Lecture – 07
Attention: Mental Concentration at Play

Hello in this class we will be looking at another cognitive variable or another cognitive factor which is attention. Now attention is a very interesting cognitive factor because it signifies the mental concentration the mental effort somebody puts into. And so, attention is important why because attention decides whether perception takes place or not.

So, even before something is perceived even before something is registered by the brain and analyzed, attention decides what message is to be analyzed, what stimuli is to be analyzed, and what stimuli is not to be analyzed. Now why is attention really necessary? Think of a scenario where you could hear a lot of things you could hear almost all the stimulus which are impinging on to you at any government movement. It would be very difficult to process all the stimulus at any if every stimuli is being imprinting on you are able to here everything. And so, focusing or concentration will be difficult and that is why the cognitive system or our human brain has the system of attention.

So, attention is just like a sieve or a filter which separates those information which needs to be processed in those information which need not be process. And so, basically then the question comes in that how is attention directed. So, in this particular lecture we will look into attention, we look into what are the factors which control attention, how is intention manipulated and whether this attention that we are talking about whether this could be improved.

So, does attention span improve. We will also look at some of the theories of attention and talk about something called automaticity of attention. In addition to it we will also look at something called the psychological reflector period, which is basically a caveat which is basically out process of attention. So, let us then begin our section or attention. Think of a scenario a car driving scenario look at the picture on the screen.

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Attention

The study of attention concerns primarily the cognitive resources and their limitations. At any given time people have only a certain amount of mental energy to devote to all the possible tasks and all the incoming information confronting them. *Attention is sometimes synonymously used with mental concentration.*

Does people's concentration level change with practice ?

Now, when an expert driver car drives a car he does not need to pay attention to a lot of variable to a lot of things he is an expert. And so, driving is kind of a byproduct to him. And so, he does not need to focus on all the systems which are there in the car like the gear the steering and so many other things.

So, what he could do an expert could do is not only drive the car, but also start a conversation, follow a conversation, fiddle with some gadgets, take up a phone call and do several other things, but reverse the scenario or look at look at the scenario in the picture in the picture, you can see a no wise driving a car remember the first time you started driving a car, or a vehicle now at that point of time you did not know what the controls were and you did not knew so many other things about the car or about the vehicle that you were drawing or any new thing that you learn.

And so, you have to put your attention or your mental consideration into it because this mental consider concentration decides, how you should be doing a particular job into incase of the car the novice user pays attention to whatever is happening around him learns about the control, learns about how to move the vehicle and later on when he practices for some time when he has enough practice for some time he can then use something called divided attention, where he does not need to focus all his mental effort onto the controls in car and with the driving can do other jobs as well.

So, basically attention is a mental effort kind of a cognitive resource which makes you focus on 2 things. Now remember in earlier classes in smaller classes our teachers is to say pay attention, and the caveat here was that no matter how had we paid attention it used to jump from one object to another. Even if I ask you right now to pay attention on to something or some object what would happen is that for a few seconds you would be able to focus your attention onto that thing and it jumps on which basically means that attention is very fiddly it keeps on jumping from one thing to another and that is why we have something called an attention span which basically defines the amount of time for which a particular stimulus can be attended to.

So, then what is basically attention? Attention basically requires the study of cognitive resources and the limitations of the cognitive system. So, basically those cognitive psychologists who are studying attention actually look at what are the cognitive resources? How are the cognitive resources? Channelize into a making a cognitive decision making a cognitive act like perception memory and what are the limitations of this this attention this filter that we are talking about. So, attention is some time also synonymously are related or synonymously considered equivalent to mental concentration.

Now, attention is something which is very prominent without attention it would be really difficult. And so, as I said as you do more and more practice what you could do is you could take the attention that you have the amount of attention that is the your cognitive resources that is available to you and put it into other jobs; which means that people can simultaneously then do what any other job. So, one basic fact to know here is that with practice attention span or attention can be diverted you could use your attention for doing multiple jobs.

That is the question which I have here and that says that thus peoples concentration change with practice. The question is does peoples attention actually go ahead and change with practice with doing are we doing the job over and over again or learning the job over and over again. Now one of the first person to talk about attention was William James when he said that attention cannot be focused on one on more than one stimuli he predicted that attention can be only paid on or attention can be studied for only one stimuli, but if we are diverting or if we are playing around with many stimuli if we are focusing ourselves or we if we are able to do a number of jobs at the same time it is not
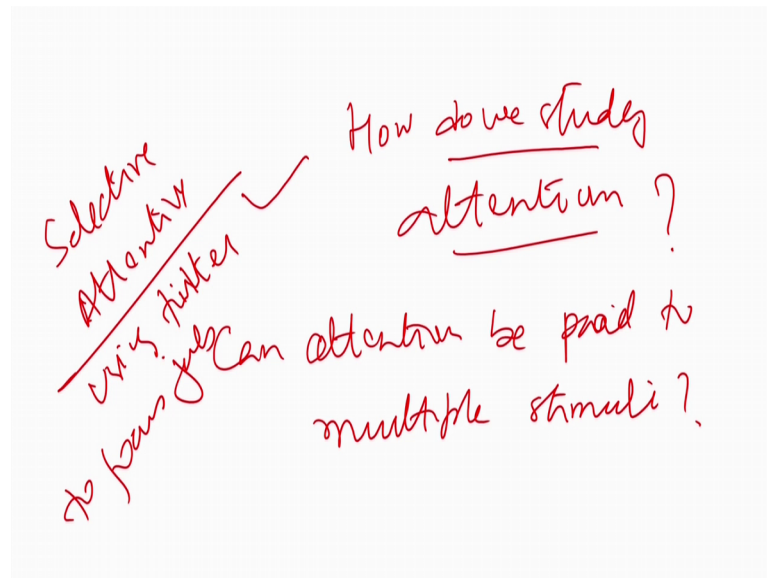
attention that we are studying it is happiness that we are studying. And so, this first definitions or this first clues basically give us something about or tell us something about automaticity which is another outgrowth of attention.

So, as you become more practiced as you have more practice you do not need a lot of attention on to jobs and so, most of the jobs then become automatic. Think about any morning any unusual morning which is there. And so, when you get up you go to doing your brushing and there are several other things, but if I ask you this question, do you remember doing any of these or do you pay attention to any of these jobs very seriously and your answer would be no the reason being that these are.

So, routine jobs that there is a process of doing it and so what you tend to do when after you get up is pay less and less attention to it and the process itself becomes automatic, till the point of time when you either miss a toothpaste or there is a one element from the whole routine that is not existing, and if that happens your attention is focused back on to the situation and solving a problem with the situation.

So, the study of attention is also important because at any given point of time we have limited cognitive resources the brain has limited cognitive resources, and these cognitive resources have to be diverted is to be used in a number of jobs that we have to do. And so, we have to use it wisely and that is my attention came comes into play where it allocates very tells in allocating these mental concentration into getting more eminent or more important jobs done and making those jobs which are routine as more automatic and more sequential in nature.

Now, the question is how do we study attention? A problem is how do we study attention? And a more relevant question here is that can attention be paid to multiple stimuli.

Let us deal with the first question how do we study attention? The moment you say somebody the moment you ask somebody not to pay attention on to something his attention goes back into that particular job. And so, it is really difficult to study attention because if you ask someone the only way I see of studying attention is taking 2 groups one group which is paying attention and the other group which is not paying attention, but as soon as you release this instruction as an experimental psychologist I would say that as soon as you give this instruction to people not to pay attention.

There goes it he starts paying attention back to whatever job you are not asked him to pay attention and that is because humans means a curious they will do what they are not asked to do. So, how do we study attention the only way to study is to have 2 groups in which one group does not pay attention. And so, a novel design was used to study attention we will talk about this design in a moment, but before that let us look at this question of can we pay attention to 2 things at the same time. There are several answers to it and several theories will discuss into it.

Think of a class a class which is filled with a number of students who was actually listening to a professor whose professing at any point of time there are so many stimuli

which is being impinging on your sense organs you have a number of stimuli interactions a number of stimuli which is trying to capture it is attention, but what you tend to do is focus yourself on to the lecture and this particular thing or this particular job of focusing your attention on to one particular thing is what is called selective attention.

So, selective attention basically is selective attention is basically using the filter, to focus on one job and to eliminate other jobs to eliminate putting your focus on 2 other jobs. So, as soon as the teacher stops teaching you will soon start hearing your class wrestling against yourself your skin you can hear the noise that the person who sitting right next to you is making you can hear the fan the noise of the fan which was there well amazingly when you were actually looking at the professor when he is teaching you actually did not pay any attention to all the other songs which were there and this particular thing this interesting thing of focusing our attention on to one particular job or one particular event is called selective attention.
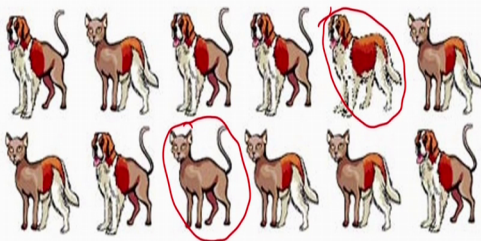
And so, what we will be looking at now is something called selective attention, but even before looking at selective attention let the question is how do we study attention. And so, a very ingenious design was used to do that and that design uses something called the Dichotic listening task. So, as I said selective attention is the term which refers to the fact that we usually focus out attention on too few tasks and events

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Rather than many of this particular task and help assure one of the famous figures in attention research states that; attention is basically equivalent to any given movements people awareness and it encompasses it comprises of only a tiny proportion of the stimuli which he is receiving from the environment.

Now, let us do a very quick thing a very quick study to find out how selective attention really works and so on the display in front of you see 2 rows of animals. Now what he earlier has happened is most of the figures that you see are actually a combination of a dog and a cat and there are some pure figures. When I say pure figures you what I really mean is a pure dog and a pure cat take some time and do tell me or you do this exercise of finding out which is the cat pure cat and which is the pure dog.
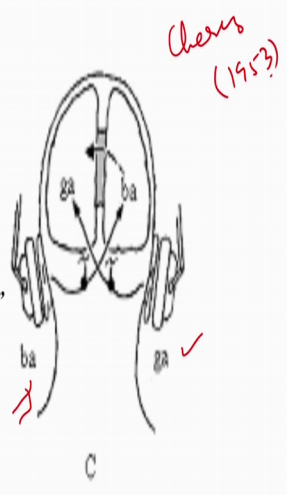
Now once you are given this job you will soon realize the only pure dog is this and the only pure cat is this now how did you come up with this answer. For finding out this answer what you really needed to do is to scan each of these image one by one and for that what you needed to do is to focus all your attention or mental concentration focus yourself into this image and basically compare the prototype as we saw in the perceptions section.

Prototype is basically the most abstract abstraction that you have the most clear abstraction that you have of any category. Use that prototype to compare each of this image with a pure dog image in a pure cat image and once you do that you will realize that the fifth image from the left on the top row is the dog of your dog and similarly the third image from the left bottom on the bottom row is a pure cat and what you did right now when you did this job of finding the pure cat in pure dog is something called selective attention.

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So, the idea here was how do we go ahead and study attention and as I mentioned a few minutes before the best way to do that is using something called dichotic listening task.

Now, what is this task art all about. So, this dichotic task listening task involves a listener a person who listens through a headphone, another on the cavity or the hidden part here is that both the heads or both the channels or both the ears that this person has will be receiving 2 different inputs. So, one ear will be seeing a different input and the other ear will be receiving a different input. When I mean input what it really means is that they will be receiving 2 different messages.

So, it is a situation like this where you can see the one ear is receiving stimulus is like ga go ge kind of thing and the other here is using stimulus like ba be something like that. So, basically for the people who take part in the dichotic listening task are given a earphone and the 2 ears then receive different messages. Now there are some the; obviously, there are some assumptions here or there are some clue there are some points to be noted here, instructions that is followed the first thing is that the people have to shadow one here now what does shadowing actually really mean? The shadowing means to repeat aloud whatever you are hearing in a particular ear that the experimenter is asking you to do.

So, in the dichotic listening task what you really have to do is both the ears that that you have received 2 different inputs from 2 different microphones turn to 2 different

headphones and all you have to do is to shadow one ear. Now shadowing is repeating aloud whatever is here on one other ear. So, if it is right here that you are shadowing whatever is coming to your right ear you are going to repeat that allowed.

Now, the rate of presentation of stimuli in a dichotic listening task is very fast it is nearly 150 words per minute. At the end of the task people are asked to reveal what information that they have gathered from the message, from both the ears or from a single ear. And so, the deal here is that this experiment or this dichotic listening task was designed by someone called cherry in the year 1953. In a classic study cherry define this dichotic listening task. Now the question was there are 2 different ears, on one ear you are doing shadowing the other ear you are not doing shadowing.

The question is whether you are able to hear words from the ear that you are not shadowing; which means that whether you are able to hear from the ear that you are not paying attention to. The answer to this cherry got was that yes most people were able to hear some information, some messages, or some kind of stimulus property from the other ear and this information was basically towards or towards stimulus properties like what is the and what is the message type whether it is noise or whether it is words which has been repeated or who is speaking whether it is a female or a male whose speaking, whether it is the message is in a correct order which is a forward order or whether the messages are in reverse order.

This kind of information basic stimulus information you can gather from the non in intended or non attended ear, but from the right hear you tend to hear everything. So, basically this question here or this property here tells us that people are able to hear some kind of information from the other ear. So, basically attending to one stimulus does not mean that the information from the other ear will not come in or will not be attended to. So, basic information or basic facts from the other ear is also attended to.

Like stimulus properties related to basic message properties that is what is attended to. And so, when a cherry later this this particular thing he said that the unintended ear or he found out that his subjects from the unintended ear although could not analyze the message the meaning of the message from the unintended ear, but they could tell the voice of the person who was repeating it the kind of message that it was whether it was

noise white noise which has been presented or it was words and letters that was being repeated and whether it was a forward other backward direction.

Now what they could not tell of the message which was being played and the nun intended ear was whether the what was the language in it was it was being played and what was the content of the message. And so, this was the first demonstration or this is the kind of a first demonstration a very ingenious design to study attention now as I related before studying attention is difficult because as you say do not pay attention to this people start paying attention. And so, this design has been used in a lot of cognitive psychology tasks or a lot of experimental tasks which measure attention.

So, the question here is what kind of information do we get from the intent intended or the unattended ear? And whether some information and the meaning level can also bypass the attentional filter the question to be looked at is whether attention is in is an all or ninth kind of a filter; which means that when you are not when you are not focusing yourself or when you are not use using attentional filters, whether the one the messages which are not being attended to whether they also pass and at what level what kind of level do they pass.

Now cherries experiment very clearly says that some information or some idea about the non intended message you can hear, but then to what level is what several other theories will argue. And so, there are theories of attention which has been put forward which go ahead and actually talk about what is being attended to and what are the matters being attended to and what part of the non-attended message or what is it from the non-attended message that people can actually here. Now remember in this case in this whole scenario we are talking about focusing our attention on to one ear and we are attending and shadowing it. So, when you are shadowing it becomes really difficult job because shadowing requires you to you to repeat allowed whatever is being said and so puts a lot of mental effort on to the working memory. And so, it will be very difficult to actually go ahead and process anything from the non-in attended here.
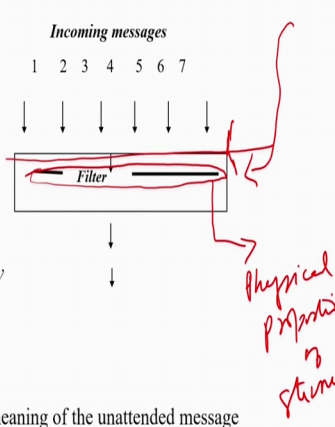
So, the question whether things from the non-attended here stimuli from the non-attended here also moves back or are also heard another paradigm that we will go into further is whether attention is fixed or does it fluctuate and so one of the reason that has been given in one of the theories either attention is never 100 percent. And so, it keeps on

fluctuated fluctuating from one ear to the other ear and that may be the reason why we are able to ear from the other ear, but we will look at these debates one by one when we move into it. So, let us start with the first theory of attention which is called the filter theory of attention.

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Filter Theory

To explain the findings of DLT Broadbent (1958) proposed the *filter theory* of attention which states that there are **limits on how much information a person can attend** to at any given time. If the information available at any given time exceeds capacity, the person uses an attentional filter to let some information through and block the rest. *The filter theory is based on some **physical (basic acoustic in case of DLT)** aspect of the attended message (location, pitch, loudness etc)*

Filter theory explains why so little of the meaning of the unattended message can be recalled: *The meaning from the unattended message is simply not processed.*

So, let us start with the filter theory. So, what does this theory actually say? It is a very simple theory which was proposed by someone called Broadbent in the year 1958 and he proposed that there are limits the cognitive limits of how much information a person can attend to. Now if the information available at any given time exceeds the capacity of the mental the mental limit. What will happen is a filter is designed which we will block most information and let things pass or let those stimuli pass on to which we are paying our attention. And so, it is it is a simple demonstration I had tried to look at the or tell you about this theory or the filter theory.

Now another question is on what properties does the filter work what is the variable switch control the filter. So, let us first look at what happens here. So, there are a number of messages 1 2 3 4 5 6 7 these are 7 messages which are here and which are impinging on to our cognitive system and this is any cognitive barrier which is there, this is the barrier the psychological and physical barrier which I was talking about and as I said in previous lectures that the most important thing in psychology is to define how physical stimulus has entered the psychological domain.

So, this is the barrier which is there it could be here it could be I, it could be anything. And so, the number of messages which I impinging on to it, but the amount of mental concentration the limitation the limit is very less the mental concentration available is very less. And so, what happens a filter like this is available which basically takes in one message and let us it pass and filters all this message away. Now the question is on what properties does the filter work.

And so, the answer to this has been given in terms of physical properties of the stimulus is what so physical properties of the stimuli guide the filter. So, the filter the use of the filter or the variables which control filter is the physical property for example, the basic acoustics in the DLT when decides whether you attend to it or not and these basic caustics could be location pitch loudness and so on and so forth. So, then the filter theory goes ahead and says then that, any message which you are not paying attention to will be blocked only those message which have not been put to a limitation will only get passed on and this is the message which you require. And then the filter which filters out these messages is based on something called the physical property of the stimuli which is impinging on to it.

Now, the filter theory explains while there is. So, little of the meaning of the unintended message in cherries experiment happened the meaning from the unintended message was simply not processed, and that is why we only get the basic physical features of the unintended here remember cherries experiment that we talked a while ago and as I said from the unintended ear things like the basic property of the message whether it is in forward or backward direction or whether it is a male or a female which is which is speaking this message these way process, but nothing beyond that.

And so, that is what the filter theory goes ahead and says it accommodates that, and it says that these are the only thing which can be processed or which is processed through this particular theory because other pictures are not being attained to. Now the question comes that can be not here or can we not pay attention to 2 messages at the same time, can we pay attention to 2 messages at the same time? Is it that; if we are paying focusing on one message is it that the other message gets passed on or only physical basic physical features of the stimulus a register.

Broadbent propose that 2 messages that contain very little information or that information or if the information is presented very slowly in this case we can process both the messages. So, what Broadbent goes ahead and proposes that there are situations in which we can focus our attention or even if you are focusing attention on one message we can process the other message and that happens in only those cases where either both the ears contain very basic minimal information the messages contain very basic in minimal information or the presentation rate is very slow now in these 2 cases and in these 2 cases alone both the ears can be tended to or both the messages can be actually read or perceived.

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But an interesting thing was pointed out by someone called Moray in 1959. And he is stated something called the Cocktail party phenomenon. Now what is the Cocktail party phenomenon? Now in the Cocktail party phenomena look at the figure on your right as you see there is so many people sitting here and it is a large party which is happening everybody is enjoying this large sounds loud music everywhere. And so, even in this cases and you are focusing yourself on to what your friend next to you is talking. So, this person or these people are actually listening to listening to somebody who is talking among their growths.

Now in the Cocktail party phenomena what moray suggests is that if your name is said or if some bodies name is uttered this message even if we are not attending to will pass this

filter will pass the filter. Which filter he talks about and that raises a problem now what he says what more goes a ahead and says in the cocktail party phenomena is that shadowing performance is disrupted when one's own name is embedded in either the unattended or the attended, ear now this happens as important materials can penetrate the filter set up by set up to block unintended messages.

Now pashler experiments say that only all although only 33 percent of people could actually when the could actually hear their name when they were not informed before, but then this really happened which basically means that there are certain stimuli out there where which can be processed. When your name is being processed from the unintended ear which means that it is being processed not at the level of the stimuli, but the level of meaning because you know your name has a meaning and when your name is being processed when somebody is speaking your name it is a meaning.

So, at the even at the level of meaning your name or words like fire or words which are more important to your adaptation our process, and so one of the what the cocktail for a party phenomena goes ahead and says that whatever Broadbent suggested in his theory filter theory which says that only those messages we are tending to gets passed and processed from meaning whereas, other messages if ever process a process for basic properties is actually wrong.

And so, he demonstrated the that through this phenomena where he where he very showed that peoples own name or some important words which are adaptive in nature can be processed even from the unintended here. So, even if in a big party where you are enjoying yourself listening very hard to your friends and somebody calls your name it is found that most people turn around and look at who is calling their name which means that they are able to attend within that huge voice when that huge noise into their name.

And the reasoning that was provided for this particular feature of the Cocktail party phenomena was that attention fluctuates, since attention fluctuates since the attended ear never takes up 100 percent of attention, that attention keeps on fluctuation in between the unintended and an intended here and that could be the reason why the cocktail party phenomena happens. So, shadowing in Morays term shadowing does not take 100 percent of attention since attention fluctuates between the attended and non-attended here

and that could be the reason why you are able to here at the message level the information from the unattended ear.

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FIGURE 3.3: An Illustration of the Treisman experiment. The meaningful message moves to the other ear, and the subject sometimes continues to shadow it against instructions. (Adapted from R. L. Klatzky, Human memory, 1st Edition, W. H. Freeman and Co. Copyright 1975.)

Now, Anna Treisman actually goes ahead and hits back at or demonstrates that whatever Moray says in terms of attention fluctuation or not or the fact that 100 percent attention is not being paid on to that in nature ear is wrong. And so, Anna Treisman designed and very ingenious experiment to test whether the attended channel the channel the ear that is being used for shadowing that has been used for reading allowed the words at which is being put into that ear whether 100 percent attention is being is devoted to this ear.

And so, in her experiment what she did was she used the same dichotic listening task in which 2 ears were there or 2 the 2 different ears got 2 different kind of messages, and what really happened is that the message one ear was to be shadowed and the other ear was not to be shadowed. Now in the only interesting thing or the only new thing in this experiment was that in the middle of in the middle of the whole listening task the messages where reverse.

So, the message on the right ear went to the left ear and the message from the left ear right went to the right ear. What really happened? The results of the experiment suggest that people who were paying attention or shadowing the left ear and as soon as the message from the left ear shifted to the right ear they continued hearing the message from the left ear and repeated a couple of words also of the message from when even

after the message got reversed into the right ear which means that they were clearly focusing 100 percent attendant.

So, at the point when the switch happened people did not know the switch people did not follow the switch and they moved or they were able to repeat a couple of words from the unintended ear or the messages from the unintended ear after the switch. It basically means that people were paying 100 percent attention the into the attended ear and later on as time progressed or after the couple of seconds people started repeating after the switch messages from the unintended ear.

Which basically proves that people are able to pay 100 percent attention and that the reasoning that attention fluctuates is not. So, correct a similar experiment was done by someone called Wood and Cowan. And so, they wanted to test similar experimentation by Wood and Cowan and Conway Cowan and bunting in 2001, resulted in showing that messages from the untreated ear was also processed that is challenging the filter theory. And so, what Wood and Cowan experiment was that Wood and Cowan use the same dichotic listening task for their experimentation.

Now they have they gave on both the ears 2 different film clips to be heard on one ear you have the grapes of what dialogue from the grapes of what which was being processed and on the other ear from 2000 space odyssey dialogues were from that particular movie was being repeated. And so, people they were to group of people who were able or who were given this kind of a task to be done and a control group was also there. Now people were asked to shadow the grapes of our dialogue for the grapes of what movie and the words represented 175 words per minute.

So, basically the setup is like this the 2 ears here 2 different movie dialogues the left here is something from the grapes of what movie, and the right ear hears of dialogues from 2000 space odyssey. 2 group of people do that there is a control group also the which is there and the word presentation is 175 per minute, and people are asked to shadow or repeat allowed the message which comes on the leftth ear or the ear which is which is here in the grapes of what.

Now, 5 minutes into the experiment 5 minutes after the experiment started the unintended ear the ear which was here in 2001 space odyssey dialogue there was a reversal. So, the message goes reverse or black test a back messaging was done. So, that
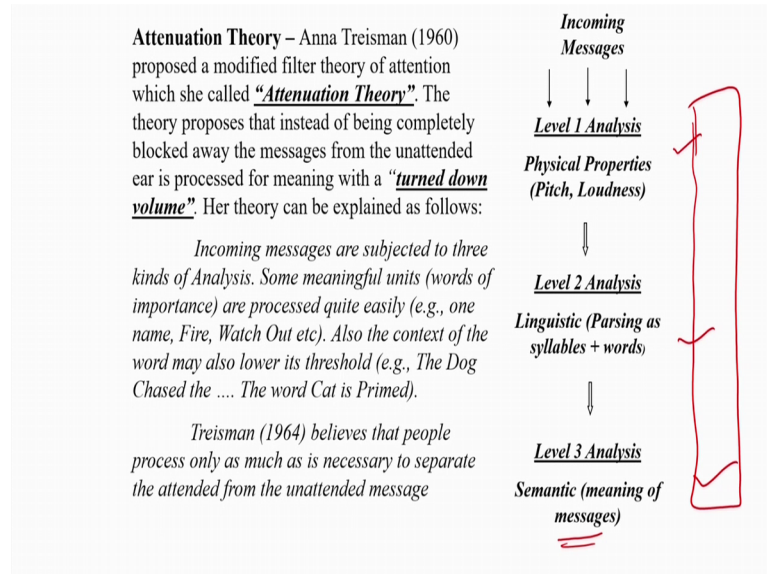
words were repeated from front to back shadowing or a backward message was played into it, and that happened only for 30 second and later on after that, one group heard the or followed on to the original experiment for 2 and a half minute, one group followed the experiment for one and a half minute and the control group actually never saw or never heard the back of messaging into the unintended ear. Now it was the result what would be the result of the experiment.

And so, then experiment like this the result is that people who notice the backward problem shadow the people who actually go ahead and notice that there is a backward shadowing on one of the ear, they create or they do more number of errors and this error exit actually gets generated after the backward messaging stops. Whereas, people who actually do not people who actually do not hear this backward messaging they never notice that the backward messaging was done.

Also, the third group who did not hear any kind of backward message they never heard any kind of thing. And so, there was that was what was comp comparable. And so, the idea from this is that this at this idea of attention shifting or attention fluctuating between 2 ears is not so correct and that was what was relate so that was the main idea of would not condense theory.

So, fill they went ahead and this particular experiment suggests supported the filter theory that, when only those messages you are tending to actually go ahead and a process, but those messages you are not attending to are not process.

That is the bottom line of the Wood and Cowan experiment. Now these are very interesting experiments or these are a very interesting theory of attention, but later on another attentional theory or theory of attention, of how the attention works or how attention goes attention filter goes ahead and looks at cognitive resources or the location of cognitive resources 2 different factors are different cognitive tasks and one of the limitation of this was proposed by someone called Anna Treisman. So, Anna Treisman what she did was Anna Treisman 1960 proposed a modified theory of attention which is called the attenuation theory. It is a very simple theory to look at. Now the theory proposes that messages from the unintended ear is not blocked.

So, what happens then messages from the unintended ear according to Anna Treisman is actually toned down is brought down or volumed down is attenuated. And so, what she says is the volume of the unintended message that, the tone of the unintended message is attenuated or a brought down and that is the reason why this kind of an attentional filter really works.

So, incoming messages what Anna Treisman, but then extended a theories to that any incoming message any incoming information on to the sense organ before the attentional filter works on to gets cross through or 3 stage attentional filter. And what are these attentional filters. So, incoming messages what she says are subjected to 3 kinds of analysis there is a physical analysis, there is an analysis at the word level and there is an

analysis at the meaning level, we quickly look into that in a minute. Now some messaging units are processed quite easily because they have more adaptation or more adaptive value right and sometimes messages are also processed from the unintended ear.

So, some messages from the unintended ear a process because they have adaptive value like your name you words like fire, danger that kind of words because they have adaptive value the or the help you negate a threat. Some of the messages are also processed from the unintended ear because they are in context for example, if unintended ear you are being played this message dash is chased by the dog and in the attended ear if you have words like cat into it you will quickly go ahead and hear the word cat it is something called the context effect.

So, sometimes context in which the message is being played the context of the message also helps us in attending or in processing messages from the unintended ear. So, what Treisman Anna Treisman says that any message which has being processed which is move process to the attentional filter goes through 3 stage of filtering, 3 extensive stage of filtering. So, I have a drawing here to basically go ahead and show you that how does it happen. So, this is the incoming message any incoming message at the first level of analysis are the physical properties of the sound of in terms of sound because since we are looking at the dichotic listening task for I, but sound here what happens is the first level of analysis f is at the level of physical property.

And so, here physical properties of the sound or the message which is being relayed ordinarily to you in terms of it is pitch and loudness is what is being focused on. So, this is where the focus is. If messages pass through this stage it goes through a second level of analysis where linguistic or parsing as syllabus and words is done. So, if the messages are not filtered at level one of attention which is the attention filter dependent or based on the physical property second level is our second level analysis the second level filtering is initiated and, in this level, what really happens is that the filter is dependent on.

So, the linguistic parsing in terms of words and syllabus and so, if in terms of words and syllabus the filter operates here in terms of the linguistic property of the world. So, what kind of linguistic property a word has what whether it is in which context how many words are there so differentiation in terms of da ba kind of one thing it is it happens at

this level. Even if at this level the filtering cannot be done if there is a problem in filtering or if the filter does not work in this level a third level of filtering is or level 3 analysis is run on to a level 3 filter is run on to the incoming messages which is the semantic level.

And here if the messages are not blocked or cannot be blocked at level 1 or level 2 a semantic level filter is applied, where the messages are blocked in terms of the meaning. And so, here the filtering happens in terms of the meaning what the message has or what is the meaning of the message and in on the basis of that. Basically, go ahead and make the filtration or the blocking of messages are done in terms of the filtering.

And what Anna Treisman goes ahead and says is that the Cocktail party phenomena happens because your name or certain other words which are adaptive value have lower thresholds. When they have lower thresholds, they are get processed from level 1, level 2, and level 3 and at the level 3 even at the levels here the semantic level it is the meaning of your name. And so, it since it has very less threshold it gets processed. Now what Treisman Anna Treisman goes in and says is that people will use these levels of analysis based on at what level they can separate the attended and the unattended ear.

So, let us say the messages of similar physical property is coming at both the ears. So, filtering will not be done here. And so, a second level will be applied where people will be looked at in or both the messages will be looked at in terms of the linguistic properties in the in terms of the words in terms of the phases that is that. Suppose both the messages have the same tone the same physical property as the say as well as the same linguistic property, only in those terms only in those cases a semantic level analysis will be done.

Now to prove this Anna Treisman did an experiment a dichotic listening experiment where both the ears were hearing a message and in both the in the attended ear the message was about particular seashore and the word bank came in some here, and on the unintended ear the financial structure bank was being produced or something related to the finance structure was being put into. And so, for distinguishing when bank the word bank came in both the ears they were having the same physical properties the same speed the same word properties 4 words same kind of a thing.

And so, a semantic level analysis a semantic level filter was applied and because the context in which the attended message was working on the bank what they were discuss
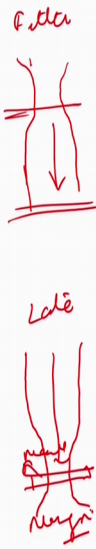
was being described in the attended message was in terms of sea shore a bank of shore, bank of a sea kind of a thing, bank of a river kind of a thing, the water body and so that was the message it was grabbed and the financial institution which was being grabbed which was in played on the unintended ear which also had the word bank was not taken forward and so, at this level the kind of analysis or the kind of interpretation was done.

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So, basically then these are the theories which have been proposed for using or for attentional studying attention or how does the location of attention really works. Another theory which is out there which looks into which adds on to the theories that we are discussing is something called late selection theory.

Now, this theory is much similar to what the filter theory has in it was proposed by someone called Deutsch and Deutsch in 1963 and what does this theory and the theory was of course, modified by Norman in 1968. And so, what does the theory say? Well the theory takes up some information from the filter theory and some information from Anna Treisman theory and comes up with a new theory and what this theory says is that the filter that Broadbent talks about does not happen at the initial stage of processing of a message, what happens at a later stage at a meaning stage and that is what the theory is all about.

So, what this theory goes ahead and says a that all messages are routinely processed for at least some aspects of meaning. And the bottleneck the filter since in the in the filter

theory the bottleneck or the filter the filter is equivalent to the bottleneck think of a bottle and the neck of the bottle basically prevents spillage of information. So, the bottle neck or the neck of the bottle is thought of as a filter. And so, in the filter theory this bottle neck is towards the top of the bottle. And so, since it is there what happens is much information does not rush in. And so, the spillage of information from the inside to the outside is reduced.

Now, what Deutsch and Deutsch 1963 theory of late selection says is that this bottleneck appears at a later phase of time, at a later stage in message processing and the bottleneck comes in a later point of time. So, a message important depends on many factors what is what makes message important according to this theory. So, basically what they say is that most messages are processed through all the stages to process through most of the features and to or and to some level of meaning and only at the level of the meaning we have this filter or bottleneck coming in.

So, if this is how I have the filter theory where this is the bottleneck and later on this is the processing stages this is if I can describe the filter theory, the late selection theory says that this is how it looks like. So, all messages are processed early on and later there is a filter of bottleneck which a through the meaning using the meaning as the reason for the filter or meaning being the variable which controls the filter through which a message is stopped or block. And so, they what they again go ahead and say that there are several other variables which of determined how the filter will work, and they say that the content and personal significance of messages are also responsible for this filtration.

What is the content the message and what is the personal significance of a message. For example, names of people for example, certain words which are personally significant to people they have very less threshold and they are not blocked by the filter even at the late stage and for when it is process for meaning it is led in that kind of information is letting whether you are focusing it or not. And another thing that they bring into the picture another interesting variable that bring into the picture of attention is something called the observers level of alertness.

How alert somebody is that defines, how you will process an information or how much information you will be process the more alert you are the better processing of a

messages you can do, the more attention you can pay the lesser alert you are the lower alertness you are showing for example, alertness in sleep or if you are in a sleep stage, if you are sleeping, you have very low lower level of alertness. And so, the message will not be processed at all.

An additional factor is the complexity of the message, if complex messages are there then these messages will take more resources. And so, processing will be difficult, but if easy messages are there then even the non-intended messages actually get processed. So, in this lecture we looked at what is attention, what are the various factors which determine attention, what are the theories which go ahead and explain attention we looked at 3 theories of attention and try to compare these theories of course, we will do a more comprehensive comparison of these methods or these theories at a later stage or later point of time, but this is what we did in the structure we looked at what is attention what factors control attention what is the definition of it and best of all how do we study attention, it is an interesting thing because once as I discussed before if I say do not pay attention you start paying attention to it.

So, how is it solved an answer to this is something called the dichotic listening task. So, bye, bye we will meet again in the next lecture and continue with this.

Thank you.