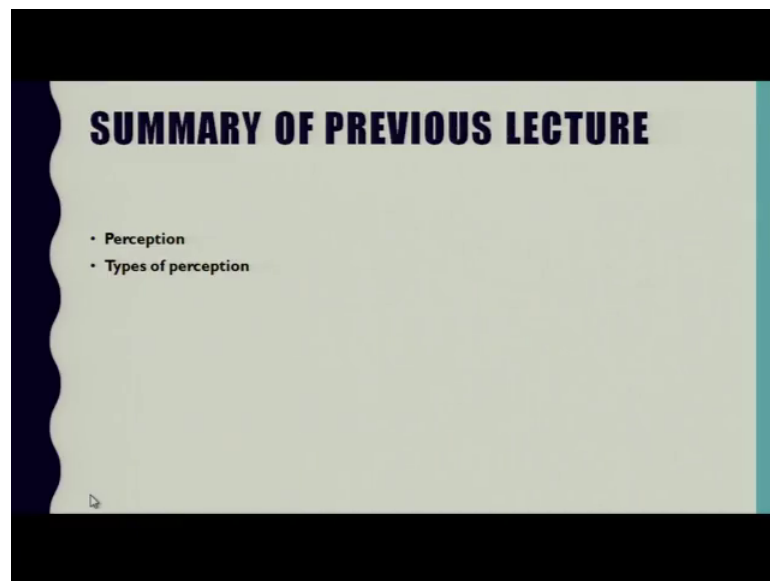


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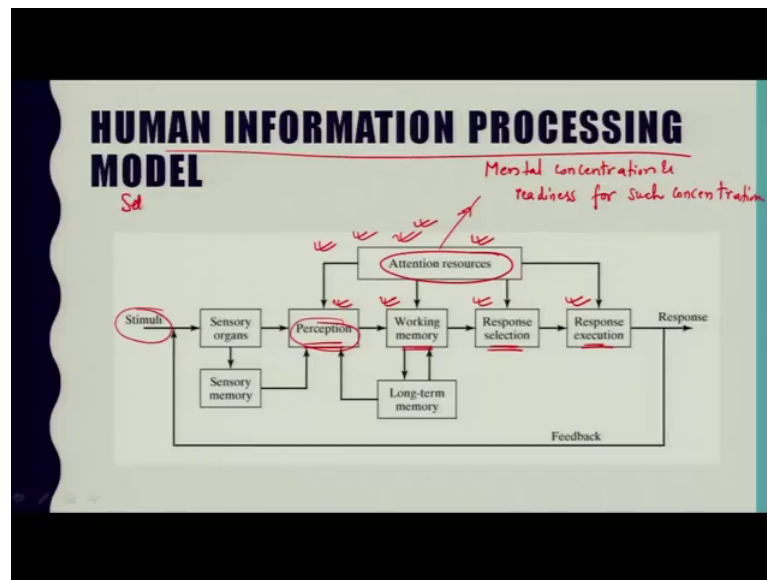
Lecture – 14

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So, welcome to this lecture series of cognitive ergonomics. So, we in this lecture are going to cover this what is attention and attention resources. So, in series with this we will be covering attention resources; and as for as previous lecture covering is concerned, so we covered this perception and types of perception. So, as far as the definition of attention is concerned every as a normal English word attention is nothing but a folk sink towards particular work. So, if you are giving a proper focus or keeping your mind towards a particular work that is attention. So, but this attention is playing a very important role in cognitive ergonomics. So, any cognitive active which you want to work in a well efficient manner, so the attention is very much necessary. So, in cognitive ergonomics, this attention as of several types that we will discuss in later slides.

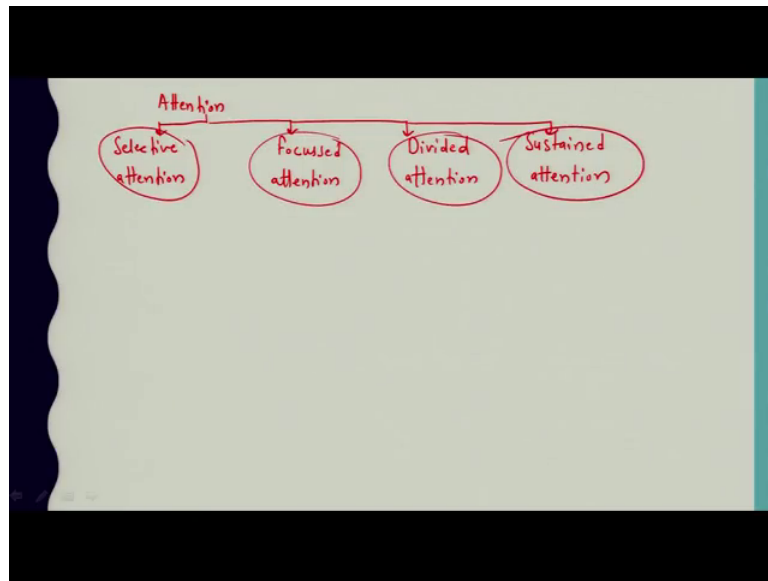
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And this particular model that you are seeing in the slide, so this is the human information processing model that we are taking every time in order to understand this cognitive ergonomics in a better way. So, as you can see that we covered in the previous slide, this perception portion stimuli we are parallel covering throughout our discussion for this ergonomics. So, here this particular part now we will focus in this lecture. So, attention resources occupy an very important position in our model of human information processing.

So, as the particular diagram is indicating that attention resources at a part nearly all stages of cognition as a driver of these stages that perception, working memory, response selection, response execution. So, in all sort of part of human information processing this attention resource is playing a very important role and in fact, it occupies a top position in this particular model of human information processing. So, here attention is just having meaning to keep once mind on something that something maybe any work that is related to your daily activity or the work related to your job. So, it involves nothing but mental concentration and readiness for a such concentration. In cognitive ergonomics, several types of attention are being explored. So, these attentions are selective attention in fact, we will use a separate slide for that.

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So, this particular attention can be distinguished as selective attention, it can be focused attention, another kind of attention is divided attention and sustained attention. So, in this way this attention can be subdivided into four categories. So, now we will try to understand what this selective attention is, what focused attention and what is divided attention and what is sustain attention.

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SELECTIVE ATTENTION Humans are inherently multi-channel beings as they have multiple sensory organs (eye, ears, nose)

Refers to a situation in which a person needs to monitor multiple sources of information in order to perceive irregularities or opportunities.

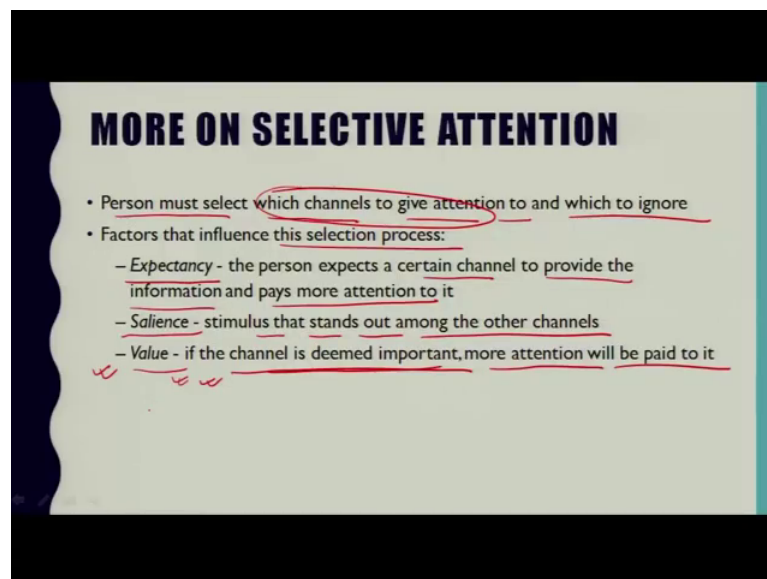
- Involves filtering out certain channels of information in order to focus on one channel that is deemed important
- Examples:
 - Pilot checking gauges, looking for readings that might explain airplane's erratic behavior
 - Football quarterback watching other team's defensive line to exploit weaknesses
 - Driver periodically checking the gauges and dials on the dash-board while watching the

So, first of all we will take selective attention. So, this particular selective attention it refers to a situation in which a person needs to monitor multiple sources of information

in order to perceive irregularities or opportunities. Basically it involves filtering out certain channels of information in order to focus on one channel that is deemed important. And then obviously, rotating attention to other channels in sequence or intern. So, human are inherently multi channel beings in that they have multiple sensory organs and each one is capable of responding to multiple stimuli. So, we can make a one sentence here also that humans are inherently multichannel beings has they have multiple sensory organs like eyes, ears, nose etcetera; and each one each one of this sensory organ is capable of responding to multiple stimuli.

So, examples of selective attention include the following which can be the pilot checking gauges looking for readings that might explain airplane's erratic behavior. Football quarterback watching other team's defensive line to exploit weaknesses. Another kind of example that you can take a driver periodically checking the gauges and dials on the dashboard while watching the road ahead, driver periodically checking the gauges and dials on the dashboard of four-wheeler while is parley watching the road ahead.

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MORE ON SELECTIVE ATTENTION

- Person must select which channels to give attention to and which to ignore
- Factors that influence this selection process:
 - Expectancy - the person expects a certain channel to provide the information and pays more attention to it
 - Saliency - stimulus that stands out among the other channels
 - Value - if the channel is deemed important, more attention will be paid to it

So, here in this case the person must select which channels to give attention to and which to ignore at a particular moment of time. So, in a task involving selective attention, the individual must be aware and must be sensitive enough to decide which channel to give proper attention at that particular time and which channel to neglect at least or a temporarily basis. So, factors that influence this selection process is including

expectancy, salience and value. This expectancy means that if a person expects a certain channel to provide the information and pays more attention to it. Salience refers to the stimuli that stands out among the rest of the channels, they grab your attention. The truck horn in an earlier example was a salient a stimulus.

The finally, the value, the value of the information acquired by means of a given input channel is likely to by its selection. If the channel usually provides no useful information less attention will be paid to it. So, conversely if the input channel is deemed important more in attention will be paid to it. So, while driving a car leaving the road and the vehicle ahead is much more important channel that has to see a gasoline dashboard the gasoline gauge in the dashboard. So, here this selective attention is to set the priority that at particular time which thing has to be focused on and which thing has to be what kind of thing has to be in a lesser priority.

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FOCUSED ATTENTION *only one channel / Exclude all of the other stimuli.*

Proximity refers to the physical distance of stimulus source from the person trying to focus attention.

Refers to situations in which a person must cope with multiple input channels but focus on only one channel for a sustained period of time

- Person pays attention to one stimulus and is not distracted by others ("noise")
- Examples:
 - ✓ Conversing with a friend in a crowded room full of people who are also talking
 - ✓ Reading a book in an airport lobby
 - ✓ Fighter pilot landing an airplane on the deck of an aircraft carrier during rough seas

So, now we come to the next attention that is focused attention. So, as in selective attention, task involving focused attention force the individual to cope up with the multiple input channels, but the differences is that the person must focus on only one channel for a sustained period of time and exclude all of the other stimuli. The person attention to one stimulus and is not distracted by the others which can be considered as a noise at a particular time, so that particular attention is known as focused attention. So,

irrespective of the noise and the external disturbances that is around a particular person if he is focusing towards a particular work that is his focused attention.

So, focused attention refers to the situation in which a person must cope up with multiple input channels, but focus on only one channel for a sustained period of time. This person pays attention to one stimulus and is not distracted by others, these other factors are considered as a noise. For example, having a conversation with one friend in a crowded room, which is full of people who are also talking. So, this particular situation everybody can face in his life and when you are completely focused in towards your own words to communicate to the person in front of you, so that is your focused attention.

The second kind of example that we can take here in the category of focused attention that is reading a book in an airport lobby, while many other activities are going on in that particular area. Another kind of example in focused attention is a fighter pilot landing on his airplane on the deck of an aircraft carrier during rough seas. So, the factors affecting one's ability to focus attention on a single stimulus include proximity, separation of sources and the ground noise. Basically this particular approximate is what it refers to the physical distance of the stimulus is basically it refers to the physical distance of a stimulus source from the person trying to focus attention. It is easier to pay attention to someone when they are speaking right next to you.

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MORE ON FOCUSED ATTENTION

- Factors affecting one's ability to focus attention on one stimulus
 - Proximity - distance of the stimulus source from the person trying to focus attention
 - Separation - refers to stimuli arriving from different directions
 - Easier to focus attention on a source directly in front of a person
 - Background noise - (e.g., visual clutter, auditory noise) affects one's ability to focus on a desired stimulus
 - Intensity of background noise → visual clutter
 - Auditory noise
 - More noise, the less one can concentrate on the desired stimulus.

So, why I am talking about this proximity, because these are the factors affecting one's ability to focus attention on one stimulus. So, the proximity is the distance of the stimulus source from the person trying to focus attention. There is another factor that is affecting one's ability that is separation. So, separation of the sources means that stimulus are arriving from distinctly different directions. So, it is basically easier to focus attention on a source directly in front of a person meaning thereby that it is easier to focus attention on the source that is facing you rather than someone located in your peripheral vision.

Then other kind of thing is background noise. So, this the intensity of the background noise is giving you some sort of distraction; and it is adversely affecting your ability to have focus attention to a particular work. So, the intensity of the background noise it may be visual clutter, it may be auditory noise, so less one can concentrate on the more noise basically more noise the less one can concentrate on the desired stimulus, so that is the idea towards this focused attention. And this is the complete explanation of focused attention and you can easily correlate with the day-to-day activities in order to express this focused attention.

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DIVIDED ATTENTION

Recommendation

- (1) Minimize number of input information channels
- (2) Reduce the level of difficulty of the task
- (3) Reduce the similarity of tasks in terms of demands on input channels, mental processing & output requirements.

Refers to situations in which there are multiple stimuli, but multiple tasks must be performed together

- Examples:
 - Driving a car while talking on a cell phone with someone
 - Doing income tax return while watching television
 - Machine operator attending several machines in a machine cluster

Now, we come to the another kind of attention which is divided attention. So, here this divided attention refers to the situation in which there are multiple stimuli, but multiple tasks must be performed together. So, here in this case there are again multiple a stimuli

present, but difference is here is that the multiple task must be performed together. So, here kind of word is coming here that time sharing, so that time sharing is something used for this type of situation.

So, here in this case is divided attention does not necessarily means that at the same time you have to perform two task. So, there is no as such compulsion in this definition that the task should be performed simultaneously although that sometimes happened, but in many cases the individual performing the multiple task accomplishes them sequentially switching back and forth among them. So, now, I am giving you some examples, so that the definition of divided attention could be more clear. So, the driving a car while talking on a cell phone with someone; so driving a car while having a conversation with the passenger in car that is also one of the example. Driving a car while talking to a cell phone with someone, doing income tax return while watching television, or a machine operator attending several machines in a machine cluster.

So, the important issue in divided attention is that the performance on at least one of the task is likely to be adversely affected because the person is trying to accomplish more than one task at the same time. So, the following recommendations there are several recommendations address this issue in order to improve performance in divided attention situation. So, the first kind of recommendation is to minimize number of input information channels; the second is to reduce the level of difficulty of the task; third recommendation is to reduce the similarity of the task in terms of demands on input channels, mental processing and output requirements etcetera. So, in this way these following recommendation address this issue; and at the same time when you are performing in multiple task as a divided attention so as an ergonomics these issues, can be address as a recommendations.

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SUSTAINED ATTENTION

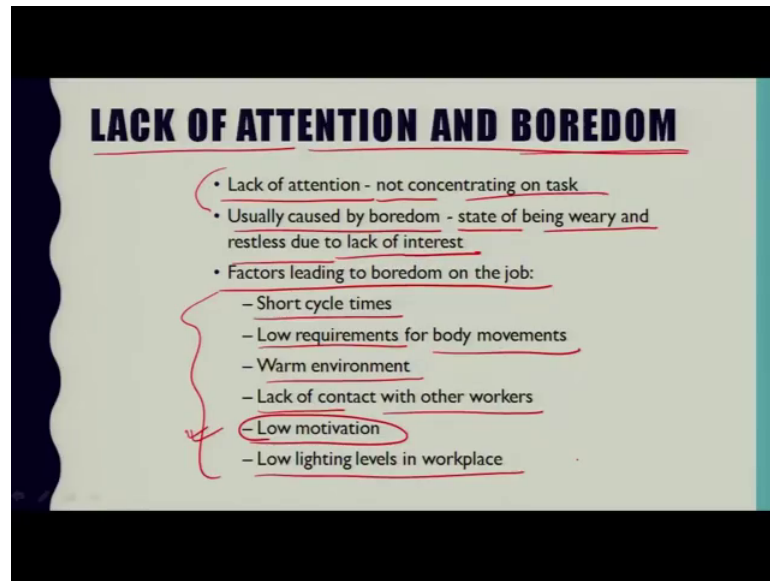
Refers to situations in which a person must watch for a signal of interest over a relatively long period of time, and it is important to avoid missing the signal

- Also known as vigilance
- Examples:
 - Inspector looking for defective products moving along a conveyor line
 - Radar operator monitoring a radar screen for incoming aircraft of enemies
 - Security guards observing ATM with TV monitors showing scenes of various locations in a building and etc

So, now, we go to the next attention and that is sustained attention. So, this sustained attention which is intact also known as vigilance. It involves a situations in which a person or any individual must watch for a signal of interest over a relatively longer period of time, and it is important to avoid missing the signal who were a relatively longer period of time, and it is important to avoid missing the signal. Basically false alarm should also be avoided, but the situations are usually such that a much higher penalties paid for the missed signals. So, in that case just putting several examples so that the sustained attention can be expressed in a used way.

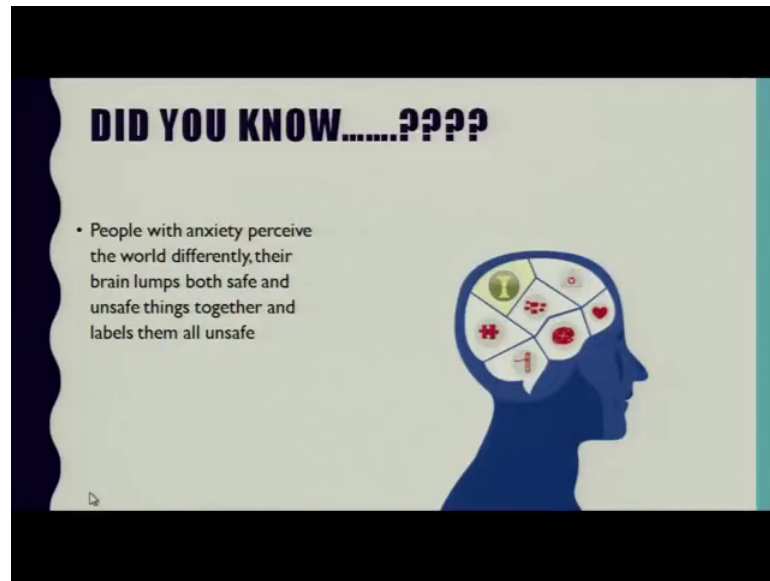
So, as an example and inspector looking for a defective products moving along a conveyor line on their way to packaging; another example is the radar operator monitoring a radar screen for incoming aircraft of enemies. So, this is the case where false alarm should also be awarded and situations are in such that that the higher penalty can be paid for a missed signal. And another example the that sustained attention can be carried that the parent waiting up for a teenage son on his first night out with the family car. So, another example that you can take that a security guard observing a ATM with TV monitors showing scenes of various locations in a building and looking out for intruders. So, these are some of the examples which you can take help to understand this sustained attention.

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Now the next topic is lack of attention and boredom. So, in that case the lack of attention means not concentrating on particular task. So, what will be the resultant, so it will result in the demonized a state of the readiness to perform the task. So, it is usually caused by the boredom that is state of being weary and the restless and due to lack of interest. So, I hope that the students were listening to me will not be in that is state or to hearing me, so I hope this kind of boredom is not appearing by my lectures. So, the factors that is leading to boredom on the job or shorter cycle times, low requirements for body movements, warm environment, lack of contact with other workers, low motivation this is the one of the important factor which appears to every employee in an company though that is inclining towards this lack of attention. So, low lighting levels and like improper physical work environment in the workplace. So, those are the situations who were which is leading to the boredom on the job.

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Now, going to close this lecture and but before that that just of fact I have added for you that do you know that people with anxiety perceive the world differently, their brain lumps both safe and unsafe things together and labels them labels them all unsafe. Just have a brief history of cognitive psychology because this in the 19th century the William James have contributed in the form of writing the first psychology textbook that is principles of psychology which was the central work of his career. The concept of functionalism is expressed in James psychology, which he treats as a natural science. Functionalism is the adoption of living persons to their environment. Lames also contributed to the James-Lange theory. This theory is states that we feel an emotion because of the action in which we choose to engage. For example, we infer are afraid because we run. So, this has the William James has contributed in the 19th centuries part of the cognitive psychology and there is a graffiti for you I am leaving this sentences for you to understand. So, you read it and understand and enjoy and be ergonomically effect.

Thank you.