Introduction to Brain and Behaviour
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Lecture – 27
Categorizing Emotions

Hello and welcome to the course Introduction to Brain and Behaviour. I am Doctor Ark Verma from IIT Kanpur. This is the sixth week of the course and today will be talking about categorizing emotions.

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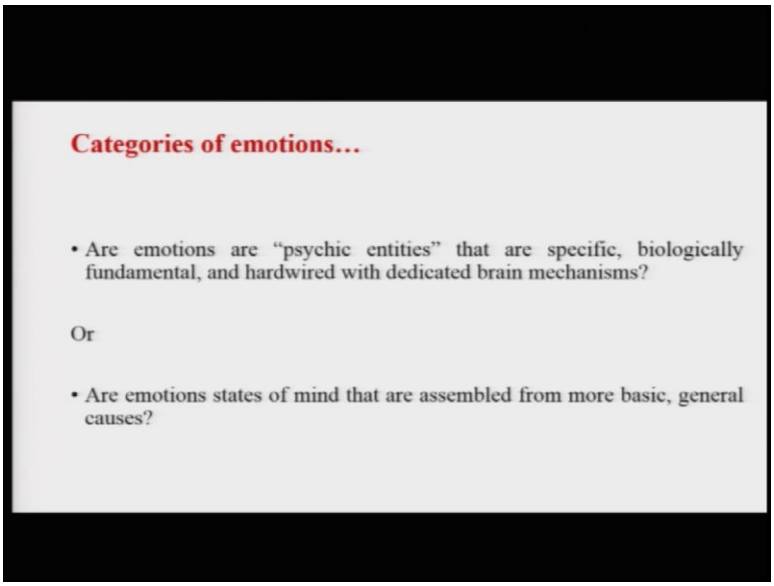

Now, we can begin asking this question or basically begin the task of categorizing emotions by asking a couple of questions. The questions could be say for example are emotions are psychic entities are they things that exist in our abstract mental world that are very specific biologically fundamental and hardwired with dedicated brain mechanism? So, basically what I mean by saying is there a thing called happiness? Is there a thing called sadness, anger, despair, love whatever?

Are these actual things that exist in your brain spacing or metaphysical world or in your psychic world as people like to call it? So, that is one question. If already question is if these are things are they very specific? Are they hardwired in the brain or say for example are they dedicated brain mechanisms, that take care of let us say feeling of anger, feeling of happiness, feeling of sadness, feeling of love and so on.

Or in a different way we can ask that our emotions states of mind that are assembled from more basic and general causes. So, the idea could be that mind undergoes different kinds of subjective experiences and it could be possible that emotions are just assembled from these general causes. So, general feelings of pleasures or general feelings of disappointment accumulate to can make you feel either very happy, sometimes or very-very angry at others. So, we can sort of ask these questions and we can move ahead to starting to understand how the emotions are categorized.

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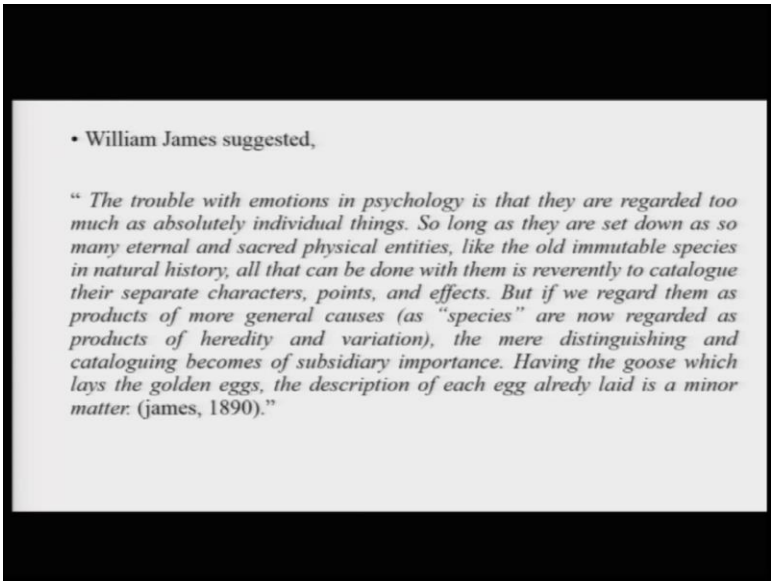

Now, William James the father of psychology as he is popularly known as. Suggested or he said this about emotions where he said that, the trouble with emotions I psychology is that they are regarded either too much as absolutely individual things. So, his idea was that he probably had a problem with the regarding emotions as separate distinct entities.

Anger separately, happiness separately, love separately, sadness separately and he said, so the trouble with emotions in psychology is that, they are regarded too much as absolutely individual things. Now, so long as they are set down as so in many eternal and sacred physical entities, like the old immutable species in natural history.

All that can be done with them is reverently to catalogue their separate characters, points and effects. So, as long as we start you know as long as we treat each emotion as a very separate individual entity. Then it will be very difficult to sort of sew them together or stitch them together in a particular theoretical framework or to understand every thing.

Because it will basically we get all we can do at that point is, just to catalogue their separate characters to catalogue their different points and different effects. But, on the other hand if we regard them as products of more general causes. Say for example, as today species are now regarded as product of heredity and variation or in a matters of genetic mutation.

If we kind of treat them as generic experiential things that are sort of you know arising out of general experiences. And various permutations and combinations of these experiences are making it feel sometimes happy, sometimes sad, sometimes frustrated, sometimes disappointed or sometimes proud, sometimes ashamed, guilty and so on.

So, this is basically the idea that James is putting forward. He says but if we regard them as products of more general causes they may distinguishing and cataloguing of them becomes of subsidiary importance. Then we are not really concerned about what is each specific emotion is about and what are its characteristics experiences and behaviours.

Rather we can actually put them in a particular framework that will actually further our understanding of emotions. You know what is says is rather funny and he says, that having the goose which lays the golden eggs, the description of each of the eggs laid is a minor matter. So, he basically the says is on understanding the whole concept of how are emotions as a general phenomenon generated.

How do they come about? What are the experiences that they lead to? What are the causes that generate them and so on? So, this is one way or one of the classical let us say oppositions to categorizing emotions. So, James as you can see says that, categorizing emotions is a subsidiary is of subsidiary importance is not really going to help us in furthering our understanding of emotions as phenomenon anyways.

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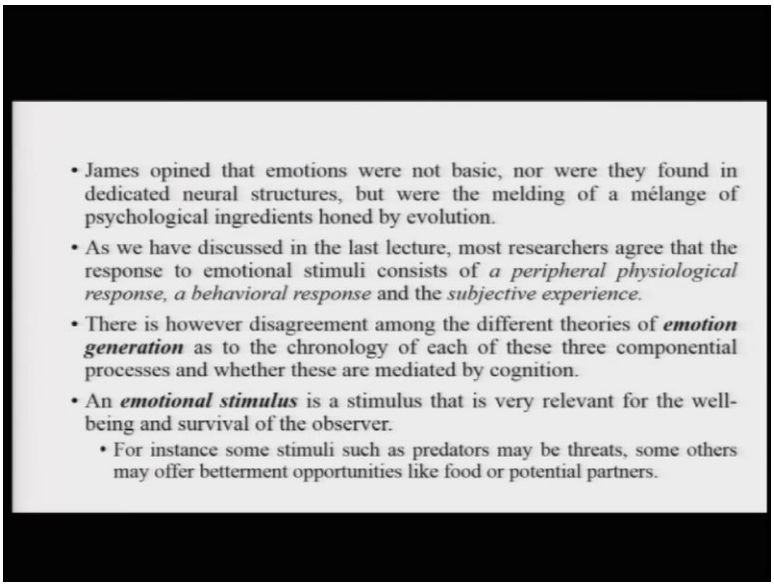

James opined that emotions were not basic, nor were they found in dedicated neural structures. But, they were typically the melding of a mélange of different types of psychological ingredients honed by evolution. You know by evolution as beings we have learned to experience certain things. We have learned a lot of things culturally mostly however by evolution let us say.

A mix of these different psychological ingredients, a mix of these different aspects of experience. You can they can you know you can sort of wrap up that emotion and understand it in that sense. Now, as we have kind of already discussed in the last lecture, most researchers agree that response to an emotional stimuli consists of three parts.

What are the three parts? A peripheral psychological response, a behavioural response and finally the subjective response or feeling. There is however some disagreement between researchers about the different theories in among the different theories of emotion. And basically the idea is what is the chronology of these three? What is the chronology of these three events? What comes first? Does peripheral psychological response come first? Does behavioural response come first? Feeling of a particular kind happened earlier.

This is something on which separate different psychologist have different takes and different kinds of disappointments. Now, an emotional stimulus is a stimulus that is very relevant for the well being and survival of the observer. If the stimulus is not relevant for the well being and

survival of the observer. He will not feel any emotion or response to that stimulus or she will not feel any emotion in response to that stimulus.

So, for instance some stimuli such as predators may be threats, some others like cute animals may offer betterment opportunities feeling philosopher. Say for example, foods may offer opportunities for nourishment, potential partners etc. So, different kinds of stimuli differ in their potential to elicit different kinds of emotional response.

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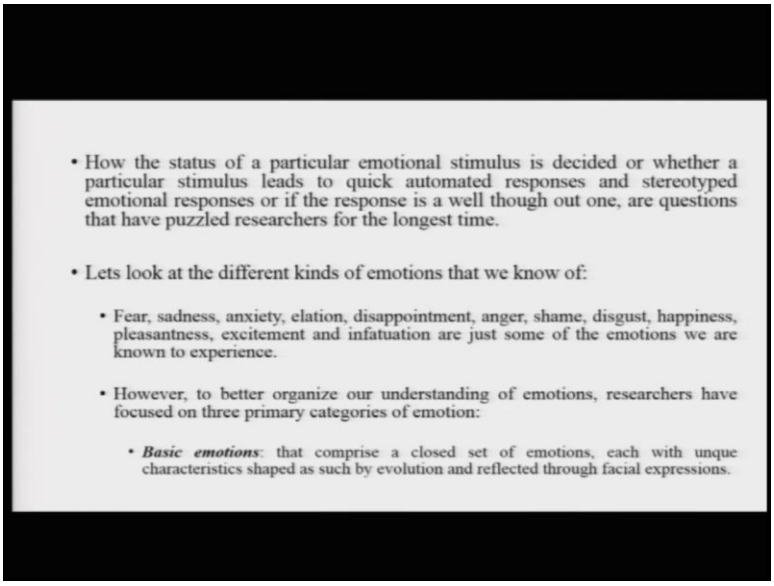

Now, how the status of a particular emotional stimulus is decided on such as, whether a particular stimulus would lead to quick automated responses or an stereotyped emotional responses or if the response is going to be a well though out one. Now, these kinds of questions that have puzzled researchers for a long time. Now, people have wonder say for example, as I am saying in the last lecture if you suddenly come across a snake.

Do you have the time to think whether I should be afraid or not? Whether the snake is poisonous or not? Will this snake attack me or will go in its own way? No, you will immediately feel fear. Similarly, but on the other hand if you are going to visit friend for the first time and suddenly you notice the friend has a pet dog and the gate is still closed. You have that chance you have that amount of time to wonder on whether this is a ferocious dog? Whether the dog will be very friendly? Whether I should go inside the house? Whether should call my friend outside? All of those kinds of things.

So, that all of these kinds of things have been thought about and several researches of kinds of spend the time investigating this issues. Now, let us look at the different kinds of emotions that we know of as we are talking about them again and again. So, fear, sadness, anxiety, elation, disappointment, anger, shame, disgust, happiness, pleasantness, excitement and infatuation are just some of the emotions that we are aware of I have still not name all the emotions that are there to experience. However, to better organize our understanding of emotions and quite contrary to James would have to do.

Researchers have focused on three primary categories of emotions. What are these categories? First is a basic emotion, basic emotions comprises slightly a closed set of emotions, each having unique characteristics as such by the evolution. So, something that we sort of learned almost innately through the course of evolution and they are reflected through our facial expressions. Say for example, fear, happiness, sadness etc. are basic emotions.

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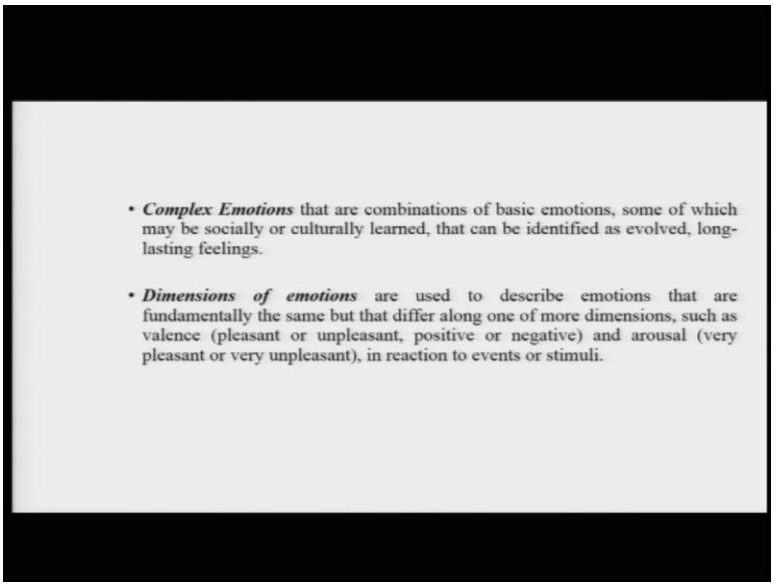

Complex emotions are emotions that are can be seen as combinations of basic emotions. Some of which may be socially or culturally learned and that can be identified as evolved and long-lasting feelings. Something let say this is the second or the third level. Say for example, the emotion of jealousy or the emotion of pride is a mix bag of a few things.

It is a mix bag of an approach or withdrawal kind of a thing. It is a mix bag of that you feel, you jealous of only things you feel that you probably like. But, then jealousy is negative emotions

will kind of move away from that kind of thing. So, basic emotions are very basic they are unitary each having very unique properties. Whereas, complex emotions are combinations of these basic emotions, some of which may be socially learned or culturally learned.

Say for example how to react to these different combinations of emotions sometimes can be just learned through our societies. We can learn to have pride in a particular individual who has done let us say so much natural service, social service and so on. And we have learned to be say for example you know ashamed of individual so engaged in things, engaged in activities that are not good for the well being furthers.

So, some of these things can be learned culturally as well. Now, the dimensions of emotions are also very important. Dimensions of emotions are used to describe emotions that are fundamentally the same but that differ along one of more dimensions. Say for example, the dimensions could be either valence or something is very pleasant or very unpleasant.

Or arousal something is against pleasant and unpleasant same thing; high intensity or low intensity, in reactions to events assembly. So, the dimensions along which the emotions have to be rated or also in that sense rather important to understand these entire things. Let us talk a little bit in more details about each of these categories. Let us talk about basic emotions.

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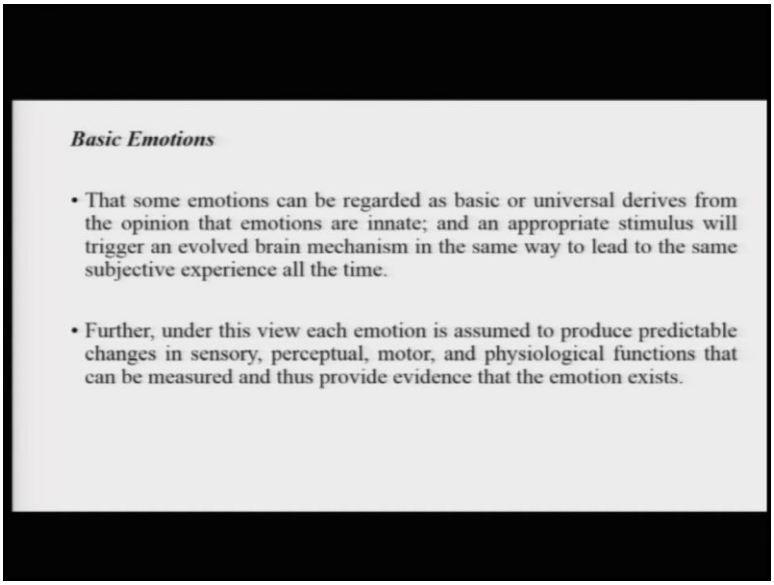

Now, that some emotions can be regarded as basic or universal derives from the opinion that emotions are innate. That is the basic things something that has come through evolution has to be innate. An appropriate stimulus basically can trigger an evolved brain mechanism in the same way to lead to the same subjective all the time.

So, the idea is that each of these basic emotions, a particular stimulus will be appropriate. Say for example, a particular stimulus will make you happy a particular kind of stimulus will make you sad a particular kind of stimulus will make you angry. And the reaction and the entire cycle will be very predictable, it will be same all the time when the same kind of the stimulus comes.

So, something very basic, very distinct but very unique. Further under this view each emotion is assumed to produce predictable changes in sensory, perceptual, motor and physiological functions that can be measured and would thus provide evidence for the fact that these emotion exists.

Say for example, if we have to from the back of your hand tell somebody is happy or not; even just to look at their face, if they are smiling they are probably happy. So, these basically is the idea is that each of these basic emotions will lead to predictable responses sensory, perceptual, motor or physiological responses.

If you are very excited, very angry you will face say for example people sometimes say that I am so angry that my blood pressure is rising. And every time you become that angry, every time you experience that kind of (())(13:44) your blood pressure is going to rise. So, predictable physiological reaction, predictable facial expression, predictable acts as well predictable experience is well. So, this is basically what the basic emotion suppose to do.

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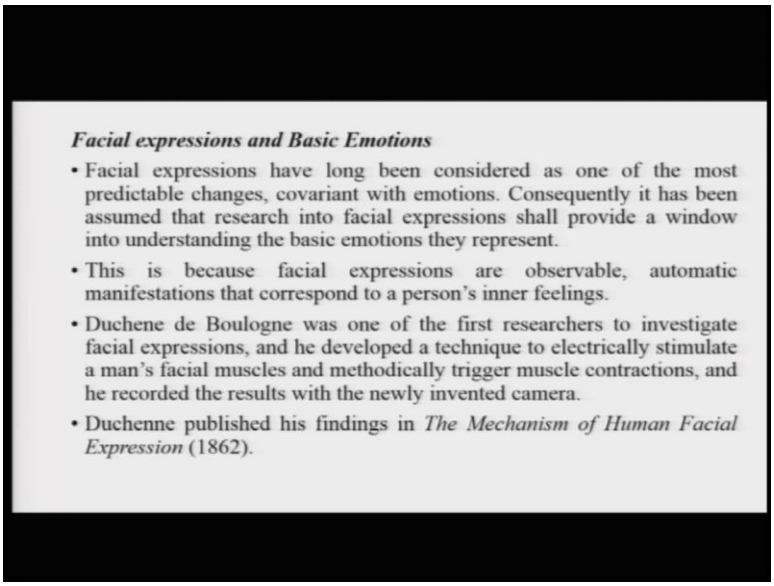

Now, let us talk a little bit about facial expressions and the relationship to basic emotions. Now, facial expressions have been considered have long been considered as one of the most predictable changes that correspond to changes in, what we are feeling on the emotional front. Consequently it has been assumed that research if somebody researches, somebody investigates these facial expressions. They will probably get to a window of understanding the basic emotions better as well. Now, this is because facial expressions are observable, they are automatic manifestations that correspond to a person's inner feelings.

I said, if you want to go and check if somebody is happy look at whether they are smiling or not. If you want to see if somebody is angry look whether they are grimacing or whether they are sort of making the clanged face or not. Now, Duchene de Boulogne was one of the first researchers to investigate facial expressions. And he de.veloped the technique to electrically stimulate a man's facial muscles and basically what he was to do he used to methodically trigger muscle contractions, and then he would record them, whether the results in the newly invented cameras.

Camera was very new at that time. But, what this guy was to do is he use methodically trigger particular muscles. Record what the result and the expression is and then documented a long with what the person was feeling. Now, Duchene published his findings in the book called, the mechanism of Human Facial Expression.

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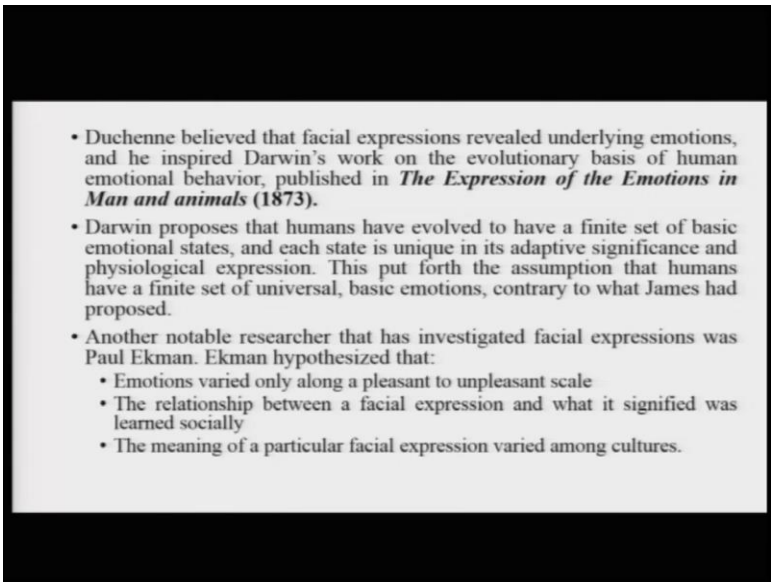

Interestingly Duchene also had the degree of influence over Charles Darwin and he inspired basically on the Darwin's work on the evolutionary basis of human emotional behaviour, which Darwin's published in the book, The Expression of the Emotions in Man and animals. Where the idea is both species is man and the other animal species feel emotions in a sort of universal manner, in sort of a manner that is common to everyone common across these species.

Now, Darwin's proposes that human's evolved to have a finite set of basic emotional states and each state is unique in its adaptive significance and physiological expression. So, Darwin basically says that human's have basically these set of very basic emotional states and each of these sets has its own physiological value, has its own adaptive significance. It helps in the survival it helps in the propagation of these species in whatever manner.

This put forth the assumption that humans across the board as a species will have the same finite set of universal and basic emotions contrary what James what trying to proposed earlier. So, this is very interesting because what Darwin trying to mean and says is that emotions exists for particular purposes. They have adaptive survival value and that is why they are and because something is involved in the process of the evolution of an entire species. It is going to be available to all the species at once. It is not going to be different for let us say, coactions versus Indians versus Africans.

So, the idea is that's basically what the idea is that this is very significant but universal entity. Another notable researcher that has investigated facial expressions was this guy called Paul Ekman. Paul Ekman had specific hypothesis about how emotions are and hypothesis is that emotions varied along a dimensions of pleasant to unpleasant. He said, typically this is continuous where on side they are these very-very pleasant emotions on the other side they are very unpleasant emotions. He also said that their relationship between a facial expression and what it signified was learned socially.

It is something that we come to learn in society through feedback and through hit and trial and so on. Ekman also said that the meaning of a particular facial expression could vary among cultures. Now, he somebody who is kind of saying that his idea, his hypothesis was no emotions are not universal. They are definitely vary across different cultures.

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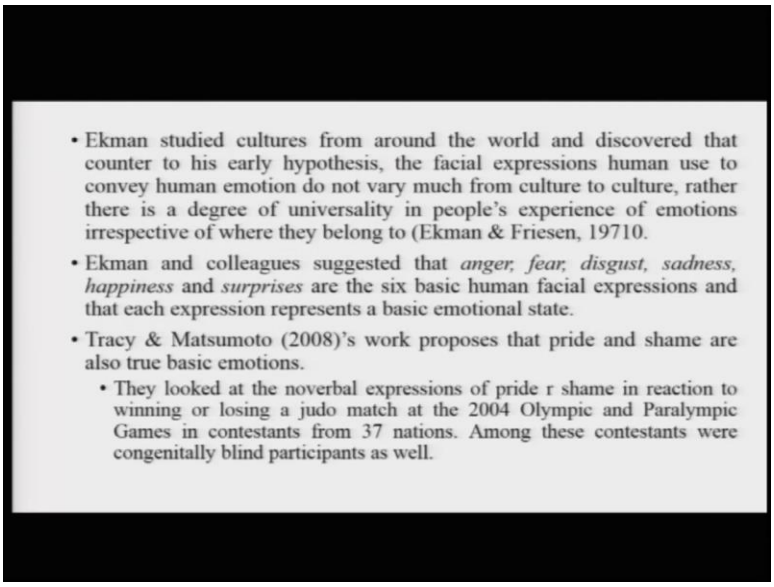

That is what he found out moving further. So, Ekman kind of certain on path studying cultural processing, studying emotional processing across different cultures across from around the world. And then he discovered contrary to his early hypothesis that the facial expression, that human used to convey human emotions.

Do not rely so much across cultures rather he was forced to conclude that there is a degree of universality in people's experience of emotions. So, people across these different countries that Ekman may travel felt an expressed and an experienced the emotions, in a rather uniform manner

or rather in a universal manner. Ekman and colleagues suggested that anger, fear, disgust, sadness, happiness and surprises are the six basic human emotions which are felt. And experienced in the same manner across the various countries and hence they can be regarded as basic universal emotions.

Now, Tracy & Matsumoto in 2008 proposed that pride and shame are also true and basic emotions. They did some research; they were basically looking for non-verbal expressions of pride and shame in reaction to winning or losing in a judo match. Winning or losing a judo match at the 2004 Olympic and Paralympic Games in contestants from 37 countries. So, these researches were just focusing on how do people expressed their expression, their emotions of pride or shame corresponding to whether they have won or they have a lost. And in these participants were these guys were doing their research were sampling from they were cognitively blind participants as well.

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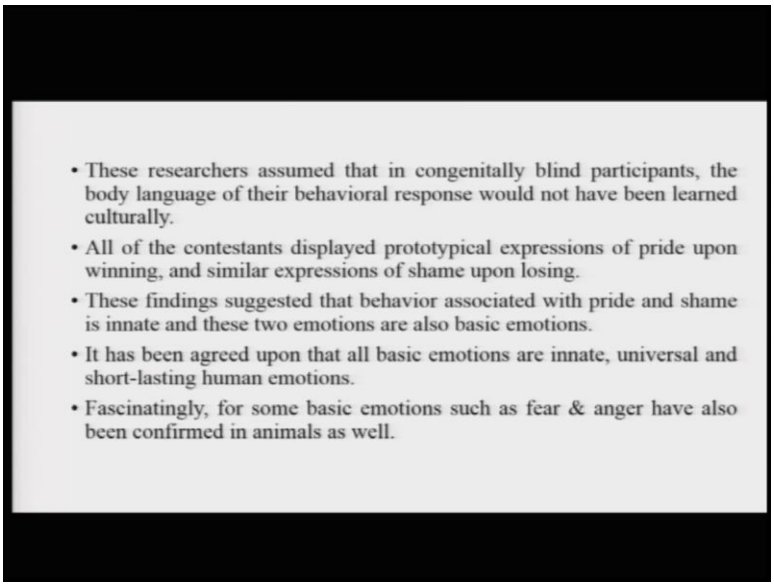

Now, cognitively blind participants are unique and sense that they do not have the luxury of learning a particular behavioural response. Contingent to particular facial expression culturally because they cannot see facial expressions they have no idea of what the significance of facial expressions are. Now, all of these contestants which they were displayed prototypical expressions of pride upon winning, and prototypical expressions of shame upon losing.

Now, these findings suggested that Tracy & Matsumoto have suggested that behaviour associated with pride, and shame is also innate and these two are also basic emotions. It has been agreed upon that all these basic emotions as I have been saying are innate, universal and their short-lasting human emotions.

Fascinatingly for some of the basic emotions such as fear and anger have also been confirmed as in animals as well. So, it is not only that they are universal emotions just for the human species or just the Homo-sapiens. But, they might well extend across fishy level boundaries as well but more on that later.

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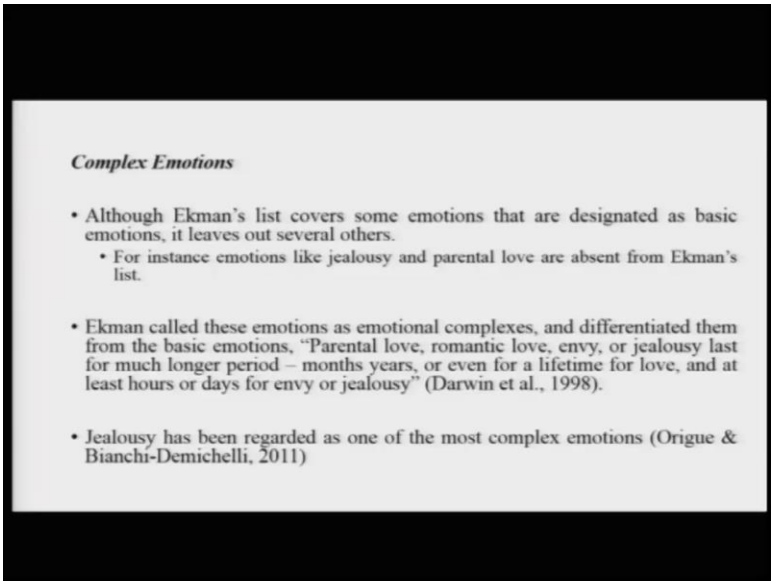

Let us talk about complex emotions. Although Ekman's list covers some emotions that are designated as basic emotions, it leaves out several others. For instances list out emotions like jealousy and parental love from the list of basic emotions. Although some would assume that they are also very basic and found across species and culture across the entire species and culture. Now, Ekman called these emotions as emotional complexes and these differentiated them from the basic emotion.

He said for example, parental love, romantic love, envy or jealousy last for much longer period than the duration of these basic emotions. And hence they are not to be put in the same box. Now, jealousy has been regarded as one of the most complex emotions let us look at it.

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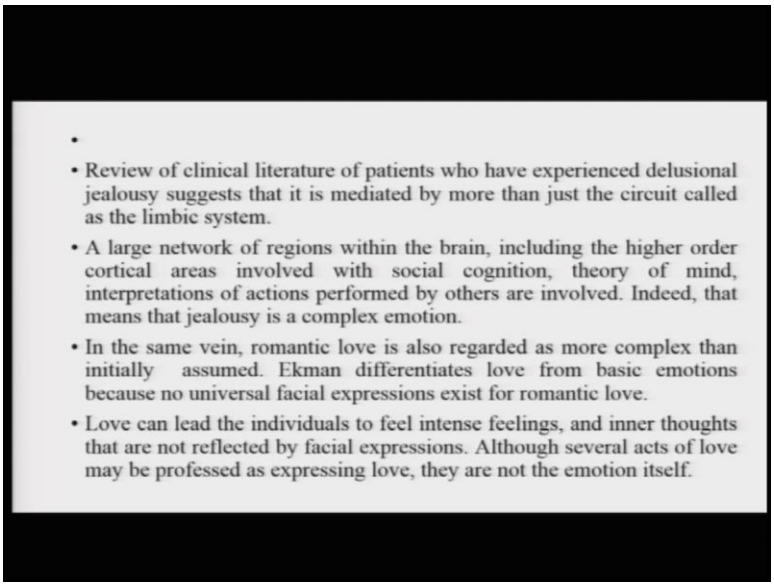

Now, review of clinical literature of patients who have experienced delusional jealousy suggests that, it is mediated by more than just the circuit that is we have been talking about as the limbic system. A large network of regions within the brain, including the higher order cortical areas involved with social cognition. Theory of mind, interpretations of actions performed by others is involved in people experiencing jealousy.

Indeed, with the involvement of so many of these areas it means that jealousy must be a very complex emotion. In the same way romantic love is also regarded as more complex than initially assumed. Ekman differentiates love from basic emotions because no universal facial expressions can actually depicts whether somebody is in love or somebody is love for some other object or event.

Now, love is potentially complicated thing, it can lead the individuals to feel intense feelings, and inner thoughts that are not really expressed by the face. Just not express by singular facial expressions. Although several acts love may be professed such as may be professed as that these acts express love. They are not really the emotion itself they do not really there is no way, there is no direct mapping between the feeling of love, romantic love that is and a specific facial emotion, facial expression. So, there is no mapping here.

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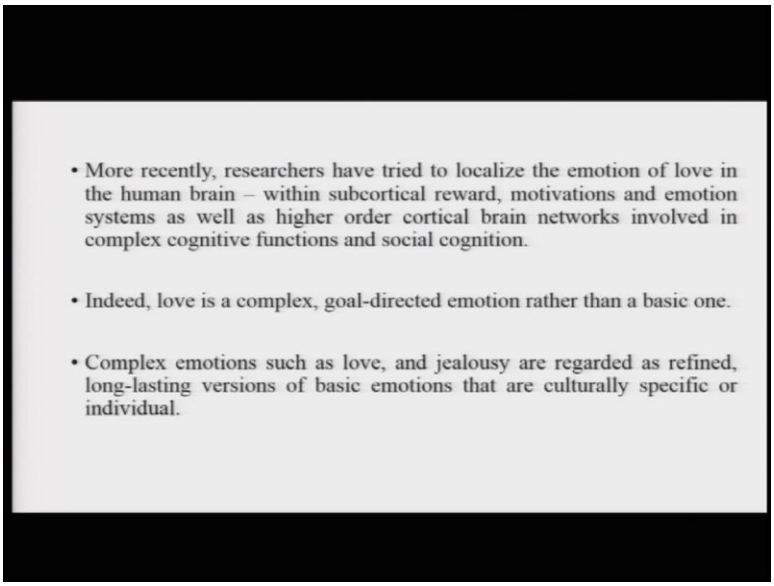

More recently, researchers tried to localize the emotion of a romantic love in the brain. And what they found is that subcortical reward, motivations and emotions systems as well as the higher order cortical brain networks that are involved in complex cognitive functions and social cognitions are all involved and they are all sort of engaged in the experience of romantic love.

So, indeed again on the basis of that there is such a bundle of areas that are responsible must be a complex, gold rated emotions rather than just a very basic. So, complex emotions such as love and jealousy are regarded as refined, long lasting versions of basic emotions that are more and that are culturally specific or a vary from individual range individually. Suppose the experience of jealousy and love can obviously vary across different individuals.

In the end the mannered and everything else can vary across different cultures as well so they neither universal nor innate in that manner.

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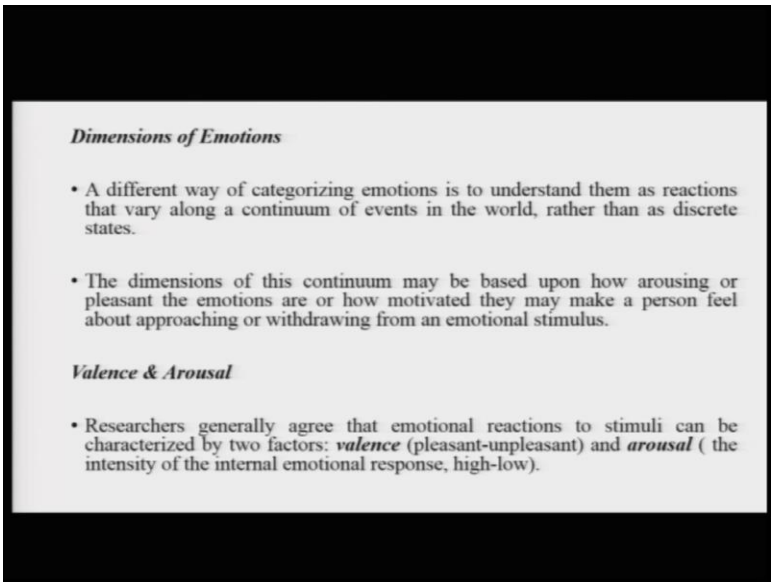

Let us talk about dimensions of emotions. The different way of categorizing emotions is to understand them as reactions that vary along a continuum of events in the world, rather than as discrete states. The dimensions of this continuum may be based upon how arousing or pleasant the emotions are or how motivated they may make a person feel about approaching or withdrawing from an emotional stimulus. Now, let us talk about valence and arousal now.

Researchers generally agree that emotional reactions to stimuli can be characterized by two factors valence and arousal. Say for example, valence varies between pleasant and unpleasant and arousal varies across high intensity or low intensity of the emotional response.

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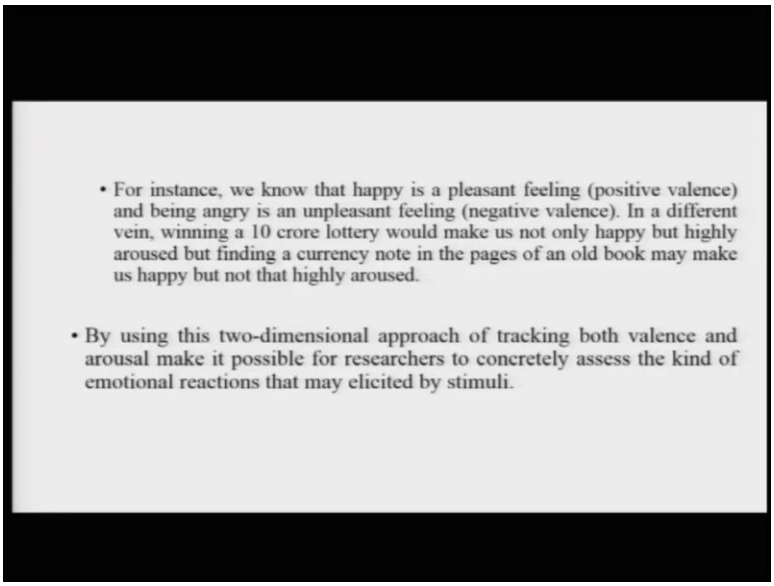

For instance, we can know that happy is a pleasant feeling. It has positive valence; whereas anger is an unpleasant feeling it has a negative valence. In a different vein, winning a 10 crore lottery will not just make you happy but it will make you just excited as well. The intensity of the emotion will be too much.

However, just finding an old currency note in a book will make you happy probably. But it will not really make you super excited, so the arousal level of that particular event will be slightly on the lower side. Now, by using this two dimensional approach of tracking both valence and arousal. It has become possible for researchers to concretely assess the kind of emotional reactions that may be elicited by stimuli.

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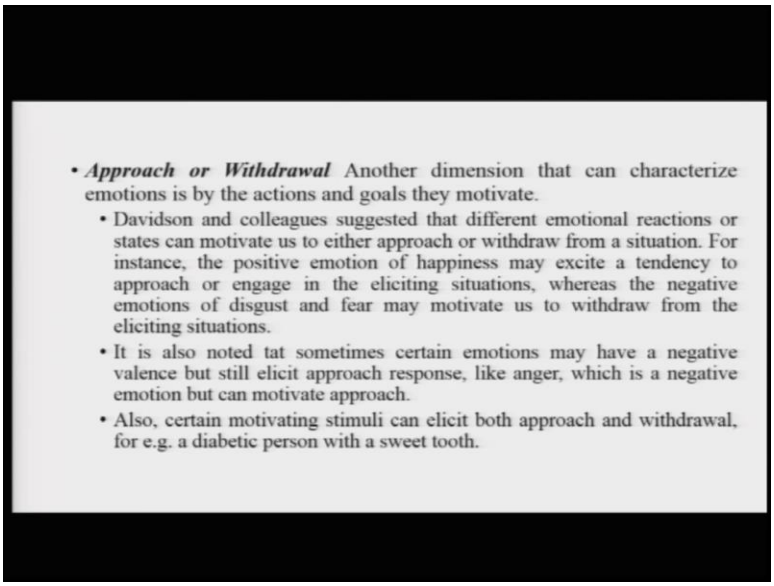

Let us look at approach or withdrawal as well. Now, approach or withdrawal is also one of the dimensions that can help categorize. You know how people react with the particular emotion. Now, Davidson and colleagues suggested that different emotional reactions or states can motivate us to either approach or withdraw from a situation.

For instance, the positive emotion of happiness may excite a tendency to approach particular objects and events or engage in the eliciting situations. Suppose say for example driving a car makes you feel happy you would want to drive a car again and again. However, on the other hand negative valence emotions say for example, negative emotions like disgust and fear will motivate you to withdraw from the eliciting situations. Say for example, if eating a particular kind of food, watching a particular kind of movie makes you feel disgusted.

Then you will draw away from watching those movies or eating those kinds of foods again and again. So, approach or withdrawal is basically depending upon whether you want to continue experiencing the eliciting stimuli or you want to withdraw from experiencing the eliciting stimuli alright.

So, it is also noted that sometimes certain emotions may have some negative valence but still elicit approach response. Like say for example anger, which is basically a negative emotion. But elicits approach response because it is sort of sometimes it motivates people to do different kinds of things.

Also, it is notable that certain motivating stimuli can elicit both approach and withdrawal. Say for example, for a diabetic person who has a sweet tooth whenever a sweet comes in front of them, they basically want to have it, they like it. But, they are also really conscious of their health and they might want to avoid eating that. So, sometimes there might be stimuli which excite both kinds of approach and withdrawal kind of reactions.

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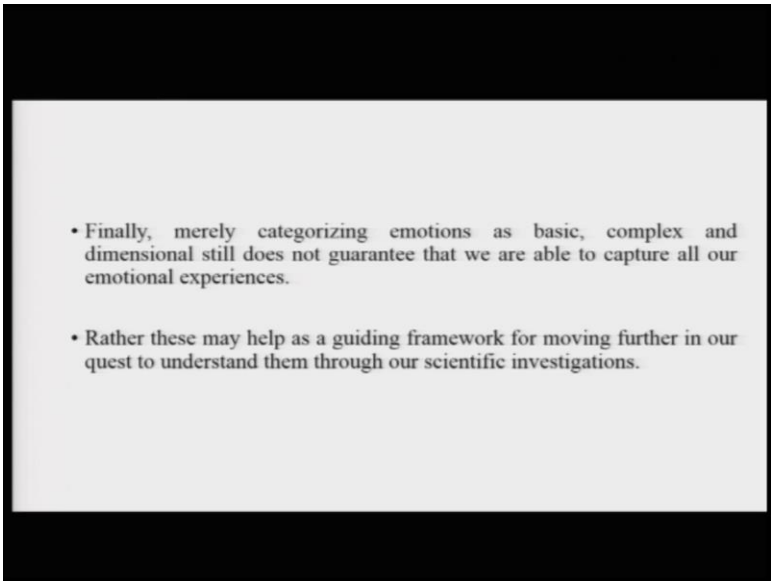

Now, finally merely categorizing emotions as basic, complex and dimensional; still does not guarantee that we are able to capture all our emotional experiences. Rather these may help as a guiding framework for moving further in our quest to understand them through our scientific investigations.

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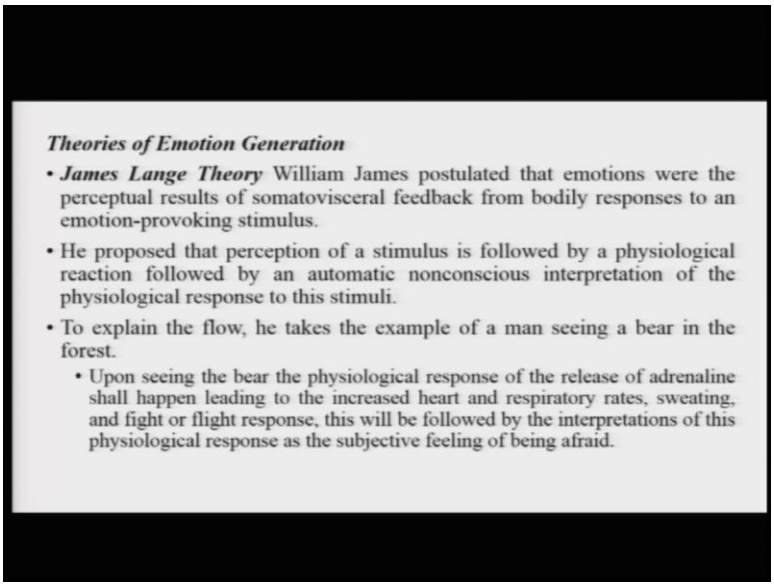

Now, let us talk about slightly different topics let us talk about theories of emotion generation. Now, there are few theories will talk about. Let us first talk about the James Lange Theory. William James and Carl Lange postulated this theory. William James postulated that emotions were the perceptual results of the somatovisceral feedback from bodily responses to an emotion-provoking stimulus. So, the idea is that when you come across a particular stimulus, there is a somatovisceral reaction.

There is a physiological reaction that is basically then followed by an automatic non-conscious interpretation of the physiological response that leads to the experience. So, the idea is let us to explain the flow of all of these he takes an example of a man seeing a beer in the forest. Now, upon seeing the beer in the forest, the physiological response of the release of adrenaline shall happen. Leading to an increase in the heart rate and the respiratory rates, sweating would happen and fight or flight response will take place. And then this will be followed by the interpretation of, why I am feeling like this and the subjective feeling of being afraid.

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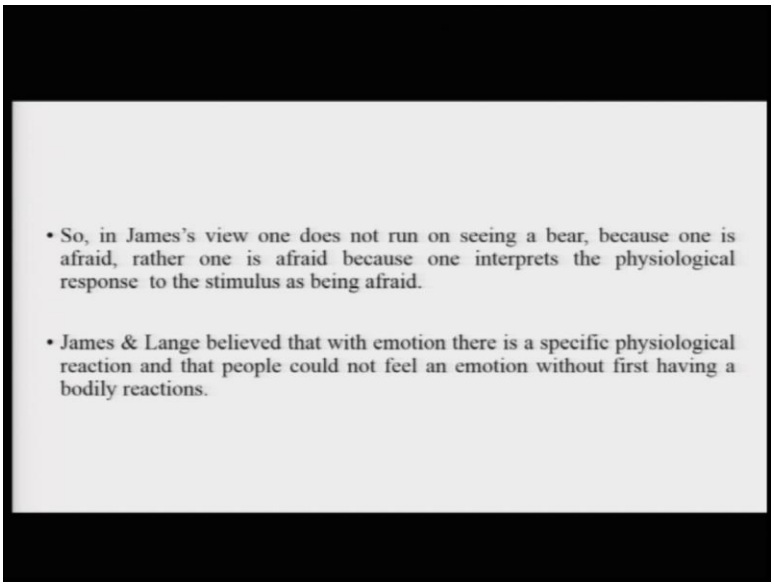

So, in James's view one does not automatically start running on seeing a bear because one is afraid rather one is afraid because one is interprets the physiological response to the stimulus as one of fear. So, James & Lange believed that with emotion there is with each emotion there is a specific physiological reaction and that people could not feel an emotion without first having bodily reactions.

Say for example, you cannot feel happiness, anger, sadness, disgust without having the characteristics physiological the characteristics butterflies in the stomach if I am use the metaphor. And you cannot have that feeling before the physiological response takes in a body.

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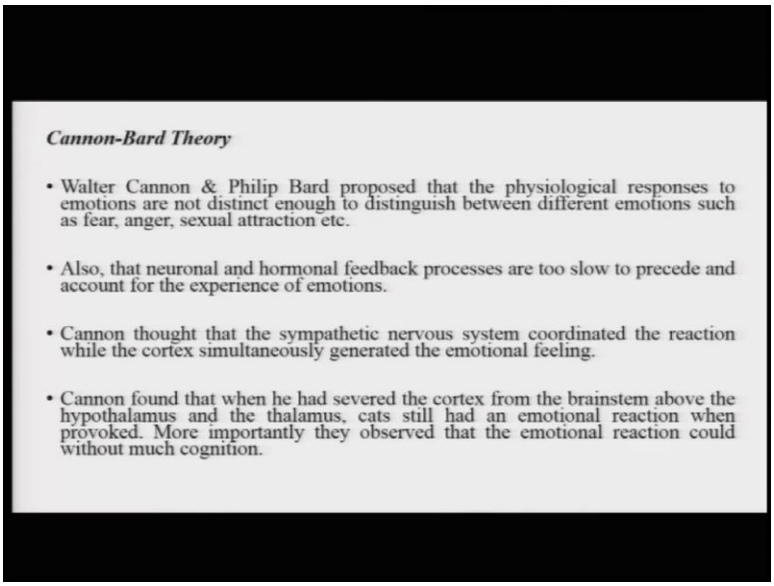

Let us move to the next theory, the Cannon-Bard Theory. Now, Walter Cannon & Philip Bard proposed that the physiological responses to emotions are not distinct enough to distinguish between different emotions such as fear, anger, sexual attractions etc. Beside in addition that neuronal and hormonal feeedback processes are too slow to precede and account for the experience of emotions.

They basically saying its very difficult that the physiological responses come before the experience of emotions it is highly unlikely is what they said. Now, Cannon thought that the sympathetic nervous system coordinated the reaction, while the cortex simultaneously generated the emotional feeling or feeling of the emotion.

So, Cannon found that when he had severed the cortex from the brainstem above the hypothalamus and the thalamus cats still had an emotional reaction when provoked. More importantly they observed that the emotional reaction could actually occur without understanding or without connection with cognition; because the cortex had been severed.

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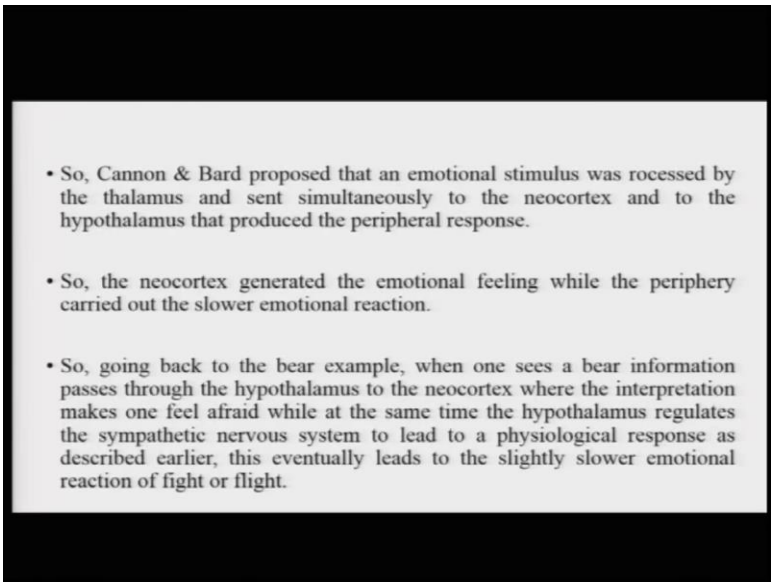

So, Cannon and Bard proposed stimulus was processed by the thalamus and sent simultaneously to the neocortex and then to the hypothalamus from there which would produce that peripheral physiological response. So, the neocortex is supposed to generate the emotional feeling while the periphery actually carrying out the slower emotional reactions.

So, let us go back to the bear example what is going to happened. When one would see a bear, the information will pass through the hypothalamus to the neocortex, where interpretation will take place. And that will make one feel afraid while at the same time the hypothalamus will regulate the sympathetic nervous system to lead to a physiological response. So, the idea is that the physiological response and that feeling of fear are happening at the same time in response to this particular stimulus.

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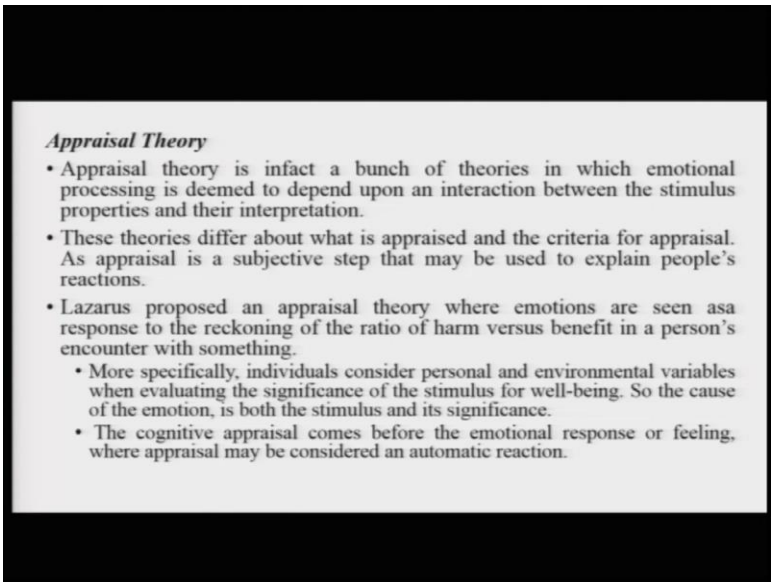

Now, let us move to the other theory, Appraisal theory. Appraisal theory is in fact a bunch of theories in which, emotional processing is deemed to depend upon an interaction between the stimulus properties and their interpretation. Remember the earlier example that I was giving you. The same stimulus might make you more happy, less happy or sometimes the same stimulus might make you either happy or sad depending upon your calculations of the risk and benefits scenario.

These theories the appraisal theories that is, differ about what is appraised and what are the criteria for appraisal? And appraisal basically is a subjective step that may be used to explain people's reactions. So, the idea is first cognition, first appraisal will happen and then only the physiological response or the subjective experience of feeling will come out. Lazarus who has given this theory of appraisal basically proposed this theory where emotions are seen as a response to the reckoning of the ratio of harm versus benefit, in a person's encounter with something.

So, when you come across a particular stimulus, you are very quickly calculating. Whether it is good for me, bad for me; whether I should feel happy; whether I should feel sad. And on the bases of that one decides, what will be the physiological responses? What will be the subjective feeling be like? So, most specifically just kind of getting a little bit deeper most specifically individual consider personal and environmental variables. When evaluating the significance of a

particular stimulus for well being. So, the cause of the emotion is both the stimulus and its significance.

Suppose, here news let us take an example, suppose you here news, that you have been offered a job in city which is bringing. Now, obviously the prospect of getting a job will make you happy. But, you will very quickly calculate that, what is the salary they are offering me. Is a salary going to be enough for me to be living there? Is the job profile expectations the job going to be exciting enough for me to be interested in the job for a long time. And at the same time while the news is happy news and you have been selected for a specific job.

You will do this risk benefit and analysis and basis of that you will basically feel, either very happy or very sad or somewhere in the middle. So, the cognitive appraisal has to come before the emotional response or the subjective feeling, where as appraisal must be considered almost as an automatic reaction.

As soon as the stimuli comes, you automatically appraise it and that is what it lead to either you feeling happy or sad or your physiological responses will be like the racing of the heart rate or dulling of the heart rate.

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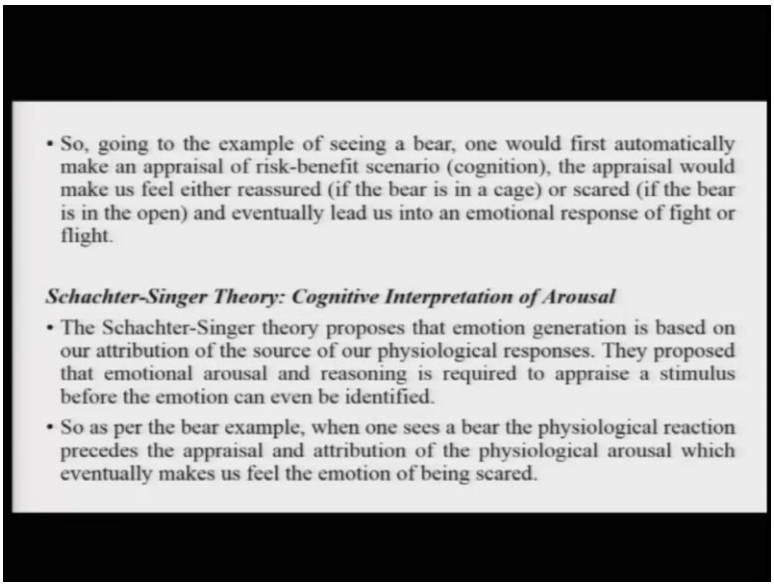

So, going again coming back to the example of seeing a bear, one would first automatically make an appraisal of the risk-benefit scenario. Say for example, whether is going to mall me say for

example, if you are seeing a bear not in the forest, but in the cage. You obviously know that you are not going to be able to harm; so you are not going to freak-out or become too afraid. But, obviously if you are seeing a bear in the open forest obviously you will automatically figure out that the bear is going to attack you.

And it will eventually lead you to a physiological response fight of flight and subjective experience of feeling afraid, terrifying and so on. Let us move to the next theory; the Schachter-Singer Theory of basically the cognitive interpretation of arousal. Now, the Schachter-Singer theory basically proposes that emotion generation is based on our attribution of the source of our physiological responses. Why are these physiological responses there? How can I understand them?

So, they proposed that emotional arousal and reasoning is actually required to appraise a stimulus before the emotion can even be identified. So, leave alone experience of particular emotion. Some kind of reasoning is going to be there, to understand what a stimulus is triggering and then something else will come up. As per the bear example, when one sees a bear physiological reaction will precede the appraisal; and attributing of the physiological arousal which eventually make you feel either make you feel scared, actually seeing in this case.

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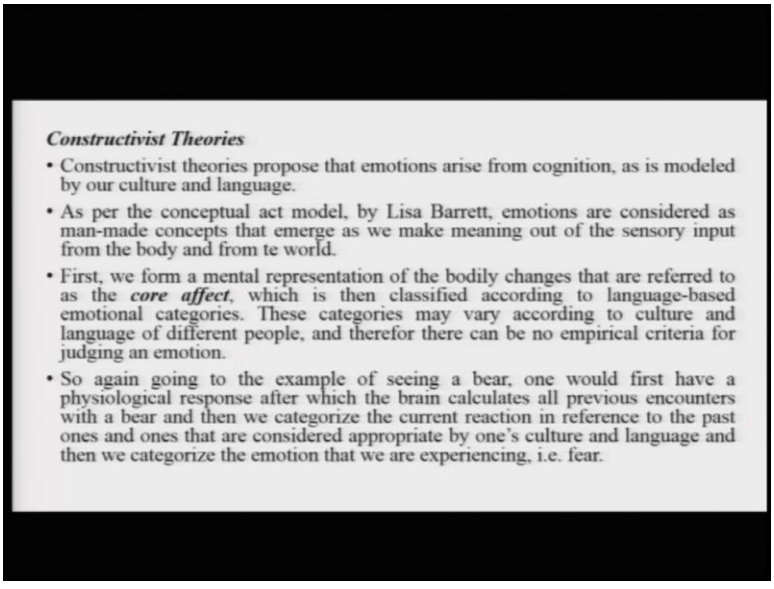

Let us talk about Constructivist Theories. Now, the constructivist theories are a bunch of theories that proposed that emotions arise from cognition. They arise from reasoned analysis and that the

reason analysis is actually one that is shaped by our culture and by our language. So, as per the conceptual act model given by, Lisa Barrett. Emotions are considered as man-made concepts that emerge, when we try to make meaning the sensory inputs from the body and the world.

So, whatever stimuli in the world or events in the world we are coming across. We are going to try and understand that and we are going to try and understand them through specific frameworks. And these frameworks are given to us by our culture and by our language. So, let us take an example.

First what will we do? Will form a mental representation of the bodily changes that are referred to as the core affect. Whether going to have a pizza, makes me happy. What is the core affect of going to eat pizza? Is that probably I am feeling happier. This is then classified according to the language-based emotional categories.

Now, I could use happiness or I could use excitement or I could use any different word, based on how my culture has taught me. To categorize this specifically bodily change that I was experiencing on going to eat a pizza. So, this is where you have to understand that idea is that the things are happening in the world.

There are events taking in the world there are objects that you are going to come across. And each of these objects will make you feel in a particular way. How you understand? What you are feeling? How you are categorized that using language, is something that you have most nationally picked up from the culture.

Because language as I have said several times that is almost an instrument of a particular culture. So, the way stuff encoded in languages in specific languages depends upon the specific cultures that use those languages will discuss probably in the next chapter or later. But, the idea is that these categories that we make to understand the core affect or the cause of the core affect. Varies according to the culture and language of different people and therefore because there is so much variation here. They can be know empirical criteria for judging an emotion.

So, that is also something is fairly important. Now, again going to the example seeing a bear, what will happen? One of first, have a physiological response after which the brain calculates all previous encounters with a bear. What happened the last time I came across a bear. Did it attack

me? Did it not attack me? What really happened? And then basically we compared those previous encounters with the current encounter. And we try and basically figure out what is it that we should feel? What is it that this specific and unique experience is to be named and then we can name it as fear.

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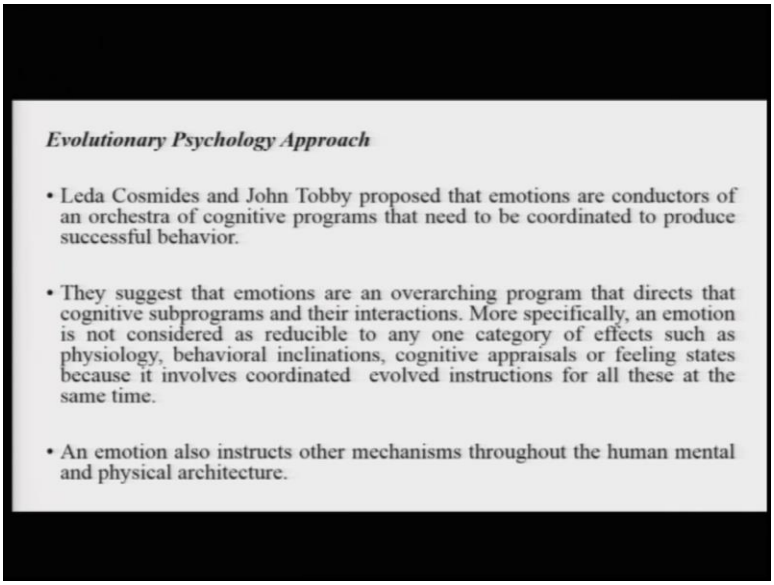

Let us talk about the evolutionary psychology approach. Leda Cosmides and John Tobby proposed that emotions are conductors of an orchestra of cognitive program that actually need to be coordinated to produce good successful behavior. And the goal and in all evolutionary theories is that emotions will have somehow need to benefit our survival. It will need to somehow further our chances of adapting and surviving to the in this changing world. So, Leda Cosmides and John Tobby suggest that emotions are an overarching program that directs the cognitive subprograms and their interactions.

So, the idea is emotions are broad programs that are going to govern or influence are well being in particular manner. So, most specifically an emotion is not considered to be as reducible into anyone categories of affects; such as things like physiological responses, behavioural inclination or cognitive appraisals.

Rather in coordinated they are supposed to be as evolved coordinated instructions for all of these at the same time. So, an emotion not only suppose to instruct other mechanisms throughout the human and so human and mental and physical architectures. So, the idea is once you going to

experience something that is going to sort of control several things about, how your body is going to be.

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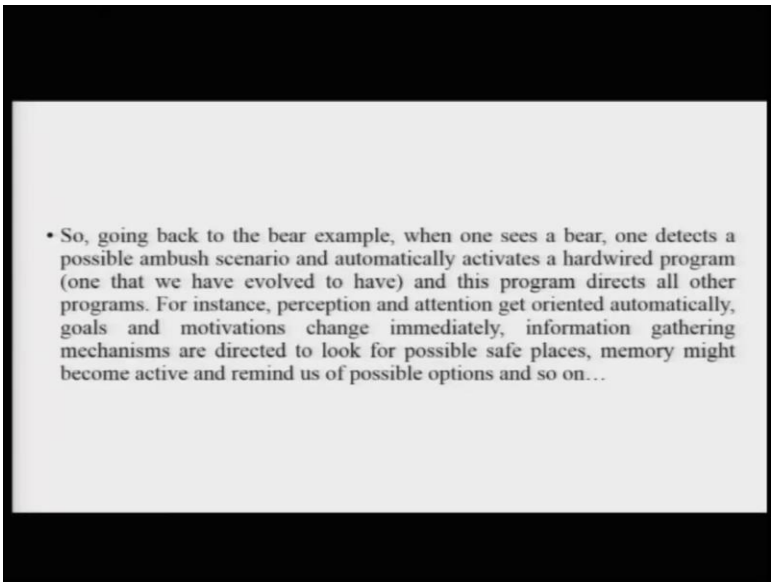

So, going back to the bear example, when sees a bear, one detects a possible ambush scenario and automatically activates a hardwired program one that we have evolved to have. And basically their program will say you have to run, you have to save yourself, you have to guarantee that you are (())(41:51) is there. And so only after that perception and attention etc. will get affect. So, perception and attention will get oriented automatically and motivations will change. The motivations you want to save yourself the information gathering mechanisms will start look, where can I run to which direction.

There is there a possible shelter, memory will come and place and tell you. If you run for three minutes on the left there is a big tree or hide behind that tree; or say for example there is a house, when you get inside and so on. So, the idea is that overall emotions are overarching evolutionary mechanisms which have the capability of instructing how the brain is going to behave how the body is going to behave and so on.

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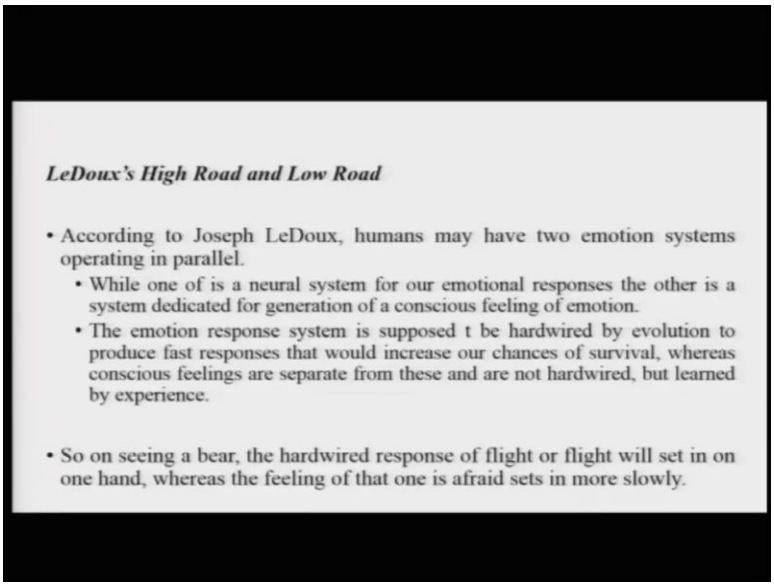

So, I think these were some of the theories of emotion that we have to talk about. We will talk a little bit about one of these theories not really a theory of emotions were say. But, in general basically theory which says that, the humans may have like two emotion systems that operate in parallel. Say it kind of specifies how humans you know how the human emotional processing system might be structured.

So, LeDoux basically proposed this theory of a high road and low road. And he said there are two systems one of the systems is a neural system for our emotional responses and the other is the system for generation of a conscious feeling of emotion. So, one is the slightly slower feeling of how you are going to feel about it. And the other is how your body or how your brain is going to respond to it.

So, the emotional response system is supposed to be hardwired. One of the systems is to be hardwired by evolution to produce fast responses that would basically increase our chances of survival. Whereas the conscious feeling the second system are separate from these and are not hardwired, but learned through experience, given a particular culture or language. So, on seeing a bear, the hardwired response of flight or flight will set in on one hand whereas the feeling of that one is afraid will sort of set in more slowly, the first reaction is just run.

Ledoux bear example, come to the snake as soon as you step upon a snake you will immediately want to run and not really ponder about what you feeling at that time. Now, Ledoux actually was one of the first researchers that sort of talked about the role of amygdela in emotional processing.

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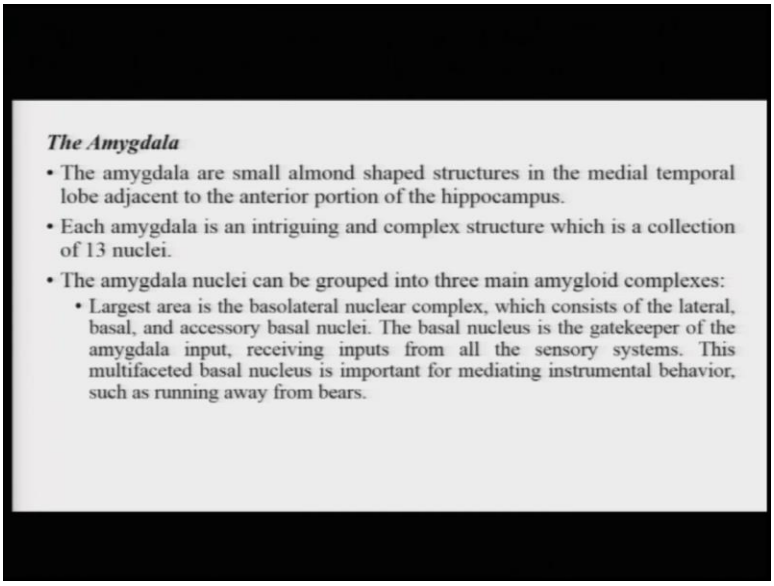

And amygdela are small almond shaped structure in the medial temporal lobe just adjacent to the hippocampus. So, amygdela are these intriguing and complex structures which is a collection of 13 different kinds of nuclei. The amygdela can be divided into three kinds of amygloid complexes.

The largest area is the basolateral nuclear complex, which consists of the lateral, basal, and accessory basal nuclei. The basal nucleus is the gatekeeper of the amygdela inputs, so all the inputs coming to the amygdela is received as basal nucleus and basically it also receiving inputs from all the sensory systems. This multifaceted basal nucleus is important for mediating instrumental behavior, such as running away from bears. So, amygdela is in that sense is very-very important region.

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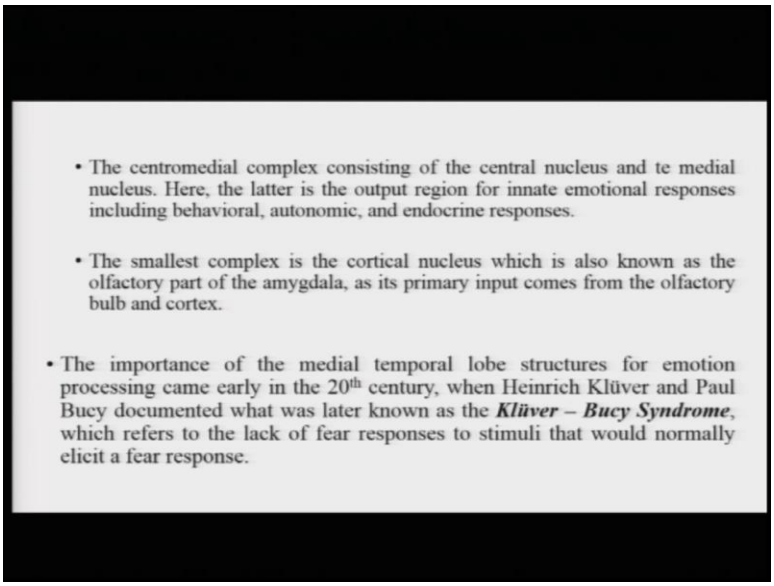

Now, centromedial complex is basically consists of the central nucleus and the medial nucleus. So, two of these nucleuses are here and the medial nucleus is basically the output region for innate emotional responses including hehavioural, autonomic, and endocrine responses. So, how is the body going to respond to a particular kind of an emotional processing stimulus?

The smallest complex is basically the cortical nuclei or the cortical nucleus; which is also known as the olfactory complex of the amygdela because it receives its primary input comes from the olfactory bulb and olfactory cortex. So, these are the three basic amygloid complexes which basically are divided from the 13 nuclei that amygdela is made up of.

And amygdela is regarded as one of the important structure for experience of emotions. Let us look at this in a bit more detail. Now, the importance of the medial temporal lobe structures as important for emotion processing. Came around early in the twentieth century, where Heinrich Kluver and Paul Bucy documented what was later were claim to be known as Kluver-Bucy Syndrome. Now, the Kluver-Bucy Syndrome refers to the lack of fear responses to stimuli that would normally elicit a fear response.

So, typically this was first observed in monkeys that when there amygdela was in lesioned. They were not displayed a fear response; they would not be afraid of stimuli to which individually moves at monkeys would be afraid of. They will withdraw from that; they will show certain degree of physiological arousal.

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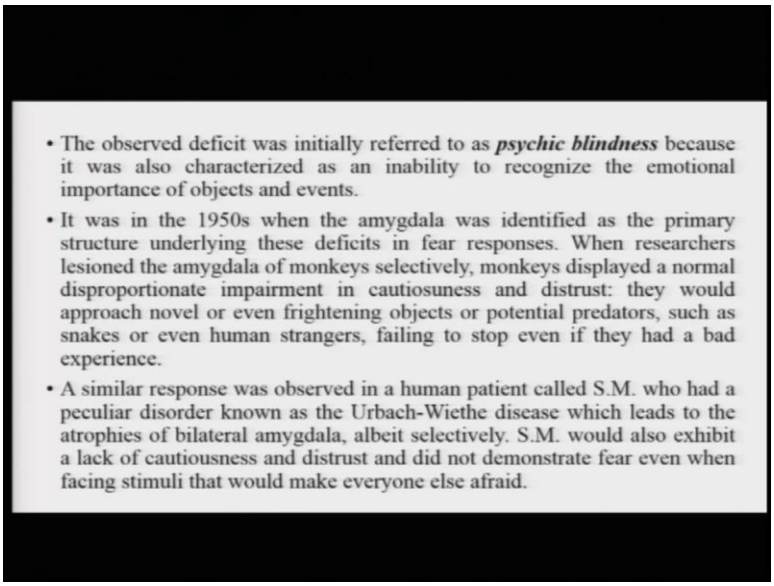

So, the observed deficit of this kind was referred to as psychic blindness earlier because it was characterized also as an inability to the emotional importance of objects and events. So, not able to evaluate whether a particular stimulus, object or event is significant emotionally does it have any emotional value to me.

It was in the nineteen fifties when the amygdela was identified as the primary structure underlying these deficits in fear responses. So, later people came to know that this is happening because the amygdela is vanished. When researchers lesioned the amygdela of monkeys selectively. Monkeys displayed a normal disproportionate impairment in cautiousness and distrust. They would approach novel stimuli they would approach frightening objects like snakes or even potential predators.

You know if (())(47:49) lion in front of the monkey the monkey will fearlessly go and approach the lion. Not because the monkey basically because the monkey is not able to experience any feeling of fear etc. Similar response to humans was also observed in patient called S.M. who had a peculiar disorder known as the Urbach-Wiethe disease.

The disease is interesting in the sense that it leads to the atrophies of bilateral amygdela. Both left and right but slightly in a selective fashion, the surrounding tissue is suspect. Now, S.M. would also exhibit a lack of consciousness and distrust. And she would not demonstrate fear

even when facing stimuli that would make everyone else afraid. Watching horror movies and looking down from cliffs touching dangerous and poisonous snakes as well.

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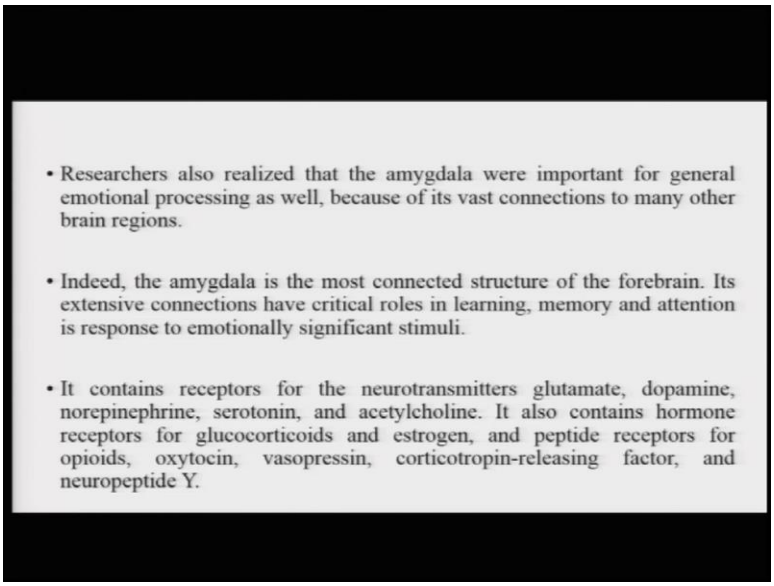

So, researchers realized that amygdela must be important for general emotional processing as well, because of its vast connections to so many other brain regions. Amygdela is implicated in fear we saw that in the Kluver-Bucy Syndrome or the Urbach-Wiethe diseases moments ago. But, because the amygdela is connected to so many other areas in the cortex which is sort of thought that okay.

It must be responsible or it must be important for general emotional processing as well. So, indeed the amygdela is the most so connected structure of the forebrain. Its extensive connections have critical roles in learning, memory and attention and is responsible and it sort of it does respond to emotional significant stimuli. The amygdela receptors for the neurotransmitters glutamate, dopamine, norepinephrine, serotonin, and acetylcholine. It also contains hormone receptors for glucocoticoids and estrogen, and peptide receptors for opioids, oxytocin, vasopressin, corticotrophin-releasing factor, and neuropeptide Y.

So, I am just naming here certain neurotransmitters you can add later at a point, Google up their functions. If talked about their functions in a different lecture but the idea is that amygdela because of these connections. Because of having so many receptors is in a position, that it can modulate the way people experience different emotions.

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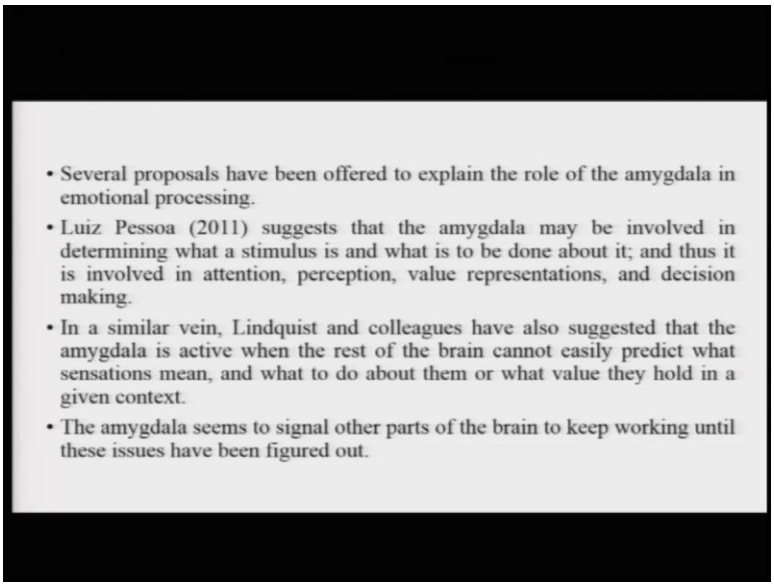

Several proposals have been offered to explain the role of the amygdela in emotional processing. Luiz Pessoa had suggested that the amygdela may be involved in determining what a stimulus is and what is to be done about it. So, basically evaluating the emotions significance of stimuli and thus it is suppose to be the amygdela is suppose to be involved in perception, attention, value representation and decision making.

So, that is basically what the amygdela function is supposed to be. In the similar vein, Lindquist and colleagues have also suggested that the amygdela is actually active region of the brain when rest of the brain cannot really easily predict what thus initial sensation means. Amygdela sort of processes that and directs the actions.

So, it basically tells the other regions what to do about these initial sensations and what valued as a particular event or object hold in a given context. Say for example, if you are coming across again the snake the amygdela is area of the brain which will act immediately and quickly and will tell the autonomic nervous system to act in a particular manner.

While rest of the cortex will basically play catch-up in a much more gradual manner. So, the amygdela therefore seems to have the ability the amygdela seems to have the ability to signal other parts of the brain. To keep working until some of these initial issues have been figured out. The initial action plan has been drafted.

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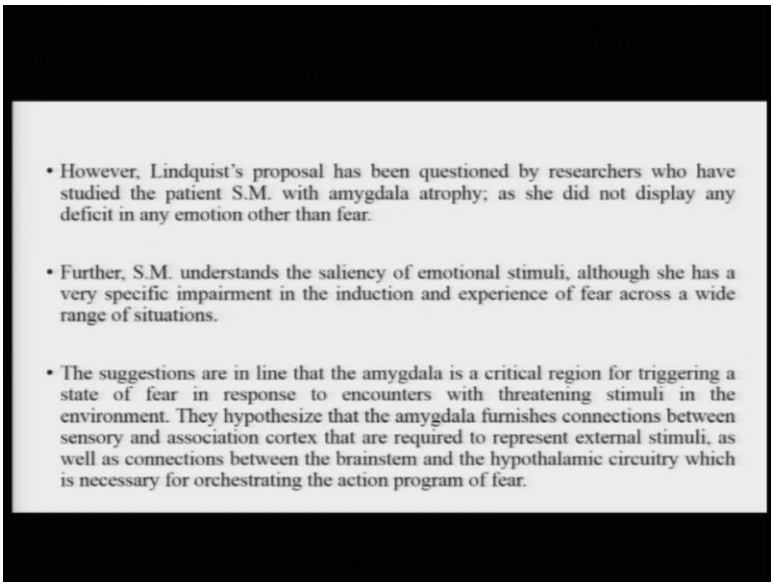

However, the Lindquist's proposal of how she imagined the role of the amygdela has been questioned by the researchers who studied the patient S.M. who had amygdela atrophy. Because the patient did not really display the deficit in any other emotion other than fear. So, the idea is that probably the amygdela is selectively responsible for understanding an expression of fear.

Further, S.M.so understands the saliency of emotional stimuli, although she has a very specific impairment in the induction and experience of fear across a wide range of situations. So, she understands the emotional significance of stimuli just that she does not understands the emotional significance of fear inducing stimuli.

So, the suggestions are therefore in line that amygdela must be a critical region for triggering a state of fear in response to encounter with threatening stimuli in the environment. And the idea is that the amygdela must have must have these connections between the sensory and the association cortex.

That are required to represent external stimuli as well as the connection between the brainstem and the hypothalamus circuitry that is necessary for orchestrating the action program of fear. What is going to be done? So, this is basically probably what the role of the amygdela is.

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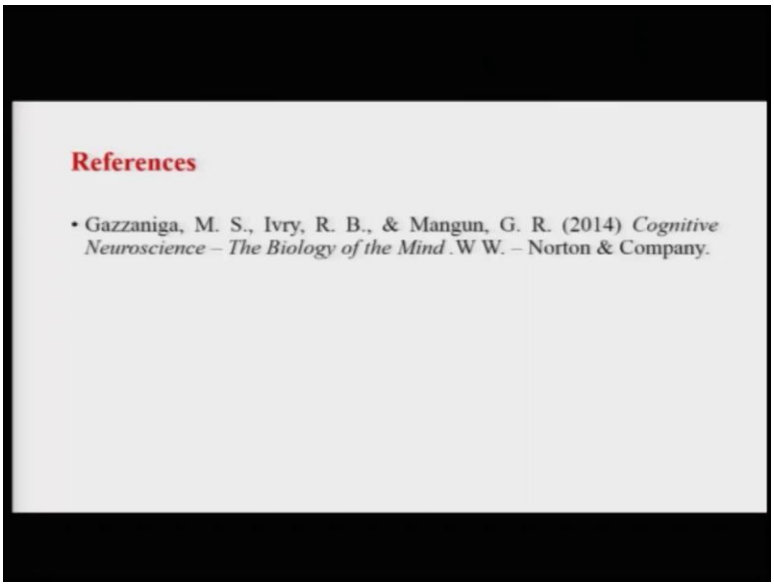

I will stop here I will talk to you about emotions again in the next chapter. Thank you.