Human Behaviour

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Lecture – 07
Learning – I

Hello friends, welcome back to this lecture number 7, on the course on Human Behaviour. Now, as I keep doing in my all other lectures, what I will do is, I will start with a brief summary of what we did in the last lectures. So, we started off, this series of lecture on human behaviour by dedicating a couple of lectures to understand, what is human behaviour and what is the science behind human behaviour.

There we looked at things like, why do we need to study human behaviour and the answer that we gave there was because people want to control or people want to understand other people. So, that they have a nice interaction among them. So, that was the baseline for understanding human behaviour and the science which does it is psychology.

So, primarily what our aim is to understand the basics of psychology and how it predicts human behaviour to this course. So, that was what the basic was. So, in the first couple of introductory lectures, we dwelled upon the fact that, how do we study human behaviour, what is the method of studying human behaviour and what are the question that needs to be asked. From there on to be quickly shifted into looking at, how the science of studying human behaviour started.

And we looked at inputs from both physiology and philosophy, and how these inputs raised certain basic questions about human behaviour and human beings in totally, then, we went ahead and looked at some schools of psychology which is the science of studying human behaviour. So, we dwelled upon structuralism, we dwelled upon functionalism looked at behaviourism, then looked at psychoanalysis and these kind of schools is, what we did and we actually looked at and further that we looked at various perspectives or studying a human behaviour.

Now, as I have outlined before, a particular human behaviour and for that matter let me clarify what behaviour is; behaviour is any reaction or action you do in the presence of a

stimuli. And this stimuli could be an event, a person and any other thing a situation environmental situation. So, any of them leading you to do a behaviour for example, if the coffee that is served to you is hot, you and after drinking it you burn your lips. So, drinking water to cool off your lips is basically a behaviour that you do in relation to the coffee.

So, basically this is what the a human behaviour and so we looked at how different perspectives can be used to study this particular human behaviour on a human behaviour for that matter, we looked at the biological perspective; obviously, the subjective perspective and the behaviourist perspective the cognitive perspective and so on and so forth. So, that is what we did in the first lecture in towards the end of this lecture.

The introductory lecture, we looked at the methods of studying human behaviour for example, we looked at experimentation, we looked at something called observation, the survey matter method, the literature review method and all kinds of methods which I employed for studying human behaviour.

After this, we went into so, if human behaviour is to be studied by using these methods, there are the first thing to study human behaviour is to identify, how humans translate physical stimulus into the psychological world.

So, how does the physical stimulus gets translated in the psychological world, what are the organic, organs in the human body, which does that and how the human body translates, any physical stimulus into psychology customers, because within us is a psychological world and outside us is the physical world. So, how do we interact with the physical world?

And there, we looked at the idea of what sensation is? So, the sensation the process of converting, physical stimulus into psychological stimulus or psychological matter is what session is all about. And that section, we looked at those devices which basically encode this physical stimulus into psychological stimulus. So, we looked at parameters like sensitivity and sensory coding.

Now, two parameters of how the sensory system encodes physical features or physical stimulus, like temperature, like pressure, like light photons, like sound, sound waves or

these kind of or chemicals which cause you to taste bitterness or sweetness, how this these are encoded into the psychological realm.

Now, two important facts of these or these sensory systems, one is the absolute threshold and the other is a differential threshold is what we looked into further. And further to this, we looked at something called the seasonal detection theory.

Now, signal detection theory, why it is important is as I said, human beings are very bad at judgment right, the reason being that, the human beings use their brain for judging and the brain has a lot of neural noise of which it makes for doing the basic human activities. And so, within the background of this noise, humans have to detect stimulus or encode stimulus and that is why the idea of single detection theory came up of, how humans actually do the detection. So, we discuss a signal detection theory.

And later on, we looked at what is sensory encoding, the methods, the biological features or the biological methods of how the physical stimulus is encoded into a psychological world. Towards the end of the lecture we look we took a classic human organ which is the eye and we looked at how does the eye do all these functions of encoding physical stimulus is in to the psychological realm. So, there is a classic case that we looked at. The last two lectures, we dedicated to perception.

So, assuming that you are able to convert the physical stimulus or encode the physical stimulus into the psychological world, this needs to be attached with a meaning and that is what exactly perception does? Perception is basically, a feature of the human brain where it takes in physical stimulus and not only takes in physical stimulus, organizes them together and makes meaning. So, that is what we looked at in the next lecture which is lecture number 5 and lecture number 6.

And lecture number 5, we looked at how the brain organizes these physical stimulus together, not only the organizes this physical stimulus together, how does it made meaning. And then we understood that the first process of perception, which is organizing physical stimulus together and deriving meaning from it is a five part process, we starts with something called attention, then there is localization, then there is recognition, then there is something called abstraction and then constancy. So, we looked at these five process.

Now, attention is the process of putting a filter on to what sensory stimulus should enter the psychological realm, because if you do not do that, what will happen is all stimuluss will enter. So, we looked at what is attention we looked at sustained attention and so on and so forth. We moved on to something call localization which is the process of locating, where the physical stimulus or the in the physical domain where is the stimulus, finding out where it is.

So, we looked at things like, background and foreground, finding out how contours are form, finding out how people perceive distance and so on and so, forth. So, localizing in the physical world in the world outside the cycle, the brain how location of the object is gathered.

Then we looked at in the lecture number 6, we looked at how recognition is done and so, we looked at several models, the simple model, the complex network model, the feature detection theory and concepts like recognition parameters of how something or how an object which is located in the physical environment, how make meaning is made of it or how it is recognized, what is the process of recognition.

So, we not only looked at words and letters or recognition. We also looked at natural object recognition of, how natural object recognition works and we looked at the idea of geons and those kind of things in this lecture. Later on, we moved on something called two processes of abstraction constancy, abstraction being the process of narrowing down, the type of information, we actually need from a whole lot of physical information which is available to us and constancy being the property of the brain to hold certain stimulus; constant to hold certain properties of external stimulus is fixed. And this is required because if it keeps on changing, then meaning cannot be derived of physical stimulus. So, that is a capsule of what we did up till now?

Now, what we are going to do today is take another topic, which is of interest. So, assuming that we have interacted with the physical world and make meaning out of it, the next step is an advanced process in human behaviour which is called learning and conditioning.

So, the topic for today's discussion would be learning and conditioning. So, what is learning and why do we need to learn? Now, learning is a process or learning is a phenomena which happens to most of us and an associated phenomena with this is

memory because learning cannot happen on its own. So, learning is a process through which people gather information, organize information and use this information later at some point of time for their own benefit. So, learning is basically a phenomena like that.

Now, this learning that you are talking about is an important part because if we if the if we do not learn, what is going to happen is that we will not be able to gather knowledge. So, learning is a process of gathering this knowledge and organizing it together and not only organizing it together, using it for our benefits and then sometimes you also let go of earlier learning and start with a new learning. So, learning is a process which not only makes you gather knowledge, it also makes you move ahead in this world.

Now, this learning that we are talking about, is basically of two different types, we have something called a non-associative and we are something called the associative form. Now, one of the interesting thing about learning is something called classical conditioning, is a form of learning and that is what we will be doing today. So, not only distinguishing what is learning and we will look at, what is classical conditioning and so to prove how learning is important to us, let us take a look at an experiment.

Now, suppose you want a person to actually increase a particular behaviour, to actually increase a particular act, how do you do that? And you can do that by using one of the principles of learning which is called classical conditioning. So, let us see how this situation really stands here. So, you have a friend of yours, who is in the habit of actually touching his hair each time or he has he plays with his hair a lot; so, he runs his fingers with ease as a lot. Now, this is the behaviour which you target on and you want this person to increase this behaviour.

Now one way to do, this is to ask this person to play with his hair more, but this is a direct approach and this is not learning and so he may question you back saying that, why should I do it right, but then there is another method of making this person do this behaviour without this person knowing that you have used the principles of learning for making him do this behaviour. So, how do you do it? You use something called classical conditioning; we will discuss classical conditioning in a while, but let us see how this can be done? How this magic happens?

So, what we do is that, the first step is reinforcing him. So, each time this person runs his hand in the through the hair you give him a compliment right and you keep on doing it,

each time he runs his fingers through the head you complement him and you keep on doing it again and again. And after a certain period of time, what happens is? This person's frequency of running the hair in his head increases. So, even if you do not compliment him, this frequency will increase, because what has happened is the frequency of running the hair which is a response, which is the neutral response, is now binded with a positive reward which is your praise to him.

And later on if you ask him the question of why are you doing, what you are doing, why are you or are you doing this because I have given you a praise this person is not going to accept your answer and the increase in the or increase in the frequency of playing with the hair will be very high.

So, this is the kind of thing that learning can do it, can make you do behaviours can make you play with people, not actually play with people to actually, interact with people in a way and learn things and then make them learn things in a way which will benefit not only you, but the other people who are interacting with you. So, let us understand what is learning and let us go into the section of what is learning and what is conditioning and how does it all work around.

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So, the topic for today's discussion is learning and conditioning. As you see this cartoon very briefly, this guys what learning is all about on this side, as you see I have cut out the captions with the caption read, that this father is doing the work of this child and what

has happened is each time the child father stops doing the work, the child actually cries, what the child is doing is watching the television and the child has know understood the principle of learning, that if he throws a tantrum the father is going to actually do the homework and that is one reason, why, how learning can really work. Or in this case, what has happened is? This person on the right hand side what, what he is trying to do? He is trying to learn, how to manage his books with rewards as you see, there is a drinking reward, then there is an eating rewards and that is how this thing works up.

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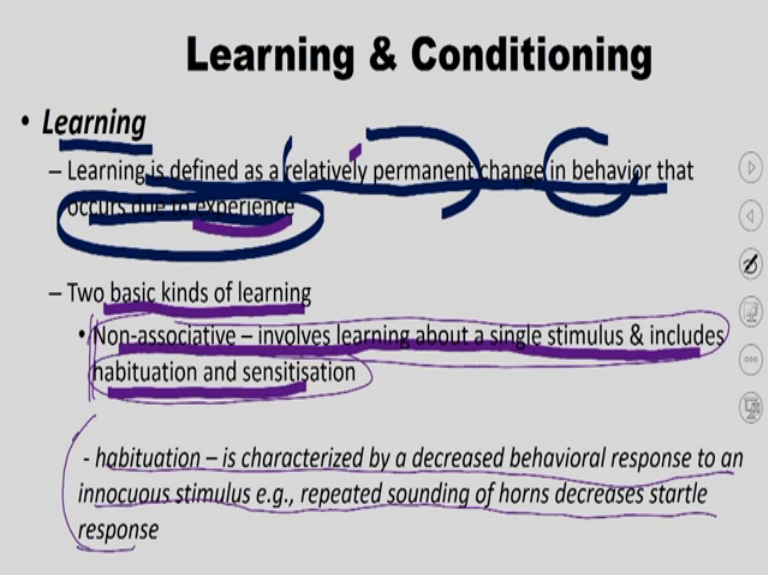

So, let us quickly look into what is learning and what is conditioning; the definitions of it. So, learning the definition of what learning is learning is defined as a relatively permanent change in behaviour that occurs due to experience. So, learning has been defined as a relatively permanent change in behaviour that occurs due to experience. Now, let us break this definition, relatively permanent change in behaviour occurs due to experience. So, let us look at how this definition can be actually use.

So, the first part of the definition is, it is a relatively permanent change. What is the meaning of a relatively permanent change; what is the meaning of relatively permanent change? It says that, the change that you are seeing in people's behaviour is per is relatively permanent which means, that it is not permanent and so, the change in behaviour which happens due to learning can always go back to the original behaviour.

Second thing, change in behaviour. So, it is relatively permanent, what is relatively permanent? Relative to the earlier situation and what is permanent the behaviour? So, behaviour can go back to the original and it occurs due to experience. So, how, why; how or why does it occur? It occurs because there are certain experiences and these experiences actually make you do learning or these experiences actually make you go through learning.

Now, as I said before there are two kinds of learning, the first kind being the non-associative which involves learning about a single stimulus and includes habituation and sensation right. So, there are two kinds of learning basically, what we did now is we looked at the definition of learning and we there looked at, there are two kinds of learning; one is called the non associative form of learning and the other is called the associative form of learning and we will quickly look into the definitions of it.

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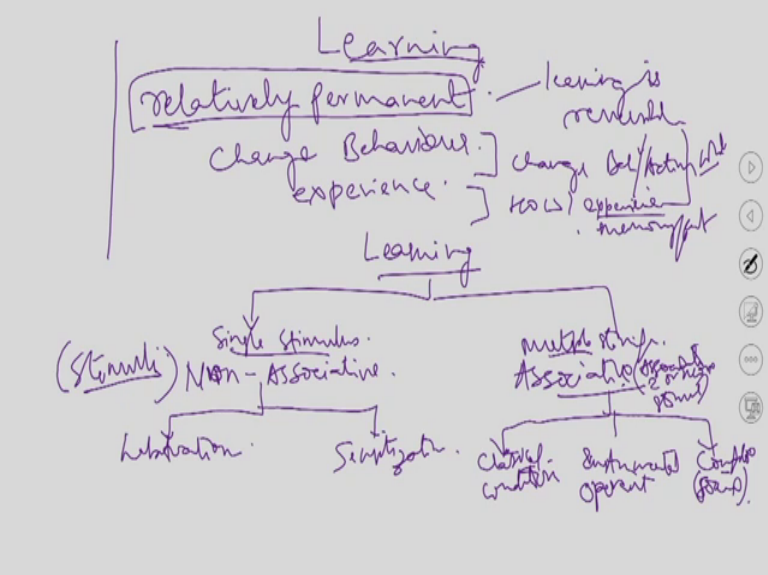

So, basically learning has been defined as a relatively permanent, what a change behaviour which happens through experience. So, relatively permanent the definition of relative permanent says that, it can go back so, learning is reversible first thing, second a change in behaviour; change in what? A change in behaviour or change in your actions and the third is how is it caused; so, how is learning cause, what changes and how it is cause, it is caused by experience which basically means that the primary cause of learning is memory and past knowledge. So, this is what the definition of learning is.

Now, as I said, this learning that we are talking about are of two types. We can have a single stimulus learning or we can have a multiple stimulus learning. So, single stimulus learning or we can have multiple stimulus learning. So, single stimulus learning is called the non-associative form and the multiple stimulus is called the associative form.

So, what is the single stimulus learning the non-associative form? In the non-intuitive form of learning, there is no association; so, a single stimulus is used people learn from a single stimulus, people learn from manipulating a similar single stimulus and in the multiple stimulus or the associative learning, what happens is, people learn to associate people learn to associate 2 or more stimuli, they learn to associate 2 or more stimuli and through that they learn and within the single stimulus learning are two forms, we are something called habituation or sensitization.

And within the multiple form, where we learn to associate multiple stimulus together and from there we learn or we learn to associate multiple stimulus together. And that makes the change in behaviour, there are two forms of it we have something called classical conditioning; we are something called instrumental conditioning or in some books that they would talk about operant conditioning and the third is called complex learning or sometimes it is also called social learning or observation learning for that matter.

So, basically this is what my learning is all about and so, what is the non-associative form of learning? The non-linearity form of learning this it involves learning about a single stimulus that includes habituation and sensitization.

Now, let us look at what is habituation, what is the meaning of habituation? So, habituation is a characteristic is characterised by a decrease in behavioural response to an innocuous stimulus example, repeated sounding of horns decreases the startle response. So, what is habituation? Habituation is a process where, what happens is that, when you when a stimulus innocuous stimulus is presented to you multiple times, what you tend to do? Is you tend to start responding lesser and lesser to this stimulus and that is what is in habituation.

So, think of a situation in which a friend of your decided to surprise you to give your startle response and what he does is? He stands inside his room or your room with a horn; and when you enter the room it is all pitch black and he blows this horn and so, you become startled. Now, he tries to do this n number of time, he tries his starts feeling

smart and he believes that he can do this with you for every day or player on with you for every day and so, he does this for multiple number of days. There will be a time, when he blows the horn when you enter the room and nothing happens because it is habituation; you habituated through to it and so, you show no reaction.

For the first couple of days maybe 2-3 days, he will show a startle response as you that you would not. So, here the kind of learning that has happened, the kind of behavioural change where from startle, to know startle that you have come up with is basically a form of learning which is called habituation.

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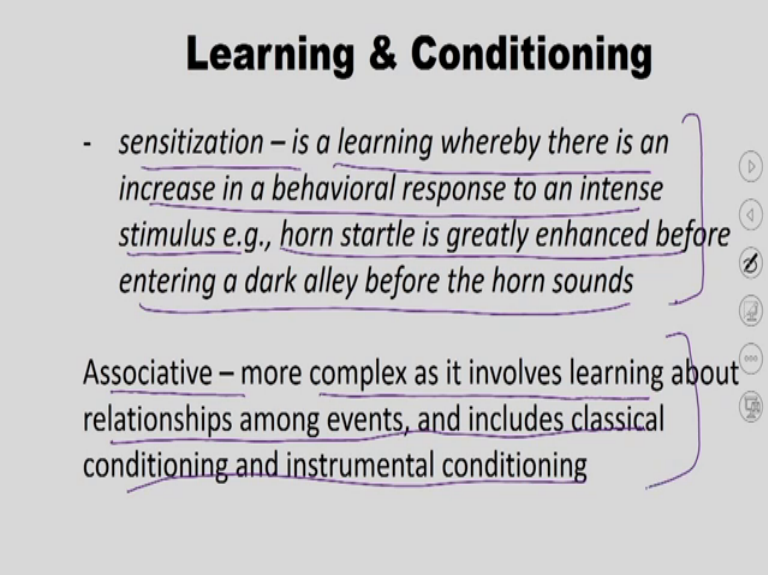

Now, let us look at what is sensitization? Now, sensitization is a process ,is a learning process whereby there is an increase in the behavioural response to a intense stimulus example, horn startle is greatly enhanced before entering a dark alley as the horns sounds. Now, you are still with the startle response and so, what has happened is since, you enter this room again and again and the startle response has gone because you know or you have prepared that, this friend of yours are going is going to startle.

But imagine one of these days you are walking back to your hostel, to your room wherever you live and suddenly that the light goes off and you turn into an alley or you turn into your hostel gate and everything is pitch black and the and the response or the startle the horn is again blown; what will happen is, your immediate response the startle

will again come back with a heightened of frequency with a heightened amplitude. So, you will be more startled and that is, what is sensitization.

So, situation environmental situation makes you startle more because initially you were startled with the response, but then you have learned it not to get startled, but then certain environmental factors make the situation, make you respond more intensely to the horn to provide more subtle activity to the respond to the horn and that is basically what is called sensitization. So, there are two forms in sensitization one single stimulus is the cause of all learning to happen. On the other hand, I have the associative form of learning, where more complex stimulus as it involves learning about relationships among events, and includes classical conditioning and instrumental conditions.

So, in the case of associative learning, what happens is, more complex stimulus are involved and what people learn is, how to associate a stimulus with another, stimulus or a stimulus with a particular kind of a response. So, understanding stimulus relations, how a stimulus a is related to a stimulus b, or how a stimulus a is related to a response b and what should be done to increase the behaviour or decrease the stimulus intensity is, what is associative form of learning. There are two in nature, we have something called classical conditioning and we have something called instrumental conditioning.

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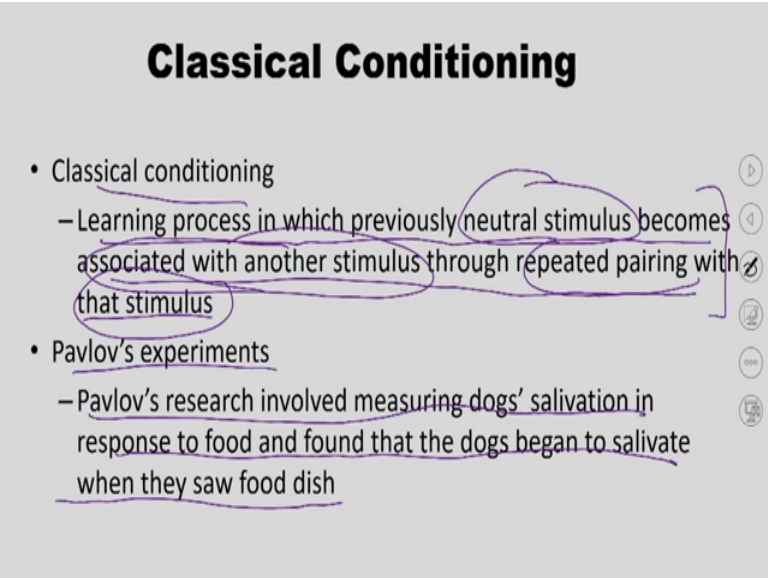

So, then look let us look at, what is classical conditioning? So, classical conditioning, learning process in which previously neutral stimulus becomes associated with another

stimulus through repeated pairing with that stimulus. So, classical conditioning is a form of learning where what happens is, that learning happens in this way that a previously neutral object or previous neutral stimulus, it becomes associated with another stimulus with another object through repeated pairing with that particular stimulus.

So, we will quickly understand that, I will make you understand this particular thing and we will also look at the various definition that I am describing here in one second, before that let me clarify, what are classical conditioning. So, here you have an object which is not reacting to anything which is not responsible for anything and then you have a another object which is producing a response.

So, the process through which you take this neutral object which does not produce any response and fix it in such a way or use this neutral stimulus in such a way. So, that it starts producing the same response or equal response as the other stimulus which is already producing the responses, what is classical conditioning. So, the power or the process of providing the power referred to a neutral stimulus to produce the response of a desired intensity, of a desired mock ability is what is classical conditioning.

So, it all started, the idea of classical conditioning started from Pavlov's experience or Pavlov's lab where he was training a dog. Now, as you know Ivan Pavlov was a Russian physiologist and he was working with digestive systems of dog, he got a Nobel prize with that, but not only the Nobel prize is also known for it for making people understand associative learning and one of the most premium definitions of recitative learning which is the classical conditioning.

So, what Pavlov's experiment was, Pavlov's research involved measuring dogs' salivation in response to food and found that dogs begin to salivate when they saw the food dish. So, what was the experiment that Pavlov have, what Pavlov was doing is, he was measuring the amount of salivation that the dog produces when he actually sees the food right, so that was what the experiment was.

And so, what happened is, he saw one day that when the person who brings the food he comes closer together or he comes into the picture, the dogs' started salivating even before the meat powder was given to given to the dog. So, which basically means that, the dog was doing some anticipation or dog was something was happening. So, that even

before the meat powder was given to the dog, the dog started salivating just at the sight of the person who brings the meat powder.

And so, you use this concept, and in this concept of the dog salivating even before the meat powder was given because normally the dog fish salivating the meat water, but he was just salivating to the persons appearing. So, he used a light bulb and in he used to light the light bulb and after that give the meat powder and slowly slowly what happened is, after multiple number of times he did this experiment, when the light bulb was kept on, the dog starts responding or the dog starts showing salivation and that was what the original experiment was Pavlov was.

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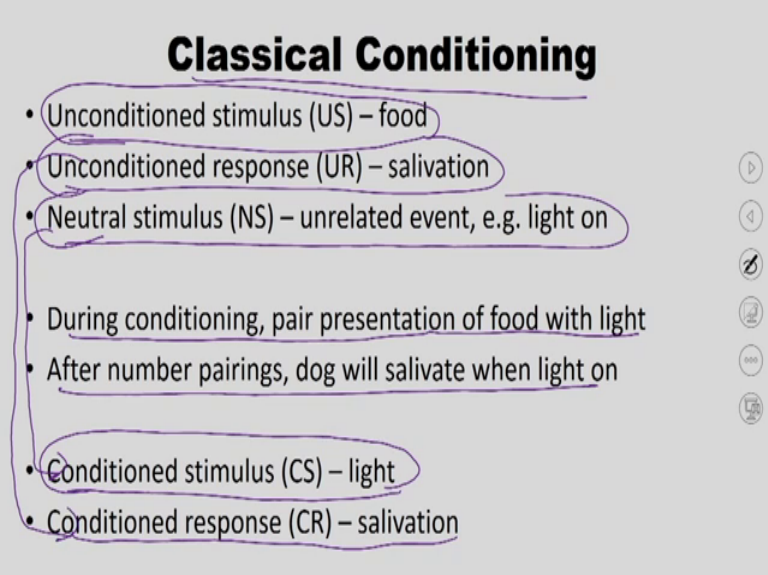

Now, before we go any further let us look at, how does this thing really work? So, before defining classical conditioning or how does classical conditioning really work, let us look at some of the primary or terms that we are going to work with. Now, unconditioned stimulus is the stimulus which produces the response, unconditioned stimulus is the stimulus in a classical conditioning setting which automatically produces the response.

Unconditioned response is the response which happens on it's own which is not conditioned which means that it is a natural response. Neutral stimulus is a stimulus which is unrelated event like light or in case of Pavlov the presence of the helper is what is the unconditioned the neutral stimulus. Now how it happens, during conditioning, pair

present presentation of food with light and after a number of pairings, dog with salivate when light is on.

Now, conditioned stimulus is the light and conditioned response is the salivation; conditioned stimulus is non-conditioned stimulus or the neutral stimulus after a number of pairings comes the conditioned stimulus and response the unconditioned stimulus response is what is produced by the conditioned stimulus.

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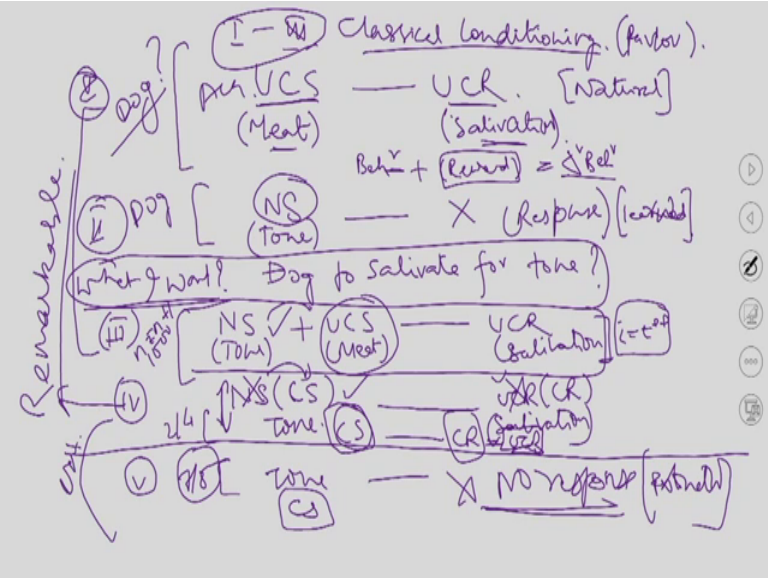

So, let us look at, what is this classical conditioning all about, classical conditioning and what I will do is, I will use Pavlov's method for the ease of people or they who are learning. So, basically there is something called the in step one, there is something called the unconditioned stimulus which produces the unconditioned response right, what is the meaning of this? Meat is the unconditioned stimulus and the unconditioned response is the salivation; natural response right.

So, in this response as you see in step one, there is a meat powder and this meat powder when it is presented to the dog and the person or the device on which this conditioning is going on is the dog. So, as you present the meat powder the dog salivate and this is a natural thing because, any dog you take, you give meat to the dog, the dog will salivate and this is called the neutral stimulus, this is called the I am sorry the natural pairing, this is called the unconditioned the meet is called the unconditioned stimulus and salivation is

called the unconditioned response; the reason being that this is natural pairing or this is something which is natural happens on it own.

Now, in step 2; what I want is, I want the dog to salivate for something called the neutral stimulus. So, neutral stimulus is a tone right; so, some tone I present and when this tone is presented to the dog there is no response because this is learned, this is not natural this is artificial or this is learn.

So, in one case, when I present the meat powder, the dog responds on it's own nothing has to be learned and this is natural reaction and then I present a tone or I present a voice to the dog, the dog does not response shows, no response to it or particularly it shows I would not say no responsiveness. So, the responses salivation because the dogs are not known to salivate for tones.

Now, the question is what I want is. So, what I want is, I want so, as I said in classical conditioning I relate stimulus together and so, what I want is? I want the dog to salivate for the tone; can I do it. Now, the problem is that dogs do not salivate for tones right; and it is a difficult problem. Dogs' will salivate for meat powder, dogs salivate for some other thing, but tones are something which the dogs is not going to salivate, my response is the salivation. Can I make the dog salivate for the tone that is what the question is and that is what even Pavlov wanted, and that is what the basic classical conditioning?

So, can I make the dog salivate for tone that is what the question; so, I what I do is in step three to achieve this particular thing to achieve this, what I do is? I present the neutral stimulus first and then I present the unconditioned stimulus which is the meat powder and if I do this, the dog will show an unconditioned response which is salivation. So, what I have done is? I have only included this step. So, what I have done is, I have presented the tone first and immediately following the tone or within the tone itself, when the tone was being presented towards the end of the tone, I presented the meat powder, but the dog was known to salivate for meat powder. So, it is going to salivate for meat powder and that is what it is.

And now, I have to do this pairing or now I have to carry out this step where I use the tone in the meat for let us say multiple times. So, n equals to n plus 1 times right, or i equals to i plus plus, in terms of c plus plus language it has an iteration. So, if I do this, let us say for 1000 times, what will happen is? After 1000 pairings, after 1000 repetitions

of this step my step number 3, there will be a time which will come where, when I just present my neutral stimulus which now becomes the conditioned stimulus.

So, now my after a multiple number of times this neutral stimulus is no more neutral stimulus, it becomes the conditioned stimulus and I do not give the meat powder, the dog produces salivation for the dogs salivate to the tone, but this is now called the conditioned response and not the unconditioned response. So, in this case what has happened is, the tone the CS produces the CR, the CR is actually equivalent to the UCR, but still the UCR is the response which has been produced by the meat powder, the CR is the same response that is there, but now it is being produced by the tone.

And so, what will happen is for the next two or three trials, for the next couple of trials, maybe say two or four trials what is going to happen is? the tone is going to produce the salivation, but soon the dog will understand that, this is this meat powder is not coming I am just responding to the tone and so, in step five what will happen is; let us say at the seven or eight trial or after trial number seven to eight, what is going to happen is, tone when you present to eight, the dog conditioned stimulus no response, and this is called extinction.

So, up till now, is what is up till this is what is called classical conditioning? So, what I have done is? What I have achieved is? I have achieved something where I make a neutral stimulus which was a tone produced a response which the dog would not have produced on his own, would not have generated on his own right. And so, if I do step number 4, step number three multiple number of times, the dog will now salivate to the tone, but sooner or later, the dog will realize that the tone is not producing or tone is not giving any meat powder and he will not responds.

But up till now, what I have done is, this is a remarkable feat step number four is a remarkable feat, because what I have done here is that, I have made somebody do something which they would normally not do, right interesting, that is what classical conditioning is all about.

So, all those situations, where you go to the market and something is offered free to you, what they are doing is, you are they are using the method of classical conditioning. The idea is that, when something is given free to you, the word free is the reward that you have and so, that reward makes you buy something.

And so, for understanding this thing, I could also explain classical conditioning as something called reward contingent behaviour is what or reward contingent conditioning is what is called classical conditioning. So, you know in the classical conditioning what happens is generally, what happens is that, there is a behaviour or there is an act and if this behaviour is rewarded it is added with a reward a change happens in this behaviour is what is classical conditioning. So, this reward makes you change this behaviour to this behaviour and that is what is classical conditioning; in classical conditioning the change in behaviour happens because of the reward.

And if you pull out the reward, if you pull out the serve; so, all those times when you went to supermarket and a 10 litre or 20 litre bucket was being given to you, if you buy surf the 10 litre, 20 liquid litre bucket is the reward which is there, in this case the USC meat is the reward and as the reward is given to you the dog learns to salivate. So, it is reward contingent conditioning where a reward is given to you and because of the reward you do a particular behaviour.

So, you salivate; the dog salivates not because he hears the tone because tone has no power itself, but why is producing this response is because he is expecting a reward or the reward has made him actually do that. So, all those times when the a bucket was taken away, you still buy surf for a couple of times and then you do not buy it anymore because you are buying it for the bucket. So, those 4-5 times when you actually brought it without the bucket is what classical conditioning is the power of classical conditioning is.

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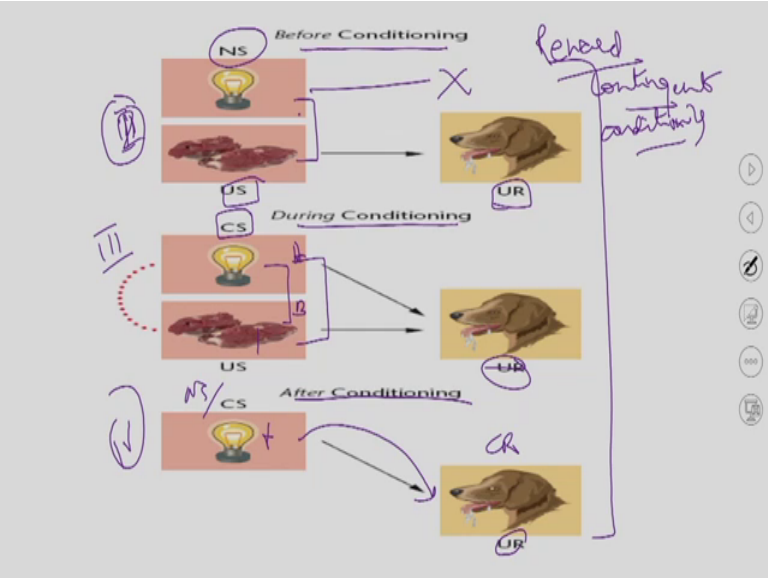

So, as you see, this is before conditioning; so, this is what my neuter stimulus is a light and this is the pairing, it is step number three as you can see, what happened is, there is the light, there is a meat and the dog is salivating. This is unconditioned response, this is the unconditioned stimulus. And during conditioning what is happening is, this is so, initially so, this is step number 2, the light produces no response, but the meat powder produces a response and this produces no response.

Now, during conditioning what happens is, this is step number 3 and this is step number four. So, in step number 3, the light is paired together; this comes together so, the dog is salivating for both the pair together this comes first this comes seconds. So, first comes the light, then comes the meat powder and later on after conditioning what happens is even if the light is given.

So, now, my neutral stimulus has become the UCS and my unconditioned response has become the conditioned response because what has happened is, this light is producing the salivation and that is the baseline of all classical conditioning. So, it is called the reward contingent conditioning that is what classical conditioning is all about. So, it is easy to understand, what some something is given to you and you do a particular act because of that particular thing is what is classical conditioning.

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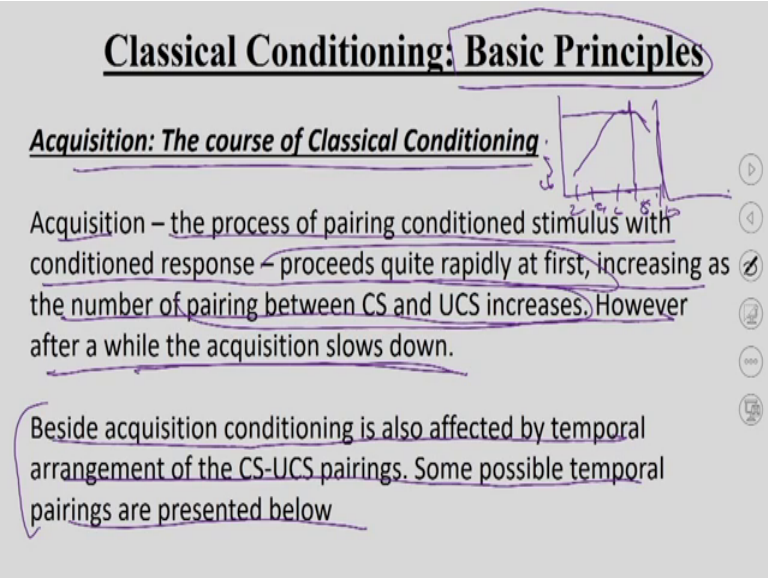

So, some basic principles of classical conditioning let us look at some basic principles. First acquisition, the course of classical conditioning; there are two parts of classical conditioning, the time when you learn and the time that the behaviour goes down. So, looking back here, this is the acquisition phase 1, 2, 3. So, 1 to 3 steps are called the acquisition phase because you learn here and this is called the extinction phase because you forget here right.

So, acquisition phase acquisition the process of pairing conditioned stimulus with conditioned response proceeds quite rapidly at first increases as the number of pairings between CS and UCS increases. However after a while the acquisition slows down. So, if I pair this way, what happens is, if this is the number of trials, 2,4,6,8,10 and this is the drops of salivation, what will happen is? Initially the curve will go like this and then it will start dropping. So, by 8th trial that will have maximum number of salivation this is called the acquisition phase.

So, initially what happens is, it proceeds quite rapidly at first increasing the number of pairing between CS in UCS increases as we keep on increasing the number of pairings increases; however, after a while the acquisition slows down. So, by after 10 trial, it starts going down and this is called the acquisition phase. Also beside acquisition conditioning is also affected by temporal arrangement of CS-UCS pairing. Some possible temporal pairings are presented.

So, that number of principles, there number of factors which control this classical conditioning, one is the acquisition. What happens is, that the more number of frequency pairings, there are number of pairings of the neutral stimulus to the condition unconditioned stimulus that you do the higher the learning will be or the higher the conditioning will be.

Now, what is going to happen is, but then after certain number of trials, p this dog is not going to learn anything, it will play too off because it has only learned the response and so, the salivation will go down. So, initial at the initial stage of learning, initial stage of padding the number of drops of saliva will increase, but as that happens they be applied to and from there on, what will happen to the saliva draws it decreased. Because it has learned this connection right, but not only this acquisition is going to decide, how classical conditioning proceeds it is also the arrangement of where the neutral stimulus is presented or how the unconditioned stimulus is presented; so, how the pairing is done.

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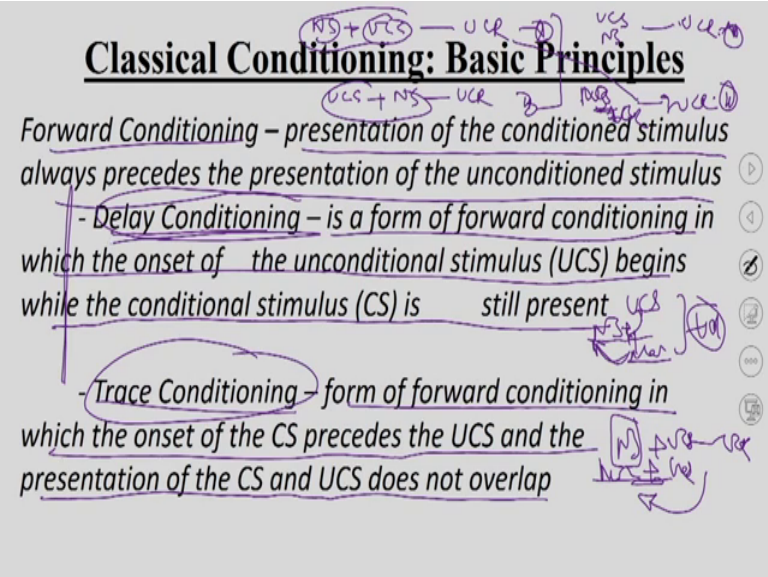

So, let us look at some of these, now there are four different ways in which you can pair the stimulus. For example, now that one way is neutral stimulus plus unconditioned stimulus will give unconditioned response it is one. I can also have unconditioned stimulus plus neutral stimulus giving me unconditioned response, this is 2; I can have unconditioned stimulus and neutral stimulus occurring together giving unconditioned

response or I can have unconditioned stimulus and if does not finished within that, I have the neutral stimulus being presented.

So, simultaneous not simultaneously, but one over another the overlapping one and I have unconditioned response. So, this is my see scene number 3, this is my scene number 4. So, let us look at these temporal presentations the way this is related, whether it has any effect on classical conditioning or how you learn using classical condition let us look at that.

So, one is called the forward conditioning. The presentation of the conditioned stimulus always precedes the presentation of the unconditioned stimulus. So, neutral stimulus proceeds UCS, this is called the forward conditioning. Then there is something called delay conditioning is a form forward conditioning in which the onset of the unconditioned stimulus UCS begins while the condition stimulus CS is still present.

So, this UCS actually begins; so, I have my neutral stimulus till here and then my UCS begins with this, so this 2, 4 and 1. These are the two forms of it. There is a form of conditioning or there is a type of conditioning which is all trace conditioning where form of forward conditioning, in which the onset of the CS precedes the UCS and presentation of the CS and UCS does not overlap. So, this is another form of conditioning where CS comes beforehand.

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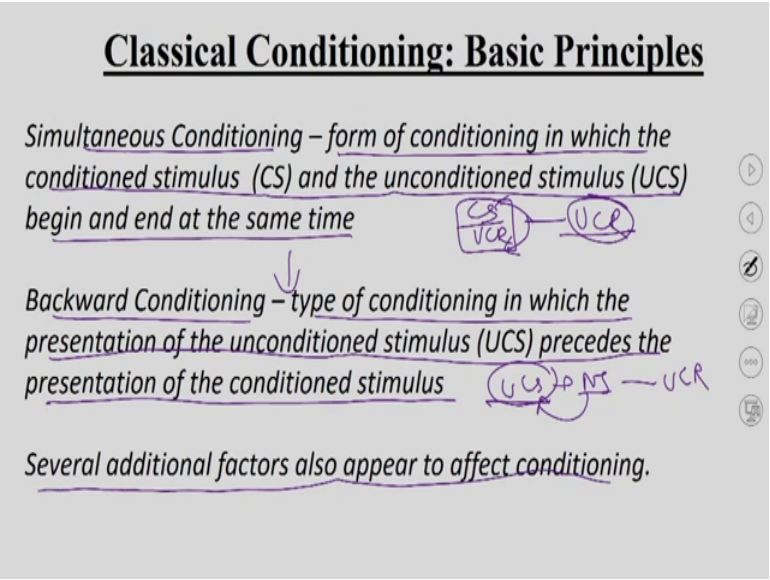

And the fourth form is the simultaneous conditioning, a form of conditioning in which the conditioned stimulus CS and the unconditioned stimulus UCS begins at the same time. So, my CS and UCS starting at the same time to form, the unconditioned response; so four types of conditioning.

And then I have something called backward conditioning it is a type of conditioning in which the presentation of the unconditioned stimulus precedes the presentation of the unconditional. So, so my UCS starts first, my neutral stimulus starts second and I have UCR here and here; obviously, the trace conditioning a neutral stimulus coming first, the UCS coming afterwards and then the UCR or the response.

Now, my questions to you is in which of this case do you think the conditioning will be better, the learning will be better right and what is your answer, and why you think that answer is there, if you can guess that. Now the answer typically is backward conditioning will have the worst kind of conditioning; the reason being that, the meat powder is already present, meat powder is already given to the dog and then you give the tone, the dog does not pay attention to the tone and so, your conditioning will be the poorest.

If you present the meat powder and the tone at the same time, the dog pay attention to the meat powder, does not pay attention to the tone and so, the conditioning will be poor here. If you look here onset of the unconditioned simulation begins, while the conditioned stimulus is still present, if UCS neutral stimulus is here and the UCS starts.

So, the tone is there and still the tone is going on and within that you start the meat powder, the conditioning is the best here, or the learning is the best here, why? because the dog is still listening to the tone and as is listening to the tone, the food is presented to him so, or the meat is presented to him; so, he forms the quickest association because the tone is still going on and he has been listening to him for quite some time and then the meat powder comes along and he produces the response so, he learns the faster.

In this case, where the neutral stimulus or the tone has ended and after that a delay you have the meat powder coming in, the dog cannot make any relation between how the tone and the meat powder is related and so, here even in the trace conditioning, the conditioning will be poorer. And so, this is the best kind of conditioning or delay conditioning is the best kind of conditioning which is going to happen.

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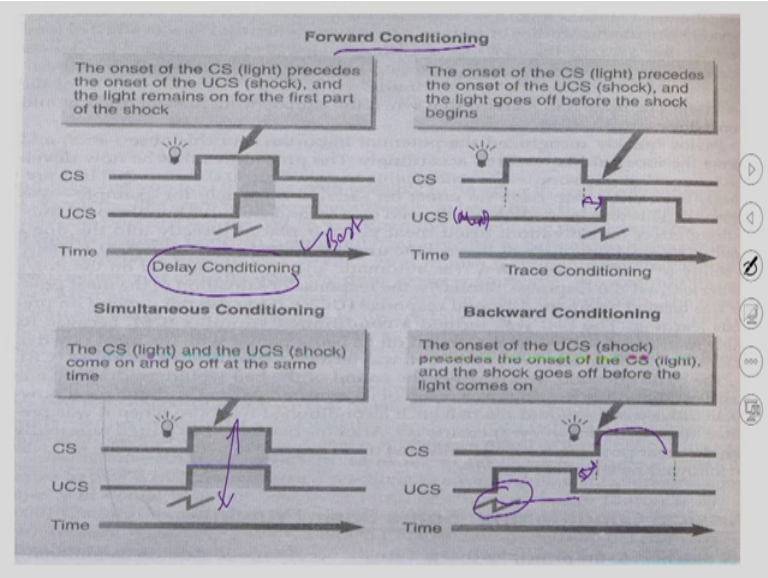

Now, there are several other conditions, that appear or factors that appear to affect conditioning. One of these factors so, these are the four conditioning that that you see, this is the forward conditioning. So, as you see this is called the delay conditioning, you see the light comes before the tone starts even when the light is on and so, this is the best kind of conditioning, I will write the best here.

In this what has happened is, there is a gap between the presentation of the meat. So, this is my meat and this is my light and so the dog forgets. In this case, they are happening together, the dog cannot distinguish between this and in this case the meat powder is already there, the tone comes afterwards and in this case and not use the meat powder it is the case of giving electrical shock; and so, in this case what happens is, the dog cannot make any association because he is busy eating the meat.

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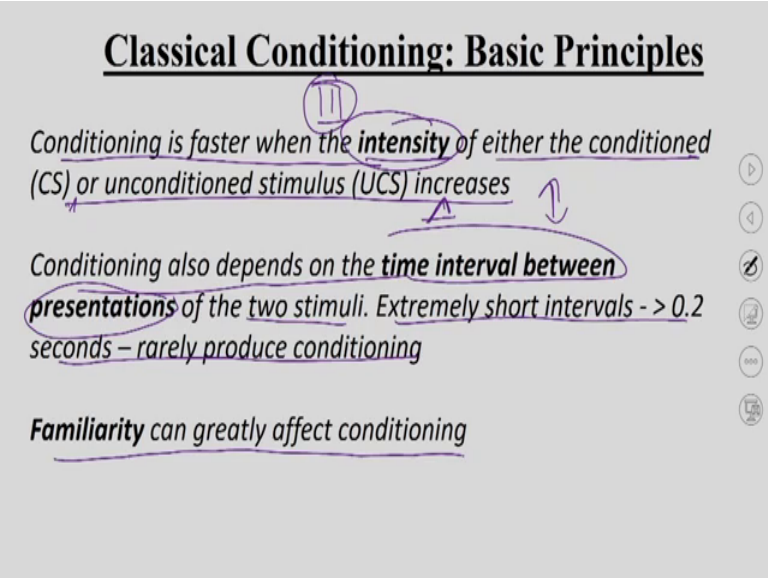

Now, there are several factors which are going to affect classical conditioning let us start to have a look at these factors. One of the factors, that is going to affect classical conditioning is the intensity of either the conditioned stimulus or the unconditioned stimulus increases.

Now, if the intensity of either the conditioned stimulus or unconditioned stimulus increases, then condition will be faster. For example, instead of the meat powder, if you give something desirable to the dog right; the intensity increases, you give more meat powder to the dog, right or in one cases what happens is if something which is very dear to the dog or if I am using instead of the dog some other animal, let us say I am using chimpanzee.

So, if you give meat powder chimpanzee, it is not going to work. So, you have to give him banana, give the dog something that it likes and if you do that the conditioning will be higher, but the question here is the intensity, which means that if the higher amount of meat powder that you give, the higher the conditioning will be.

So, intensity if either the conditioned stimulus which is the light in this case or unconditional stimulus, which is the meat powder. Any of this increases, there will be a increase in the learning because more meat powder means, more sense more salivation and more higher tone means faster learning. Similarly, conditioning also dependent on the time interval between presentations how many how much time he is being spread

between or used between these presentations of the two stimuli. Extremely short intervals of less than 0.2 seconds rarely produce any conditioning.

So, you have to have some kind of type interval between multiple sets of repetition. Remember step three from the drawing that I did before. So, this step three, where the multiple iterations of a trial is done of a neutral stimulus plus conditions to unconditioned stimulus giving to unconditioned response this step is carried out. So, between these steps between the multiple occurrences of this step, there has to be some gap. If it is very less, then conditioning is not going to happen, if it is very high again conditioning is not going to happen.

And then some the third thing is familiarity can greatly affect conditioning. Instead of the meat powder try giving the dog something which it does not understand right, there will be no conditioning. Instead of the meat party given pizza both are foods, the dog will not understand and there will be no conditioning at all or if the meat powder there and instead of the light because the light was always present in the lab.

So, that. So, the dog understood that he has to respond to it, but if you bring a stimulus which was not originally present in the in the situation for example, in the in the example that I gave to you with surf you have to only use buckets, if you start giving chips packet with surfs, it is not going to work because these do not say familiarity, these do not go together. And that way, surf is not going to increase it's production and you not going to increase the sales of surf. So, what has to happen the familiarity has to be there, the quality has to be there and so, the more familiar the person who is learning is with the kind of stimulus which is to be used the higher the learning will be or the faster the learning will be.

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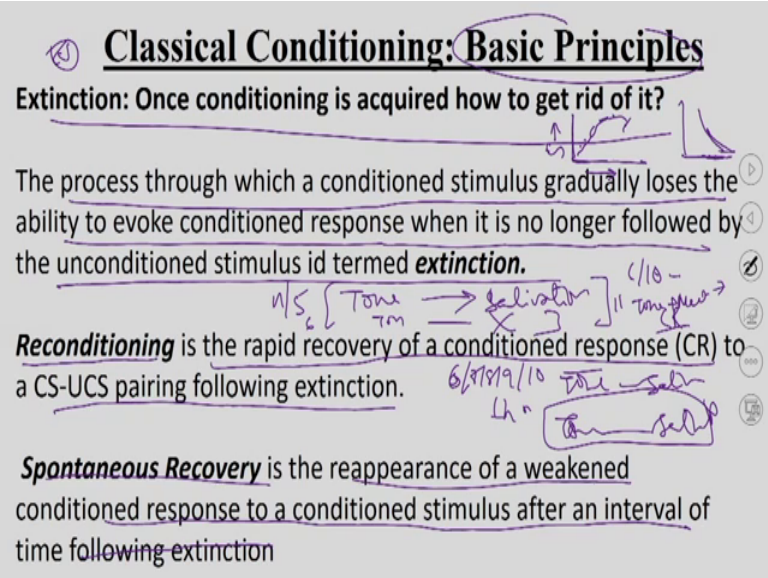

Classical conditioning basic principles and so, one of the basic principle is extinction one conditioning is over how to get rid of it. So, once the dog and I have explained that step number 5 in the drawing that I drew, I saw there is something called I told there is something called extinction. So, what happens is? Initially, what happens is this is my acquisition phase. So, initially what will happen is, the salivation will this is my salivation, this end and this is my number of trials.

So, initially what will happen is salivation will go on increasing, but after the time when you just have the tone and the tone produces a salivation, there will be a drop; a higher drop will be there, where what will happen is although it will not touch the x-axis, what will happen is the percent of salivation will go down and this is the number of trials. So, percentages of salivation will keep on going down. And this is what is called extinction.

So, what is extinction? Extinction is a process where the dog realizes, that he is only getting the tone and he is producing salivation to the tone. So, you should not produce a salivation that is what is extinction. The extinction is the process through which a conditioned stimulus gradually loses the ability to evoke conditioned response when it is no longer followed by the unconditioned stimulus. So, tone giving salivation is only going to work for 4 to 5 trials. After that, there will be extinction which means that tone on the 6 th the tone produces no response and this is what is called condition extinction.

Now, there is also process which is called reconditioning; and what is reconditioning is the rapid recovery of a conditioned response to a CS-UCS pairing following extinction. Immediately after extinction, there will be what will happen is so from trial 6 to trial 10 what will happen is, the dog is not going to respond. And so, after 10 trials let us say on 11th trial, what you do is, you take the tone and add the meat here, on the 11 trial. The response will be faster, the dog responds much faster to the meat powder salivation is higher this is called reconditioning.

So, after a period when there is no meat powder given and suddenly you start giving meat powder, the amount of salivation will increase very high and this is called reconditioning and there is a process which is called spontaneous recovery is the reappearance of a weakened condition response to a conditioned stimulus, after an interval of time following extinction. Let us see extinction happens on the 6th trial. On the from 6th trial onwards, the dog does not respond or 6th 7th 8th trial onwards or 9th 10 trial the dog understands that only tone is being produced and I should not salivate.

If I wait for some more time, stop this process, wait for some more time. And after some more time what happens is that, I give the dog again. So, let us say after a weight of 1 hour, I again produce the tone; the dog is quickly going to salivate, this is what is called spontaneous recovery. So, if there is a time gap between the presentation of the neutral stimulus and the conditioned response, then there is a spontaneous recovery which means that salivation increases very high.

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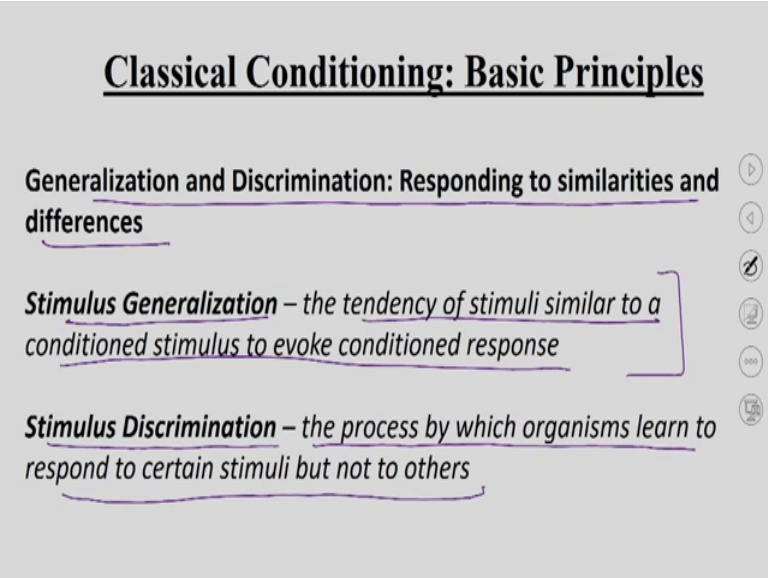

Now, there is also something called generalization and discrimination responding to similarity in differences. So, what is stimulus generalization? Stimulus generalization is the tendency of stimuli similar to conditioned response to evoke conditioned response; what happens is? If, in your classical conditioning study, we have used the tone, this tone could be coming from a bell.

So, instead of an electrical bill, if I use a mechanical bell or if I use a tuning fork or if I use some other amplified digital bell which is out there and the dog will respond to it is what is called stimulus similarity. Stimulus similarity is when the dog starts responding to or people who are conditioned start responding to stimuluss which are similar together in a same manner as to the neutral stimulus or the stimulus that that we were trained to is what is called stimulus similarity.

And then there is a concept of something cause stimulus discrimination in which people are try to discriminate between two stimuluss which are looking similar. So, the process by which organisms learn to respond to certain stimuli, but not to others.

Let us say that, I make friends with dogs and. So, what happens is I like all dogs, but one day one dog bit me. So, initially what happened is through stimulus in stimulus generalization, I started making or packing all dogs and one day one of these dogs actually bit me. Now what has happened is, I will respond to certain kind of dogs and not respond to other kind of dogs. This is called stimulus discrimination.

So, in stimulus generalization, I start responding similarly to all dogs in stimulus discrimination among dogs, also I tried responding friendly to some kind of dogs and unfriendly to other kinds of dogs and this is caused stimulus discrimination a process through which I discriminate between all kinds of dogs.

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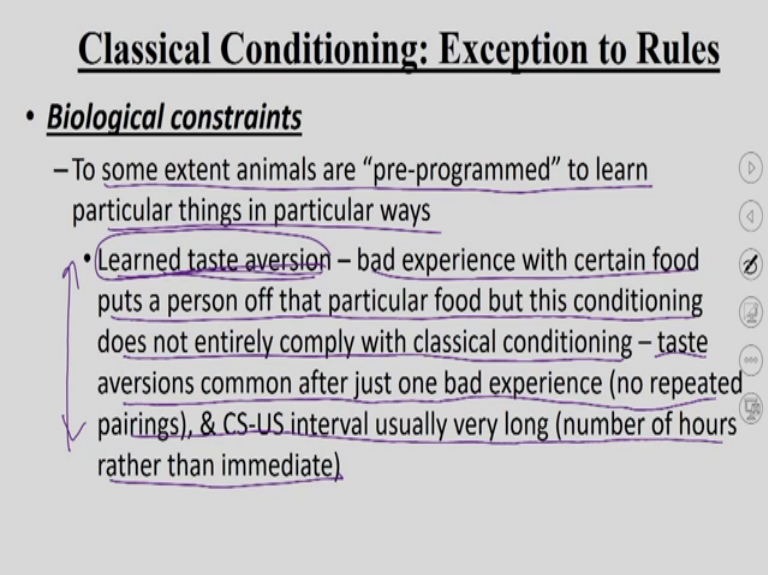

Now, there are certain biological constraints to classical conditioning for example, to some extent animals are pre-programmed to learn particular in a particular way. So, one of the thing or one of the biological constraints in classical conditioning is, the classical conditioning does not work freely the way it is.

There are certain biological limits to it for example, I will give you a good example let us say that, you actually go to a restaurant and the restaurant gives you a food and you eat that food and that food cause you food poisoning. Will you go to the restaurant again and again to learn that this restaurant is actually causing me food poisoning, will you visit that restaurant again? No, just one visit to the restaurant and the restaurant food giving you food poisoning is enough to say that, I am not going to go to the restaurant, but liking that restaurant is a reverse process.

You go to the restaurant again and again; and start enjoying the food and because of that you go again and again. So, multiple pairings are required for you to like the restaurant, but disliking the restaurant is a one process thing. It gives you food poisoning, you do

not feel good and you will never go to the restaurant and that is called biological constraints.

So, like if for in rats also this has been turned tasted which is called the learn taste aversion. So, bad experience with certain kind of food puts a person off that particular food, but this conditioning does not entirely comply with classical conditioning. Taste aversion come common after just one bad experience, no repeated pairing and CS-US interval usually is very long number of hours there is an immediate.

So, in this case of what happens is, you do not need to go to the restaurant again and again and also the time limit is multiple hours. So, you ate at the restaurant let us say at 8 am or 10 am and then, later in the night you get food poisoning, but still you remember that you ate in that restaurant and that causes you to avoid that restaurant or understand that it is causing you food poisoning.

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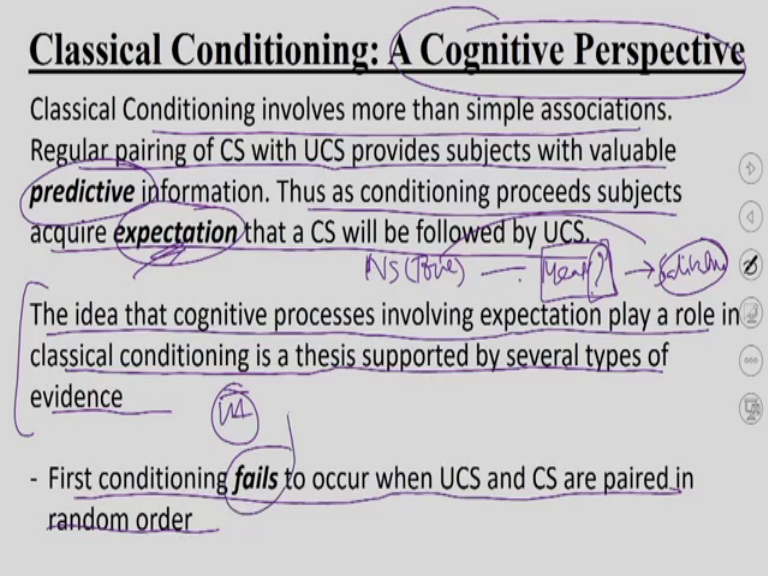

Now, let us look at, why do we have this classical conditioning, the cognitive perspective to it. So, classical conditioning involves, more than simple associations, is not simple behaviourist theory, it is not simple the idea, that a stimulus is related to the response and that is why classical conditioning happening.

So, regular pairing of CS with UCS provides subjects with a valuable predictive information. Thus as conditioning proceeds subjects acquire expectation that CS will be

followed. So, why does it happen? It happens because the dog can now predict as you go on and on, as you go pairing the neutral stimulus which is basically the tone with the food that you are giving to it or the meat powder that you are giving to it. The dog is now able to predict and with this predictive prediction, with this predictive power, it expects the food to come.

So, all those times, when the tone, the neutral stimulus or the tone was presented the dog is actually making prediction and expecting the meat to come and because it is expecting the meat to come, it is salivating. So, it is not simple tone producing salivation, it goes through a process which is the process of expectations of the dog is expecting the meat to come and that is why it is responding.

Now, the idea that cognitive processes involving expectation plays a role in classical conditioning is that thesis supported by several types of evidence. Now, the question is, is it true, is it how things really work and there are several evidence to it. First, conditioning fails to occur when CS-US are paired in random order. So, let us say when I am doing step number 3, on some trials let us say trial number 1 4 5 9 10 14 18 I give the dog, the tone and the meat powder and in and in some trials I may not give him the meat powder. Now, in those conditions, what is going to happen is the dog is not going to learn anything and this conditioning fails.

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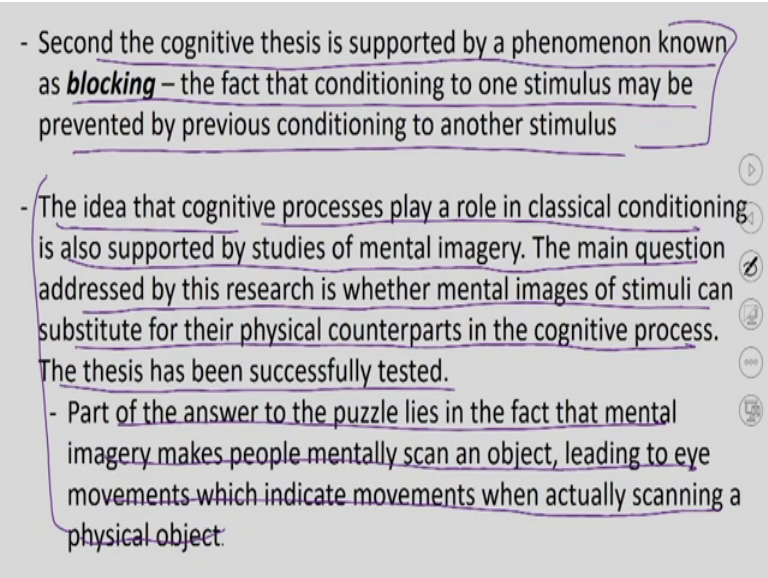

Secondly, the cognitive thesis is supported by a phenomenon known as something called blocking; the fact that conditioning to one stimulus may be prevented by previous conditioning to another stimulus. So, if what happens is? If the dog has been conditioned to let us say, pizza and or some other kind of food and this food is likable by the dog; the dog will never learn to get conditioned by the meat powder, whenever the first food is present and this is called blocking and this is another fact to be looked at and this supports the fact that, it is expectation in the dog and the predictive power the dog has that makes you come up with answers or come up with conditioning.

The idea that cognitive processes play a role in classical conditioning is also supported by studies of mental imagery. The main question addressed by this research is whether mental imagery of stimulus can substitute for their physical counterparts and a quality process. The thesis has been successfully tested. Part of the answer to the puzzle lies in the fact that mental imagery makes people mentally scan an object, leading to eye movement which indicates movement when actually scanning a physical object.

And so, there were certain imaginary studies done, and these imaginary studies, what they actually did, was that these imaginary studies made people respond or imagined. So, in one case they were asked to move a cup from a position a to b and in some situations they were asked to imagine moving a cup from a to b.

Now, what happened is in these studies it has found out that, when the people were actually doing or they were trying to learn conditioning using imagery, they were using the same mental processes as they were in a non imaginary group. And so, this another this is another thesis which supports the fact that, it is the cognitive perspective, it is the predictive power and expectation, that develops in the organism or in the subject which let us him do the or understand the classical conditioning or perform in the classical conditioning.

Now, let us do a recap, what we do today in this lecture is we started by explaining, what is learning, what is learning and the types of forms of learning with it; and further to that what we did was we evaluated one of the forms of classical conditioning, one of the forms of as assertive conditioning which is classical conditioning. So, on one end you have non-associative conditioning which is basically a single stimulus conditioning which is habituation and sensitization.

And on the other hand, you have associative conditioning which is basically classical conditioning, instrumental conditioning what we did today, is we looked at classical conditioning, what is it, what are the factors which affects it and what are the cognitive perspective to it and how does it work. So, those things which we looked at and in the next upcoming lecture, we are going to take the other kind of associative conditioning which is there, which is influenced instrumental conditioning and something called social learning or as we call it observation learning.

So, up till we meet again next time it is goodbye from here.