talk to this person even if you are talking to this person he will talk to you for 2 minutes and within 2 minutes he will forget you to think of a life of a person whether is where anybody cannot remember you or cannot remember any information for more than 2 or 3 minutes it is really a hell of a life because it will be very difficult to live a life like that because what would happen is that you would not be able to generate you will not be able to encode or you will not be able to store something new and this person had a kind

of amnesia where he where the initial memory or the present memory could not be encoded.

So, if questions were asked to him were put to him about facts which where prior to the face when he suffered this amnesia. So, his amnesia develop because of accident. So, those facts or those information which was stored which he was aware of before his accidents they were perfectly intact, but he was not able to go ahead and actually remember something which was happening right now and so, this particular case could be used as a reference for what is the highlight of memory or what is the meaning of memory the question is what are the various ways in which memory has been explained in by philosophers.

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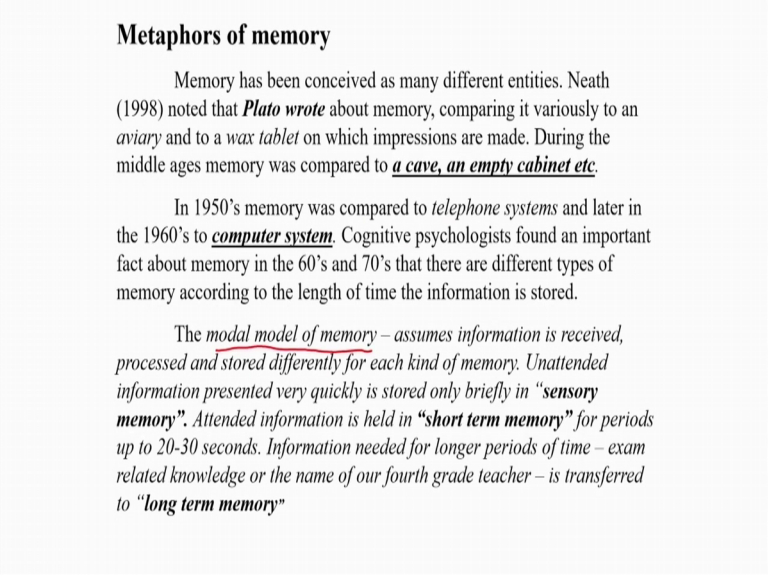

Now, since psychology moved out of philosophy and a lot of philosophers a lot of views of philosophers are carried on to it. So, lot of philosophers have also said a lot of things about what memories there are. So, there are several models there are several definitions which have been there which have been explained which have been used to explain what memory is and so, let us quickly discuss some of these metaphors or some of these models which has been proposed by various philosophers or various scientists working into the science of memory and so, a Plato here neath 1998 points out that Plato wrote about memory by comparing it to something called an aviary or a wax tablet on which an impression are made.

So, what Plato said is memory is like a wax tablet where you make certain impression and when you do not need it these impressions are taken away or it is moulded back. And, so most memory is like a wax and so, you take a pen or a chisel and heat it and make some kind of a mark on to this wax and that is what memory is similarly in the middle ages several other conceptualizations of memory were done and some of these conceptualizations let to the idea that memory could also be compared to a cave an empty cabinet or storage house and so on and so forth. So, memory mostly these studies or these viewpoints of memory all taking about memory as a storage system because retrieval is a process. So, retrieval excess a storage.

So, when I say think about something the process that you used the way that you get information is what is called retrieval, but from where you get is what is called storage part of memory. And, so the memory in itself is defined in terms of the philosophical study or in these terms of these old studies as a system which stores information. So, basically then the question here is whether memory is a single store system which means that all information stored in one typical way or whether there are different stores and the memory is stored in different ways.

So, from very early on this, philosophers knew that there are 5 sense organs and sense the number of sense organs are different is basically 5 all of them would produce a different input which is not similar to input from another sense organs which basically means that the number of memory stores have to be more than one and so that is one of the debate that how many stores are there as we quickly come to that idea of where how memory helps in defining in terms of the storage idea also how is memory arranged. So, how do access memory.

So, is memory like a box which is full of a number of items you think of your closet back in your hostel a most of you would have a disorganize closet and so, what would happen is on one particular a garment the other garment would go on and so, a number of dresses will go over it and in the middle of it that there will be book. So, many things would be there in your closet it means that a disorganise closet now if a disorganised closet is there searching anything from it is difficult. So, then how is memory organized what is the way in which memory is organized. So, are there ordered structures of organizing memory or they unordered structures and so, if there are ordered structures.

How are they accessed how what is stored how much information is stored all these questions will look into in the upcoming several weeks in several different definitions of what memory is and so, we will discuss it there, but for now the idea here is that people who fallowed from the trends of philosophy or people in the middle ages they had this idea of cave or cabinet or empty house kind of a thing of memory which suggests that they thought of memory as a store house now in the 1950s and in the 1960s, in the 1950s particularly the telephone came in graham bell has already invented the telephone system and so memory was then compared as to the telephone system which was suppose of interconnected wires from a central node and so, in those days in the 1950s telephone system was compared to the memory.

So, how one connection leads to another connection and there is a central node which goes ahead and makes this connection is what memory was thought of. So, different bits of information comes from encoding and different bits of information are retrieved and the one area which is connecting it is called the central node and that is where or it is called the control centre where people or telephone operator sit and manage telephone calls the similar way memory sort of similar ways.

So, telephone there is a central operator who actually sits there takes any information which comes in from through perception attention and this is called the incoming call kind of a issue and this is encoding then the telephone operator takes this information and whenever needed passes this information now which is equivalent to the concept of retrieval and so, this operator then manages this information and so, in those days this is how that memory was thought of and this is how the analogy was developed and now in the nineteen sixties the first computer was generated and in those days from that idea onwards memory started being thought of as a computer system which has an input which has an through put and which has an output.

So, right from the point where it was start up for cave to the development of the telephone system to the development of the computers the idea of memory kept on changing from one generation to the another generation now in the sixteen and seventies when the first computerized model or computer model of memory came in lot of information was gathered by people working in this area and some of the primary information that they gathered was that there were multiple kind of memories for the first

time people came to know there was different kind of memories, so even within a particular sensory organ.

So, I am not taking about whether a different sensory organ brings in different kind of memory, but I am taking here is that within a specific sense organ also we had different kinds of memories and also the fact that not only there are different kind of memories in terms of a particular sensory organ it is also that these memories have a particular duration a duration for which they last. So, there are certain stores there are certain terms or certain kinds of memories which last for very short period of time and there are certain kinds of memories which long which are there which are available for longer period of time. And, so these kinds of options or these kinds of studies started developing and that was the time when memory studies the full form of memory studies came into being.

So, with the advent of the computers and with the with the additional knowledge of the fact that memories are of different kind and they have different time periods to be stored and they require different time periods to be stored they are accessible for different time periods and important breakthrough happened in the research of memory and a model was developed which is called the modal model of memory as you can see now this model of memory suggests that information which is passed on from the perceptual processes and through the attentional processes these are arrived at something called the sensory register kind of a buffer where which has a property of storing a lot of information.

And from there on depending on certain features of the sensory register depending on certain other mental cognitive processes these information are passed on to another store which is called the short term store and from there depending on certain features other short term store certain active process that has to be taken that has to be taken up there memory is passed on to another kind of store which is called a long time store that is what it talks about. So, basically a 3 store system was developed which is the short term store long term store and the sensory register. So, briefly speaking then this is how memory would look like.

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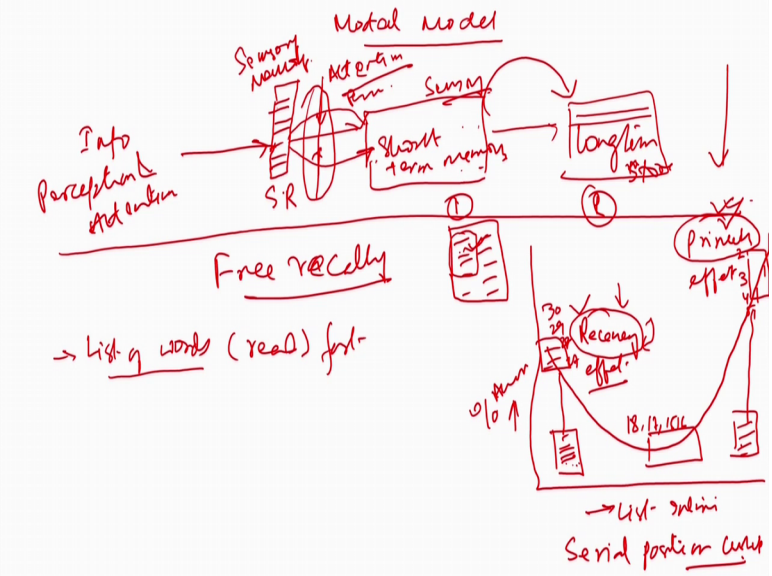

So, the modal model of memory the modal model of memory talks about a very short store which is called the sensory memory or some books will talk about this store as the sensory register not this a buffer store buffer story the sense that it has several properties of will look into the idea of sensory registers sensory memory long to very short term memory in awhile, but for now let me introduce you to the modal model. And, so what it says is that at the beginning the information which is been coming, so information which is coming from perception and attention land up at this sensory register.

Now it is a buffer as I said and it is a buffer of a unique status why it is unique it is unique because it can take up a lot of information it can store a lot of information by the information duration for which it can store information is very very brief and so, depending on certain features here certain processes here mostly attentional processes mostly attention or some person related factors also this information is passed on to another store which is called the short term memory will look at as I said into most of these model it most of the stores one by one and in the upcoming lectures. And, so the short the short term store does is stores information for a very very brief period of time.

So, mostly sensory registrar passes on information depending on certain features or certain requirements and these requirements are determined by people's attention or intention and so on and so forth and so this information then passes on to something called the short term memory short term memory is a store it is like a cave it is like a box

which can store a lot of information, but this information is very very limited because this attention, what has that is attentional filter over here has limited the number of information which passes to the short term store.

So, limited number of information can be access to the store, but then the idea here is that this information can stay here for longer period of time is equivalent to remembering a phone number while talking to a friend so that kind of a thing. And, so from here there is another store which is called the long term store where information can move out to. So, depending on whether you repeat the stimulus suboakley which basically means whether you do a rehearsal of the stimulus. So, whatever information comes from sensory register to the short term store whether you rehearse this information or not whether you go ahead and repeat this information or not that will decide whether it goes to long term store or not.

The long term store has a property that can store a number of information into it and so a number of information for extensive period of time. So, that kind of structure is what is called a long term store and this is the modal model of memory it is a keen to or similar to Atkinson Shiffrin model, but then Atkinson Shiffrin has several more edition to it will talk about that Atkinson Shiffrin model and another model which is a this model in a while. So, let me just introduce you these things here.

So, there are 2 models one is a look at model and the Atkinson Shiffrin model now the question was whether memory is single store system or a multiple store system and that was what the debate and that is the debate which will be solved by that store model and the take a look at model. So, we will come to that and we come there. So, the question now is how do we experimentally prove that this is right that this kind of a store appears that this kind of a store structure is there in memory and for there that particular thing a number of experiment a number of free recall experiments were done and what was these experiments like. So, in these free called experiments a list of words were given to people.

So, these are number of words which are given to people and they were asked to remember these to learn this by heart and later on they were asked to retrieve this back these words back and to basically go ahead and retrieve retrieve or to tell me these words back or repeat this words back to me and they do not have to follow any sequence that is

why it is called free recall there is no sequence that they follow. So, even if the fact they can remember word number ten first and word number 2 second and so, on and so forth. So, they are free to recall the way they want to only thing here is that they have to first learn a list and then retrieve a list back.

Now, the interesting thing was found out here when this retrieval the percentage accuracy of retrieval and this is the time dimension when this kind of thing was plotted something like this was found and this basically. So, these are the I am sorry this is not the time dimension this is the list items of the list and so, what was found out is that this kind of curve which is called the serial position curve was what was evident from the results.

So, what is the serial position curve? So, on this axis you have the probability of recall and this on this axis you have the list of items which has to be recalled and this is what you tend to get. So, what does this list actually tell you? So, this list basically tells you or this kind of a graph basically goes and tells you that these are items which are at the beginning of the list and these are items which are at the end of the list. So, let us say in a thirty word list these are item number 30, 29, 28, 27 and these are items number 1, 2, 3, 4 and 5 and here is item number.

let us say eighteen seventeen fifteen sixteen kind of a thing what is the meaning of all this the meaning of all this is that items present at the top of the list those items which are presented towards the beginning of the list are remembered more and similarly items which have been presented towards the end of the list are remembered more which basically means that these 2 kind of items have a preferential or have more better memory why, they have better memory this kind of effect where items which have been learnt at the beginning of the list are remembered more are called the primacy effect and this kind of thing where items which have been remember from the end of the list is called the regency effect.

So, what psychologist when they did experiments like this they found out that this kind of effect was there and this kind of effect basically means that there are 2 memory stores these memory stores the one which is storing this and the one which is storing this are entirely different the reason being that this words are being remembered because people rehearse.

So, when a list is given to you the top of the list items these are being rehearsed these are being repeated. So, item number one you first learn it you repeat it then you learn item 2 then you repeat item one and then item 2 again you learn item number 3. So, you repeat item number one item number 2 and you repeat item number 3 and fourth item comes in and then you repeat item number 1, 2, 3, 4.

So, number of reputations that item number one gets is multiplied by this factor and so, they what happened is this primary if primacy effect is happening because of retrieval whereas the recency effect is happening because people tend to say when people were questioned why do you remember list or what happened actually when they remembered items from the end of the list they thought or they basically replied back saying that they could still hear the list they could still hear the words ringing in the ears this basically means that some kind of recency was happening. And, so this proposal then says that there are 2 different kinds of memories one memory which stores information which has been repeated and another memory which stores information which has not been repeated.

And since these items are not been repeated at all not been processed at all they form another class or another domain and these form another domain or another class. And, so this is called the short term memory and this part is called the long term memory and this is one of the basic demonstration or one of the basic experiments to show that a structure of short term and long term memory exists and which basically means that memory is a multi modal store. So, another thing was found out that to basically verify recency was that another interesting thing was done and what was done is that a list of words. So, whether recency happens because people hear words or people hear the of your words whether that is the reason for recency or not to test this a list of words were read very very fast. So, list of words were read very fast.

So, that there was no time for rehearsal and so, when there was no time for a rehearsal in those cases there was no primacy effect, but still recency affect which means that people did remember words toward the end of the list you do hear at times that something some information it broadcasted very fast. So, the end of the list information still stays with you and that is what is are called recency, but then if time enough is given then you have both the primacy and the recency effect coming in to this and that basically is the idea of

something called the modal model of memory or the idea that there are different stores of memory.

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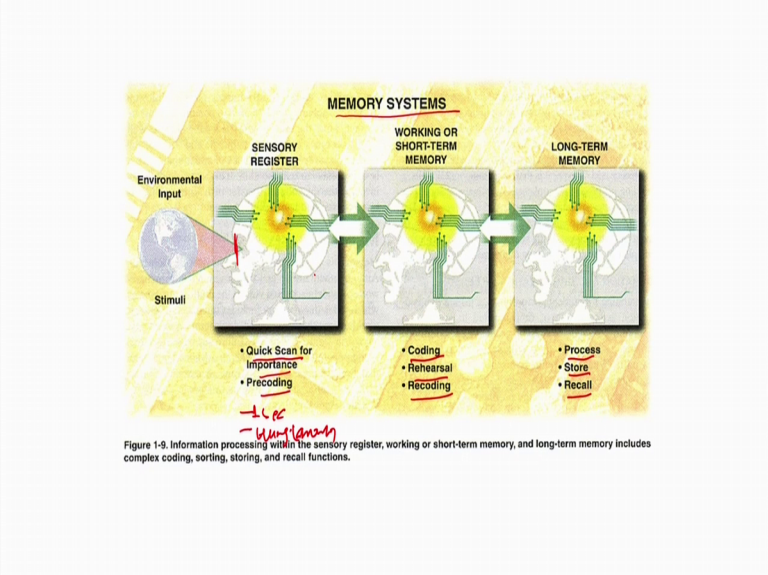

Figure 1-9. Information processing within the sensory register, working or short-term memory, and long-term memory includes complex coding, sorting, storing, and recall functions.

And so, you can see as this particular graph shows you this is about memory systems. So, you see there is something called the sensory register. So, stimuli from the world which impinges on to the sensory register it is a buffer and these are the properties of it there is quick scan for importance and pre coding these are the features of this kind of a thing information also in addition information stays here for a very very brief period drawing. So, something around one second and then the information here which is stored is huge information. So, huge amount of information is stored.

Here also there is something called short term memory or presently these days which is called work in memory. So, will introduce you I will introduce to the concept of what is working memory and what is the difference between working and sensory memory in the latter half of this chapter. So, the idea here is that there is another store which is called working memory and then features of the store is coding rehearsal recording and so on and so forth.

And similarly there is a third store which is called the long term store which has the features of processing storing and recalling. And, so we will discuss this whole idea of this is basically a quick view of Atkinson Shiffrin view of idea of memory will come back to this in a while when we discuss the Atkinson Shiffrin view about memory.

So, very briefly then if you look into here we have something call sensory register working memory and long term memory. So, then let us for the sake of consistency start with the first type of memory let me explain you a little bit about what it is how does it work and what are the features of this and then will quickly move into working memory. So, in the present section, will look into to sensory register and working memory in the next session, we will into long term memory. So, let us quickly go into what is sensory memory.

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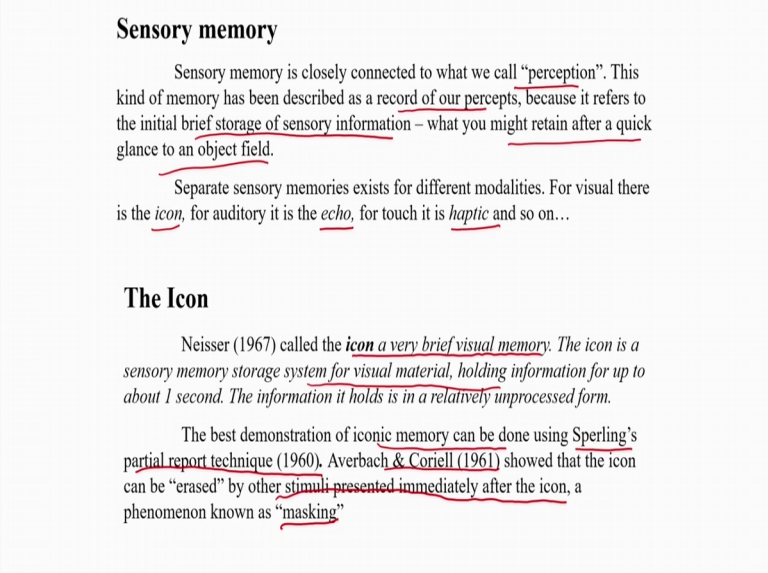

So, what is sensory memory most people generally look at sensory memory as a record of your person let me give you an example of what sensory memories most of you have looked at displaced or your professor who are teaching you and so suppose a professor is going ahead and testing whether the slide projects are not.

And, so he quickly projects something and then takes it back you do see some a form of information a you do see an image of the slide feeding away very fast this percept or this particular feeling where you see images feeding very fast is what is called the sensory memory and this is called this is kind of an iconic sensory memory its since its usually nature is called an iconic sensory memory. So, basically that is what and so, sensory memory is basically what is equivalent to the percept or what we people called it in terms of perception. Now it is a record of a percept because it refers to initial brief

storage of information you might retain it after a quick glance to an object field. So, think of looking or quickly glancing.

So, quickly glance towards the room and then move back it is just like something I did. And, so when you start thinking of what you saw you will see or you will basically what comes to mind is a fading image of something which lies behind you and that is what is called the sensory memory. So, it is a memory which is there with you for very very brief period of time holds the lot of information, but the problem is that most information that it holds is unprocessed form and so, cannot be processed. And, so attention and perception decides whether information passes from here to the next stages of memory.

So, sensory memory exists another interest thing is that we have different kind of sensory memory. So, 5 different senses 5 different sensory memory are there although the sensory memory for taste is a little bit to memory is a little bit I will not say that fast, but then most memories are follow some kind of a rule or some kind of a adherence to each other. And, so for visual we have the icon as a sensory memory for auditory, we have the echo and for touch we have the haptic and for the sake of consistency for the sake of easiness since this is not a very extensive course. So, we will just look at the icon and echo as a demonstration of sensory memory.

So, the first kind of sensory memory that we have is called the icon now icon is a sensory memory for the image or it is in and visual sensory memory. So, then what is the icon. So, Neisser 1967 called icon a very brief visual memory, it is a sensory memory storage system for visual materials holding information up to one seconds as as I said sensory memories have very very less time availability. So, information is available in sensory memories for very brief period of times, but it can hold huge information a huge number of information which comes up to the perception process. And, so what happens here is that most information is available, but since the time period for which it is available is very less you cannot look at it.

So, one of the features of sensory memory is that it can hold a lot of information for the, but for the very very brief period time and so, the demonstration that I just told you a in terms of looking at something a quick glance onto something or quickly glancing up or looking at something which is presented for a very very brief period of time the fading image is what is an icon.

So, icon is equivalent to that fading image which moves out which leaves you and it fades away quickly that is what icon is and that represents the iconic memory. So, the best demonstration of iconic memory was done using something called Sperling partial report technique in nineteen sixty and aver and Coriell Averbach and Coriell showed that icons can be erased by other stimuli presented immediately after icon will; I will show you how this happens through something called masking fees basically means that an icon or a sensory memory of the visual nature it is there, it is in front of you for a very brief period of time, but if something in the time period then the icon is presented something else is presented a masking stimuli with goes ahead and hides this icon for a brief period of time and an interference will happen and the icon disappears.

But will come back to that in a minute. So, then how do I test for the presence of an icon how do I test that iconic memory is present or not and for this a very interesting experiment was done by Sperling and what this experiment was in very brief terms I will trying to explain you is called the whole versus part report whole versus partial report technique. So, the demonstration looks something like this.

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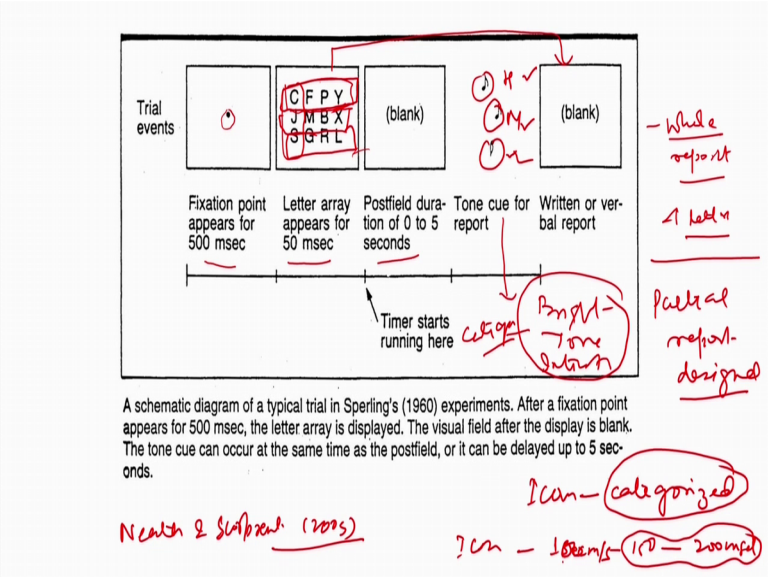

In this demonstration, what happens is most subjects who come for demonstration first sees a central fixation point like this. So, this is the central fixation point people are asked subjects for doing the experimental or asked to put their eye on to it and later on

they see a matrix like this we have which have a number of letters written on to it and then a blank slide is presented.

So, what you really have to do after that after the blank slide is presented a tone is presented which cues you which tells you to report or to write this particular thing back. So, where in simple experiment you start with focusing on this particular fixation point for 500 millisecond and then a display like this is presented to you for 50 millisecond then a blank slide is presented for 0 to 5 second, this is a masking stimuli this is done. So, that we are sure that most stimulus that the image of the stimulus is is moved out of your buffer is moved out of the sensory buffer and then a tone is there to tell you that you have to report it back. So, there are 2 versions of it one is called the whole report technique.

Now, in the whole report technique; what happened is that subjects were asked to report the whole of this. And, so what was seen I will quickly jump to the result? So, what was seen is that when that was done then people could at the best remember the first row of letters or if they are remembering it for these. So, maximum 4 letters is what they remember.

So, in this kind of demonstration people remember the 4 letters and by the time they were up to the fifth letter the image disappeared and that was what was happening. So, by the time they went to the fifth and sixth, the whole image of the whole stimuli disappeared as I said there is feeding experience whole thing faded and they could not report it back. So, the question was can this be helped can this be improved and so, something call a partial report technique was designed now it is just an addition into it and so, what was the partial report techniques the same kind of structure was used for doing the experiment the only thing here was that 3 different tones were used.

So, this was a high tone this was a middle tone and this was a low tone on. So, 3 different kind of tones were used and now the subjects interested in instructed in this way if there is a high tone you have to just remember the first row if there is a middle tone you have to remember the second row and if there is a third if there is a low tone you have to remember the third row. So, retrieve back the items from the third row what do you think happened in the situation like this subjects very accurately remembered the letters they were very accurate in remembering.

So, when a high tone was presented they very accurately remember all the 4 letters which basically means that if the first thing that it it says is that the sensory memory stays for a very very brief period of time and all information of sensory memory is available to you, but what happens is the storage you have. So, to basic proposals of sensory memory that it can use a lot of inform you that it can store lot of information, but for a brief period of time. And, so we tested both of them here the thing is that if I present a low tone and the same image you are able to go remember back the third row we basically means that the whole of the slide is is available to you, but what happens is when you start reading it back it disappears.

So, the thing is when a technique was used where you have to just remember one part of it you were able to do it, it basically means that whole of slide information the information from the slide the whole of slide was available to the people and what why they were not able to complete the whole report technique is because they were trying to read everything. So, one problem the other problem solved is that time duration now the thing is if cue was given up a particular high medium low kind of a cue was given that time was very less and people were able to accurately finish it.

So, then, but then when a whole report technique was used since that time period since the time that you required to move from one word to write these words where constantly increasing. So, you were actually forgetting. And, so this is a very clever demonstration or very good demonstration or something called the iconic memory.

Now, the thing is what kind of cues can be used. So, here I have used or here when the classic experiments Sperling has used something called the tone cue. So, the question was to find out whether this iconic memory the icons what is the nature of the icon. So, is icon does icon contain categorized information which means that what is the level of information which is stored in the icon. And, so to test that cueing was done first by something called physical properties. So, brightness colour these kind of cues were used this kind of factors were used for cueing this kind of a whole report and partial report.

So, with physical properties it was very very easy, but then if people were asked to report back from this kind of a structure from this kind of a slide whether they saw vowel or whether they saw consonance into this structure people were not able to attend this task or finish this task which basically proves that on the information which is available here

is at the very very physical level it is highly unprocessed and so, this kind of a meaning related thing can be generated cannot be generated out of it. So, basically what you can do is that this kind of categorization cannot be used or the category based distinction cannot be used for cueing another thing another interesting thing was that can people also a generate meaning from it and so, as I explain that cannot be done.

So, then what kind of cues can be used. So, very basic cues can can be used for example, you have brightness you have tone you have intensity of the stimulus and these can cue people for the whole report and part report technique, but then things like categorization if you see a vowel report it. So, report all this. So, example report all the vowels that you see here that is the question which is given to you, it is a dual task first of all you have to remember what know what of a village and then categorizes and later on report it.

So, if that kind of a task is given to you where it has certain rules certain kind of meaning information attached to it that information was very difficult to access that kind of task was very difficult to access and an accomplished by get a accomplishly done by this particular thing also one interesting thing if you are interested is to know that neath and scrip vent in 2003.

They found out that your studies say that people are able to provide category information from this kind of a display which means that category information can also be extracted from these display. So, very recent study and then that time course of an icon is not one second it is 100 and not say 100 milliseconds, it is 100 and 50 to 200 millisecond that is how icon is basically presented or it is available.

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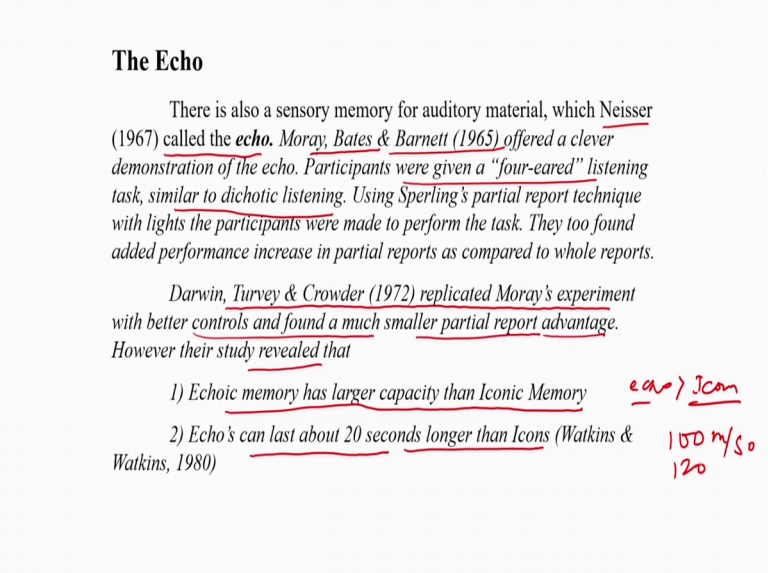

So, let us quickly then look into a counterpart of the icon the auditory icon as I would say it is called a echo. So, echo is a kind of sensory memory of the auditory dimensions. And, so Neisser 1967 called the echo. So, very interesting experiment intelligent experiment was named done by someone calling moray bates and Barnett in nineteen sixty 5 to show what an echo is. So, what they did was the presented subject with something called 4 year listening task which is similar to dichotic listening task. So, subject was centred or subjects were made to hear to the 2 years 4 different channels of audio information and so this information and this is similar to Sperling task. So, this information was coming from the right forward the left forward right backward and left backward.

So, similar to this think of it in this way. So, here what happens is that a person sits here and so, he is wearing an earphone and so, this is my person who is sitting here.

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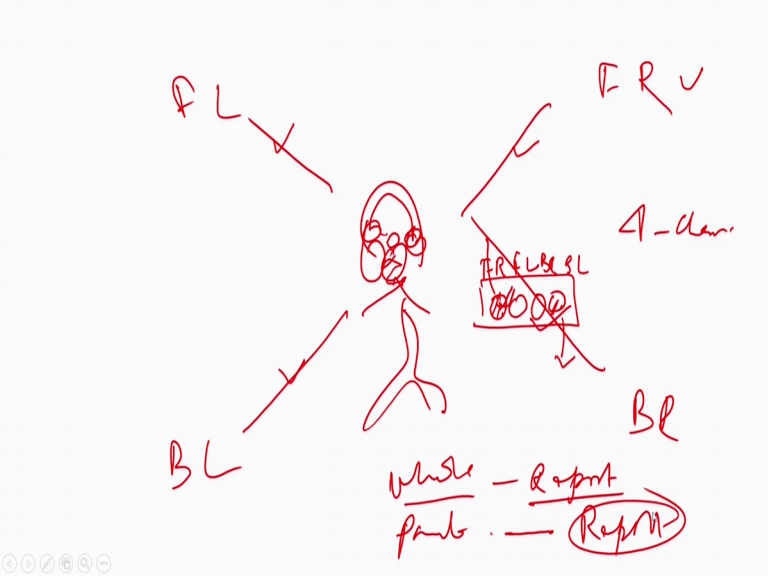

And this is the headphone that he is wearing. So, he hears 2 tones one is forward right forward left 4 channel. So, stereo mixing equipment was used and this is backward left and this is backward right. So, he is he is hearing these 4 tones now the thing is in the whole report technique the subject was asked to report whatever he heard from all these different-different. So, one string was presented here one string of information presented here in one string here one sitting here.

So, in the whole technique the person has to report everything that he hears from 4 differences. So, 4 channel system was there where is in the partial report technique what the person had to do was to report from one of these channels whether it is for forward right forward left and so on and so forth. So, how do you do it the experiment design in such a way that this person is actually hearing this 4 different-different sound and then in front of him are 4 bulbs which represent front right front left back right and back left and so, one of when one of these bulbs this is the cueing method one of these bulb eliminates this person has to tell what he heard from the forward right or say backward left. So, the elimination of these bulb will tell you to attend to this particular channel and report back.

What you hear and so, Darwin Turvey and Crowder 1972, they replicated morays experiment with better controls and found a much smaller partial report advantage. So, in this case also, the experiment has found large large benefit for the partial report case then for the whole report case and so, some facts which are revealed was the echoic memory

has largest capacity is an iconic memory and so, this is one interesting things that the echo stores more information than the icon the echo stores more information one reason could be possible reason is that echo is a single channel system.

So, the words have to be stayed for more period of time if if I write something let us say I write on a piece of paper ram goes to village this if I show you for 100 to milliseconds you would be able to understand, but until and unless I spell the whole sentence ram goes to a village you will not have an idea what is happening who is ram where is he going what kind of a thing is there. So, the whole sentence has to be played and so, various auditory system store more information because it has to its a single channel system it has to go from one word to the other word to the other word to the other word for making meaning and so, that could be the reason why stores more information also echo echos can last 20 second longer than icons that is what it is and so, the.

So, if icons stays for 100 milliseconds echo can stay for 120 millisecond or maybe echos can if icons can stay for 150 milliseconds the echos nearly about 200 milliseconds. So, then information in the echo is huge it is unprocessed like the icon, but the idea is that it is better or it stores more information than the icon and so, this is the next type of a second type of sensory memory which is there and this is a demonstration of the Darwin, Turvey and Cowder experiment where you have left right in.

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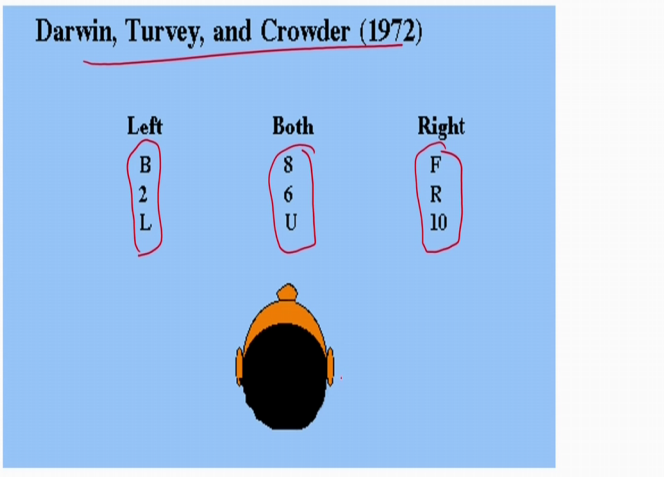

So, you do see that these are the words which have presented these are the items which are presented through different-different channels on the headphone and this person who sitting here has to report.

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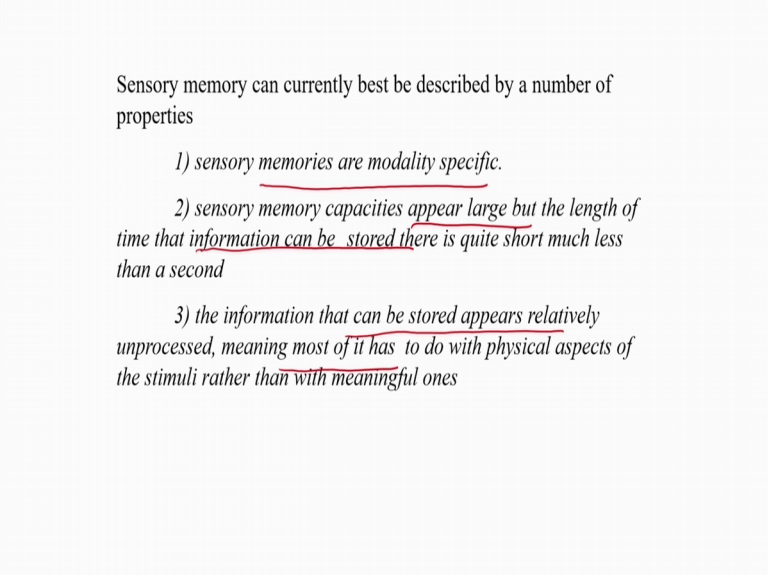

So, sensory memory can currently then what is the definition of sensory memory can; it can be described through these things first sensory memories of modality specific which means that there is a memory for visual that there is a memory for haptic sensors there is a memory for auditory sensors and so on and so forth also the capacities are huge.

But the length of time the information can be stored is quite short so, huge capacity, but smaller time. So, information stages for very very brief period of time also the information can be stored appears unprocessed as we saw the category task or several other task which require which if given to subjects to perform on to the icon or the echo they are not able to do it which means that information is available, but it is not processed in any way, it is like simple perpetual information unprocessed perpetual information.

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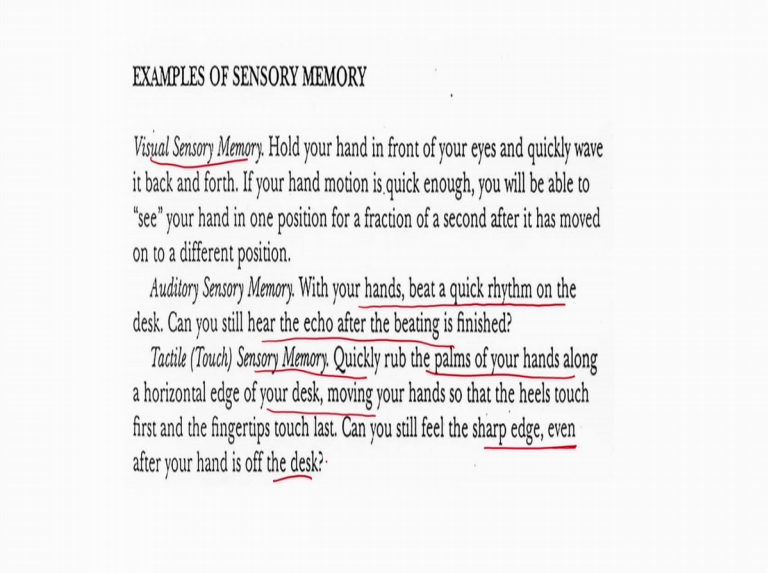

So, then let us look at some examples of what this is. So, for example, in visual sensory memory it could be that quickly take your hand and move it in front of you very quick once you do that you can still see your hand moving back and that is visual memory in auditory with your hands beat a quick rhythm on the desk you will hear a after echo and that is what is the echoic memory on in terms of tectile memory rub the palms of your hand along a horizontal surface and even when this is done when you are finished with it you will still have some kind of haptic sensation a sharp edge in this case on the edge of the desk and that is what is the sensory so, well then.

Let us break the class here for today and will continue with other types of memories of just see in today's class, what are the other why is memory important what are the different types of memory and we have evaluated just one type of memory also, the existence of something call the single and multiple store system of memory. So, in this point of presence section we just saw two different kind of sensory memory we will continue the discussion in the next class.

Thank you.