The Nature of Psychology
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Lecture – 02
Introduction to the Science of Human Behavior – II

Hello friends welcome back to the 2nd lecture on the course on Human Behavior. You know this is a MOOC's course which is sponsored by NPTEL and in the last lecture which was the 1st lecture; what we did was we spent some time in understanding what is Psychology. Now, since human behavior in itself encompasses the study of psychology. So, this course can actually be thought of as introductory course in psychology.

So, what you are going to do here in this course is understand human behavior; why do humans do certain things and how do they do it and is there a prediction. Now, as I discussed in the last class, what happens is that for natural objects, for natural things the prediction of elements is very easy. There are certain laws, there are certain theorems and these laws and theorems are followed by natural elements. And so if you did chemistry, if you take physics, if you take any other science, the prediction of behavior or the prediction of any element for that matter is very easy.

When it comes to studying humans, when is comes to studying us as people it is very difficult. The reason being that the person who is studying and the person who is being studied are both humans and so understanding human behavior is a difficult thing and the study of human behavior that is why encompasses the science of psychology. Another thing that I said in the last lecture is that why is the study of psychology difficult.

The reason being that one reason being that, human beings are studying human beings. So, if an element is studying itself it becomes a difficult task. The second thing is that like most particles human beings are also random in their order. They do behaviors. They do acts which are random, it is very difficult to predict these random behaviors.

Now, the underlying thing the underlying notion in the study of psychology or human behavior is that individual differences. Now, what binds everything or what is the bottom line of more psychologies individual differences. What is the meaning of individual differences? It means that every individual differs from other individual and that is why we are all different and so, it becomes an interesting science where somebody who is

being studied and somebody who is studying it are both of the same runner; both are the same species and that is why psychology becomes a very interesting science. Now, as compared to other sciences which are more accurate sciences psychology is a more probabilistic science.

So, we can say somebody will do something based on his past behavior, based on certain other assumptions; we can say that this is the probability that a person will do a certain act in certain situation, but again we cannot say it with certainty and so, the science of psychology probabilistic and this probability varies with the kind of knowledge that you have about human behavior.

So, the more knowledge you have about human behavior, the better your explanations; the better your predictions and the better the predictions, the better the chance of understanding why human beings do or why people do what they do. So, that is the underlying idea of this course. Now as I said in this course will be taking several elements and so, let us recap what we did in the first lecture; what where all we went in the first lecture.

Now obviously, in the first lecture what we did was we looked at what is psychology; the definition of it and then we looked at how is this definition broken into and what all comprises the science of psychology.

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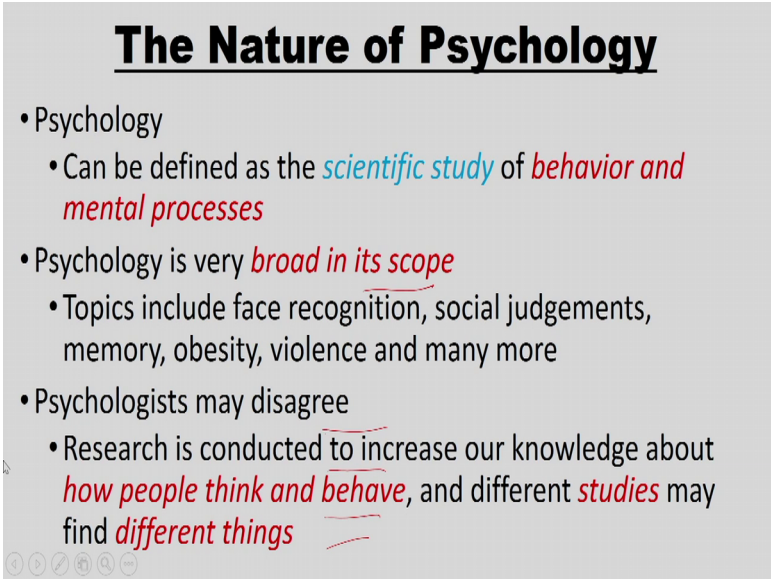

And so we quickly went into understanding the meaning of psychology; what is psychology and it is scope and also things like what psychologists do how they disagree and so on and so forth and so. That is what we did in the first lecture plus we also looked at the historical origin of psychology which is where did it start from.

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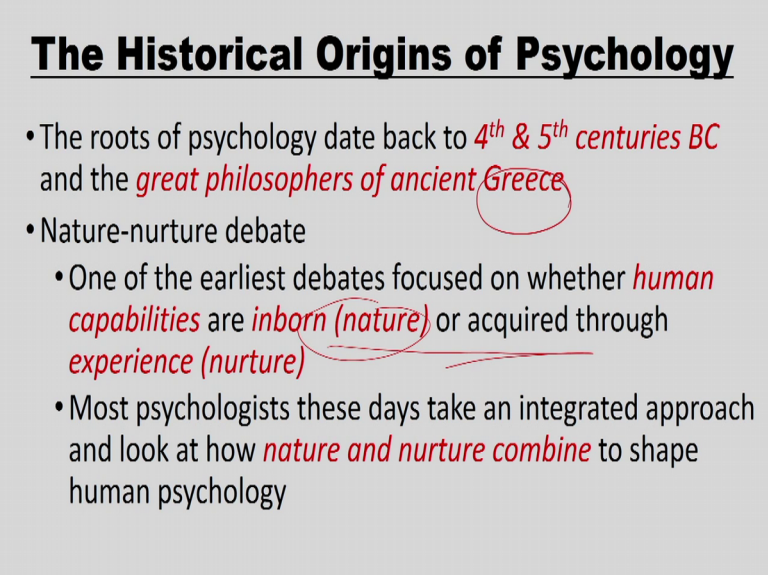

And as we said in the last lecture, I said in the last lecture it starts from ancient Greece. So, it psychology starts with philosophy it comes out of philosophy and so the two branches of psychology is one is philosophy, the other is physiology and so two do branches added together produce a psychology.

And then, we looked at what are the primary questions that psychologists agree or psychologist's debate and one question was nature and nurture which is basically the psychological behavior that anybody does; the behavior that anybody produces. Was it coming from his gene which basically means that is it embedded in his system or was it a result of learning and conditioning; was it something that came to him his behavior, came to him after he was born?

And so that is one of the debates which is there and this is generally called the debate between John Lock and an another philosopher where both of them proposed; one of them proposed that everything comes from nature and the other proposed that the mind when it is born it is a Tabula Rasa, it is empty and so, experiences actually put things onto it.

Now, most psychologists nowadays, they disagree with both of them and they believe that both nature and nurture has something to do with it.

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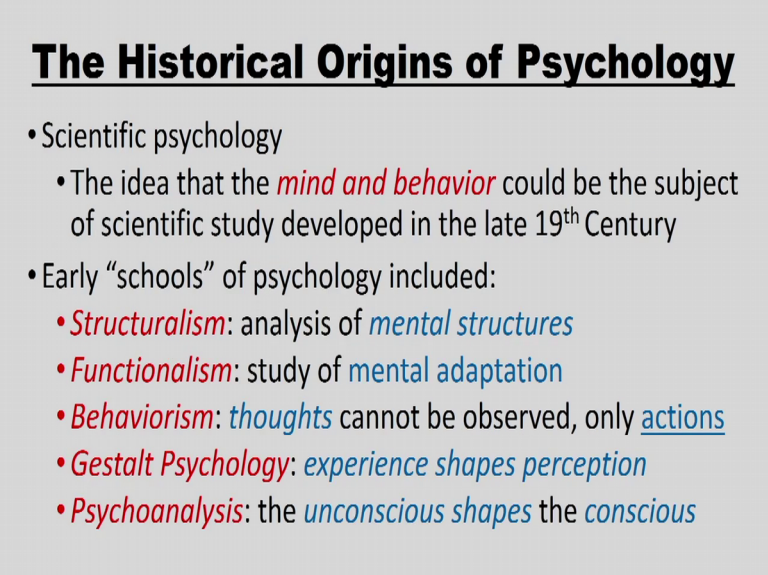

And after that what we discussed in a lecture was the various fields of psychology. So, how did the scientific study of psychology started out? And there I pointed out that the scientific study of psychology started with William, one coming up to setting up his lab in Leipzig and from there on the first method of investigation was introspection. And from there started the old schools of psychology which is Structuralism and Functionalism and then, the new schools of psychology which is Behaviorism Gestaltism and Psychoanalysis.

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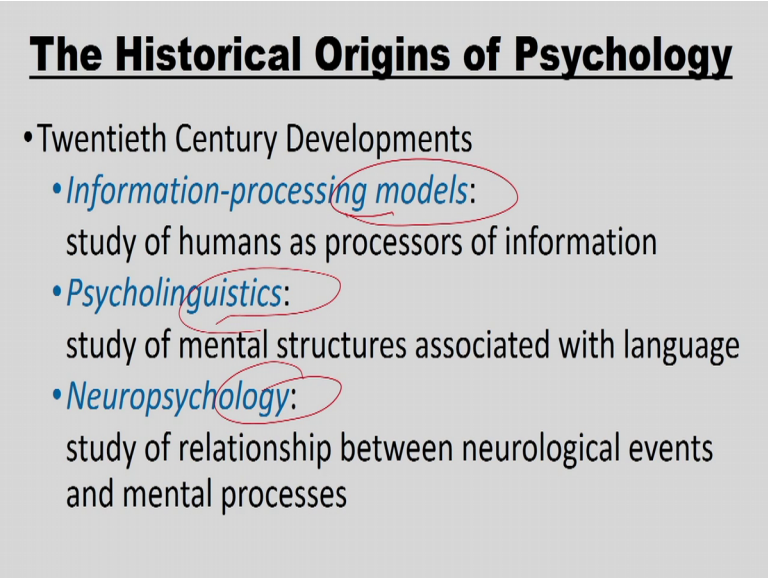

Now, once these schools were there these schools were there since the 1940's and fell after the II'nd World War and newer instruments came in and newer instruments promised a more better development of psychology and so newer fields came in and some of the newer fields that we discussed in the last class was Information - processing model, which basically is the called the Computer model and this is the core model upon which psychology was reformulated, the theories of psychology were reformulated.

And then, the study of linguistics or Psycholinguistics will actually tells how human beings produce language. Now one of the interesting thing in studying human behavior is how human beings produces language because most forms of animals and mammals do have a communication system, but they do not have a medium of language to interact.

Now one difference between communication and language is communications can carry out certain acts, but language can do more than that. It can produce things that communication mediums cannot. And so most forms of life cannot or do not have a language and human beings have a language. So, the study of Franco linguistics was an important event in the study of psychology and so psycholinguistics is another branch we started. And then, the study of Neuropsychology.

Now, everything that happens in the human behavior apart of it happens because of the brain. Now up till the first 12 our mind was what was hold responsible and as I discussed in the last class mind is nothing but some an element the function of it which can be seen

in terms of behavior. Now the behavior is controlled by brain and so the manifestations of mind which happens in terms of the behavior is controlled by the waste of station which is the brain. And so if you want to study the mind, you have to study the brain and that is why the school of neuropsychology came in which actually studies the relationship between certain neurological events and mental processes.

For example, if you are thinking then certain regions of the brain will get excited, certain neuron and fibres in the brain will get excited and so if we can study these neuronal fibers or how the pattern of activation in the brain. Then we can actually understand what is happening. Then actually we can understand why a person is thinking in a certain way and not in some other way. So, this is a quick recap of what happened in the last lecture.

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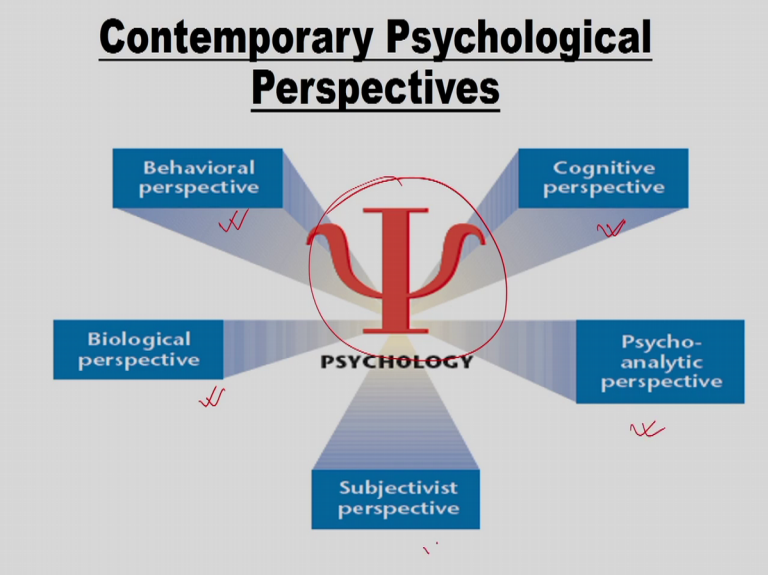

In today's lecture, what we are going to see is the Perspective; different perspectives from which psychology can start and we will also see how research in psychology is done. So, let us start quickly start this lecture. So, there are the different perspectives in psychology. There are 4 or 5 perspectives in psychology which are to be named, one the first perspective is the Behavioral perspective; the psychology the Biological perspective, the Cognitive perspective, the Psychoanalytic perspective and the Subjective perspective.

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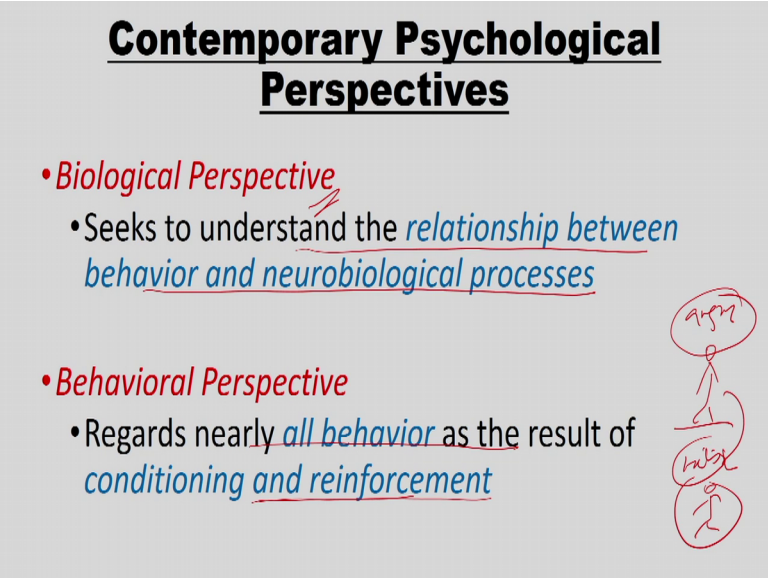

Now, let us under study what these perspectives are all about. First of all we should know what is a perspective? A perspective is a way of thinking, a way of analysing a problem. Let us say there is an event. A boy gets angry and hit someone. Now this act of hitting someone which is a behavior and this act of getting angry which is a cognitive state, the act of hitting someone by getting angry, this behavior can be explained by different viewpoints in psychology. And so what we are going to do or what I am going to do is tell you different perspectives through which this behavior can be explained.

So, let us take a model behavior and try to see what these perspectives are. So, first I will try and recount what the perspectives are and then later on, I will take a model behavior and try to explain this model behavior with different perspectives. So, what will happen is I will give an example and try to explain that example or the example of behavior in the example using the different perspectives. So, first recount all the perspectives which are there.

The first perspective is called the Biological perspective. So, what is the Biological Perspective? The Biological Perspective says that it seeks to understand the relationship between behavior and neurological processes. So, what this perspective actually wants to do or actually does is that it looks at why our behavior happens in the terms of neurological functions. What does the meaning of this?

It means that if somebody becomes angry, somebody becomes sad, if the somebody becomes happy, if somebody gives a gift to someone or shows empathy or any kind of act, any kind of behavior if a person shows because of a stimulus because more stimulus give rise to a behavior. And if you want to study at the level of the brain, when somebody does something, if you want to study what is happening at the level of the brain which neurons are active, which neurotransmitters are working, which kind of activity is happening in the brain, which regions of the brain combined together to perceive the stimulus and then later on tell the person or basically command the person to enact in a certain way this is called the Biological Perspective.

Now, the second perspective so understanding a behavior in terms of Neurology, in terms of neurological processes, in terms of the brain processes, in terms of neuron neurotransmitters and things like that is what is the biological perspective. Now we have the behavioral perspective and so what does it say is nearly all behavior is the result of conditioning and reinforcement and so what behavioral perspective says is that any behavior somebody does is because it is due to certain rewards that he has gone gotten before for that kind of behavior and he has learned it.

So, why do people do certain behaviors? People do certain behavior in certain situations because in the past those behaviors have actually given him some kind of a reward because doing that behavior is gave him some reward and because of the reward he learned that doing this is actually working.

As I said do not get worried will take an model and model behavior and try to make you understand all these perspectives or use this perspective and explain that behavior. For now, I just want you to understand what I am trying to explain. So, Biological Perspective is explaining a behavior in terms of neurological functions and behavioral perspective is explaining a behavior in terms of conditioning and learning. It says that you do a particular behavior because you were rewarded, you were conditioned to do that, you were rewarded for doing that behavior and so, you learn doing that behavior.

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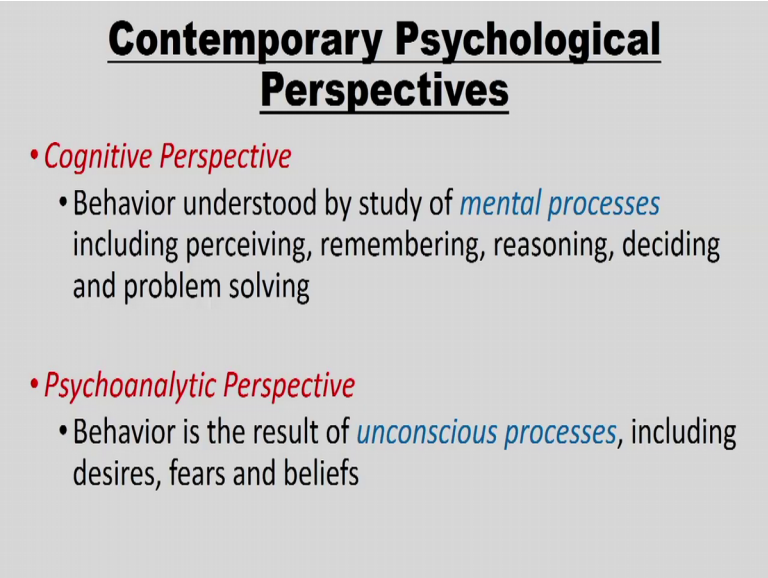

Then, you have the cognitive perspective and what is the cognitive perspective? It says that behavior is understood by a set of mental process including perceiving, remembering, reasoning, deciding and problem solving.

So, certain behaviors, which I want to explain a certain behavior which can be also understood in terms of what a person thinks; how a person perceives something; what is the thinking process going on; what is the decision making process going on in his brain? And based on these processes of thinking, decision making, perceiving, remembering, memory and all those things the person does a certain act. So, why he does a certain act? Because there is certain kind of thinking in him; there is certain kind of decision making it has and based on that he checks his memory and based on his memory actually does a certain kind of an act or certain kind of a behavior.

Now, the fourth perspective is called the psychoanalytic perspective and this perspective says that most behavior act occur because of unconscious processes including desires, fear and belief. And this perspective believes that any behavior a person does, any act a person does is because there are certain unconscious processes; there are certain fears a person has; certain anxiety a person has; certain desires a person has and these desires and anxieties which are hidden in the depth of the unconscious which is not aware of, which is in his mind sitting at an unconscious level makes him do something.

A good example could be somebody smokes at a later age of time is because he was prevented from sucking his thumb and some point of time in his childhood and because of that certain likes certain desires got into him and those desires were not expressed at that point of time.

So, at a later point of time this smoking is actually a manifestation of thumbs up sucking which was suppressed in his childhood, this is what Freud says. And so, most behaviors why somebody does something can also be explained in terms of his unconscious processes, in his unconscious fears, in his unconscious desires, in his unconscious acts.

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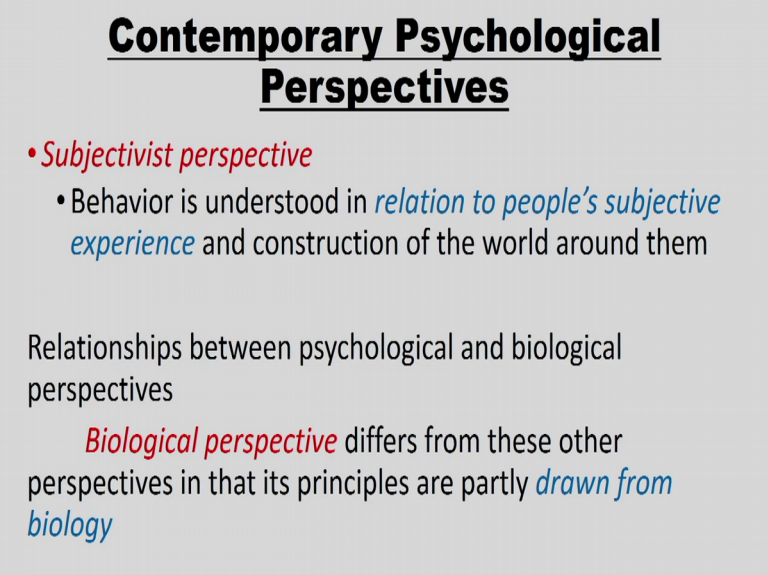

And lastly there is the subjective perspective. So, what is the subjective perspective? It says that behavior is understood a relation to peoples subjective experiences and construction of the world around them. It is the more of a social perspective and so what it says is why somebody does something is because this thing is acceptable by people around him.

People around him or his subjective experiences what he learned from the society around him because of that because of certain acts from the society he does a particular kind of behavior and that behavior is rewarded. So, part of it is also coming from behavior, but then he does because the society wants him to do that way and so he does a particular act.

Now, as promised let us take up behavior and try to explain that behavior using all these perspectives.

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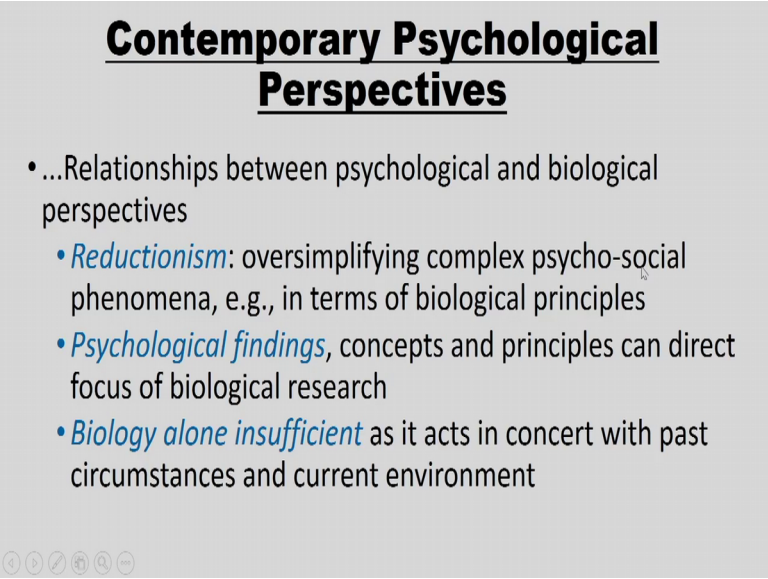

So, let us take the example of somebody getting angry and hitting someone. So, there is a boy and this boy actually gets angry and when he gets angry he hits someone. So, he hits some other boy which is there. Now why does this person when he gets angry hits? Let us take the biological perspective.

The biological perspective says that the process of getting angry makes certain regions of the brain respond and certain neurotransmitters which is related to anger fire. When these neurotransmitters actually are excited and they are received by certain regions of the brain or certain type of receptors that produces anger in him, a feeling of anger in him and that anger makes him actually hit. And so the Biological Perspective says that certain regions of the brain actually responds in a certain way when he feels angry, and so because of certain neurotransmitter release and certain neurons the region of the brain acting in a certain way this person hits back.

Now, using the Behavior Perspective, this hitting back at someone else can be explained a very easy way. Why this person hits back when he gets angry is because earlier on at some other point of time when this person hits back this boy hits when he is angry, he was rewarded. He actually got the thrill out of it or when he hits the other boy the other boy runs away and so this is a reward.

So, when you get angry and you hit someone and the other person walks away or moves away and does not confront you, you actually get rewarded and so, he learned that hitting is a good idea because that can make your enemies go away and so that is why hits someone and this is called the behavioral perspective.

Now, the cognitive perspective. So, this is a boy, he gets angry and because of angry he hits someone. So, why does he hit someone? Now using the cognitive perspective, it can be said whether boy hears something a stimulus or hear some verbal something which caused the anger because of that he started thinking. When he started thinking he realized that these words are something which are taboo with, something which he does not like, something which are insulting and because of that an anger sets in him.

When the anger sets in him, he decides multiple ways of taking out the anger and one of the ways that that has been rewarded earlier, or that has been chosen by his decision making process is hitting back. And so, he hits back. Because his decision process from whatever acts he has done before whenever he has angry he would have done a number of behaviors and so his decision making process will look at all the behaviors; the best behavior to be done when he gets angry. And because of that he selects that behavior of hitting back and through his decision process and he hits back. So, that is the cognitive explanation.

What is the Psychoanalytic Perspective? The Psychoanalytic Perspective of why somebody hits back when he is angry is because of his internal fears and so somebody has an animal instinct, somebody it is believed that the person who is angry he actually has certain hidden desires or certain hidden motives and these motives make him hit back. Because there are certain fears in him and he realizes that before the other person can hit into him, he is unconscious fears his unconscious conscious wants off getting a reward or something else makes him hit back.

And so he hit backs and that is the reason why he hits back or by getting angry. What is the subjective perspective or why somebody gets angry hits back? The subjective perspective is that because society in itself wants boys to actually hit back, they should not be girls because if it would have a girl a different situation would be there.

So, the society around you want boys to actually take charge of situations and so his subjective perspective says that the environment around him, the people around him in

and his previous experiences has shown that when somebody gets angry, they hit back. And that is the kind of behavior he does. So, because of societies want, because of what society expects from him what people around him expect from him, he hits back and that is the Subjective Perspective. So, the same behavior of getting angry and hitting back can be explained by 5 different perspectives or 5 different viewpoints.

Now what is the relationship between the psychological and biological perspective. Now, biological perspective differs from these and other perspective in that it is a principle partly drawn from biology. The biological perspective actually differs from all other perspective because this perspective is coming from biological sciences and so, most biological sciences, any biological sciences actually focus on something called reductionism.

So, relation between psychological and biological perspective is gathered around something called reductionism. What is reductionism? Look at the explanation that the biological perspective is actually providing. The biological perspective says that the person who gets angry he hits back because certain region of the brain, fire in certain ways; certain neurotransmitters are released and these are gathered up or these are released neurotransmitters are picked up by certain receptors and because of that anger is actually manifested.

So, what we are doing here is that the explanation of psychology, the explanation of hitting back, the behavior is broken down in terms of or reduced in terms of neurons and brains and certain brain regions and that is what is called Reductionism. So, one difference one relationship between psychological biological perspective is that the biological perspective can provide you the brain related factors; the mind brain related factors to any behavior which is there. So, oversimplifying a complex psycho-social phenomena example in terms of biological principles.

So, one reason is that the biological principles or the biological viewpoint actually reduces or over simplifies complex phenomena. So, getting angry in itself is a complex phenomena. People just do not get angry, but what the Biological Perspective is actually doing is oversimplifying this act of getting angry into regions of the brain, into neurotransmitters and things like that.

So, what it is doing? It is in simplifying in terms of the brain. Another thing is that psychological findings concepts and principles can directly focus on biological result. One relationship that biological viewpoint and the psychological viewpoint is that at times the biological viewpoint help us explain certain reasons of a psychological phenomena and so, there is an interactive kind of a relationship.

So, psychological findings some psychological findings to certain phenomena, certain behaviours can actually be explained by using biological principles and that makes life easy. Biological alone is sufficient and it acts as a concert with in past circumstances in current environment. So, biological environment or biological view to why somebody acts in certain way is not always correct because it does not take any experience or it does not take in account past experiences.

So, maybe the same regions of the brain are reacting. The neurotransmitters which cause you angry or which makes you angry is responding; but then, why anger why one person becomes angry and the other person in the same state, same biological atmosphere; does not become angry that has never been explained in the biology biological viewpoint. So, the psychological viewpoint says that one person gets angry under frustrated is because one person in the past, what has happened is these past experiences have actually reinforced his behavior in certain way and that is why he becomes angry. So, the same biological state it for one person can call anger, for the other it can cause something else.

So, the exactly same neuro transmitters exactly same number of neurons in the brain same region of the brain cannot express different behaviours and. So, biology alone is insufficient. Because we have to also take in the psychological viewpoint his past experiences, his present experiences, his current environment in which this person is and all that will actually finally, comprise a why person hits back when he is angry. So, defining it in terms of brain is insufficient and that is what the relationship between the Psychological and the Biological viewpoint is.

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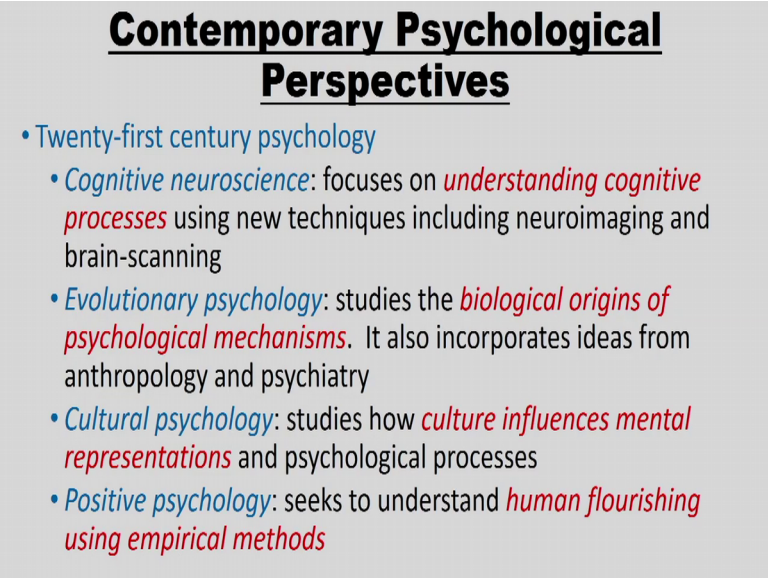

Now, newer perspectives have also come up with the coming of the new century, the 20th century and these newer perspectives are actually another way to look at psychological phenomena. One perspective which has come up current psychological perspective is called the cognitive neuroscience perspective and what is the cognitive neuroscience perspective?

It focuses on understanding cognitive processing using new techniques include neuro imaging and brain scanning. This perspective actually looks at why certain behaviours are done by certain people in terms of the brain processes and so with the coming up of new machines like MRI, FMRI or Pet scan or things like optical imaging, electroencephalography and these techniques actually can study the brain as it is doing certain acts.

And so, the cognitive neuroscience now can actually look at what is actually going in the brain, which area of the brains are responsible for certain kind of behavior. I will give you an example, the region of the brain which is call called the medial temporal lobe; the medial and temporal lobe and certain regions in the brain or the medial temporal lobe is responsible for memory.

And so when doing neuro imaging when somebody is remembering something, if I would use neuroing imaging mechanisms; for example, if a use an FMRI or if I am using an EEG, I will find more activity more significant activity in the medial temporal lobe of

the brain. So, mostly the c region that is the central region and the temporal region, the centro temporal region c3 c4 or those regions of the central and the temporal region that will show more activity. It basically means that the person is remembering something.

Similarly, if the frontal regions of the brain is showing more activity, it directly correlates through the fact that an executive functioning is happening which means that somebody is doing some planning; somebody is doing some decision making and so decision making is handled by the front of the brain, the frontal area of the brain whereas, remembering is done by the central area of the brain or the tempro or the tempro parietal region of the brain.

Tempro parietals and centro temporal parietal that is the region of the brain and so, these new techniques can now tell us that if somebody is remembering somebody's doing same behavior from memory or by just decision making and so on and so forth. So, now, the behaviours that has been let us study using the behaviourist method in the old days can now be actually processed in terms of brain, certain brain regions and brains.

There is a new perspective which is called the evolutionary psychology perspective and what does this perspective do? It studies the biological origins of psychological mechanism. It also incorporates ideas from anthropology and psychiatry and so this area or this new perspective of looking at behavior is called other evolutionary psychology perspective. What does this perspective do? It takes into account the biological origin certain behavior and certain psychological mechanisms and mixes in takes in inputs from both anthropology and psychiatry.

For example, why do humans walk away when they sense a situation to be fearful, but they cannot fight; one reason is that evolutionary in nature or why do you sleep in a certain way, why is it that new born mothers can hear high pitched sound. This is evolutionary function. This happens because new born mothers can actually hear high pitch sound because the child makes the high pitch sound.

So, if you talk in a lower register or lower tone, the mothers will not be able to hear you, but a high pitched sound could actually tell the mother that the child is crying and so she can get up and take care of it. And so this is an Evolutionary perspective. This has come from evolution and studying this kind of behaviours is basically what is the evolutionary viewpoint of psychology or evolutionary psychology. Then, there is something called

cultural psychology which studies how the cultural influences mental representations of a psychological process.

The cultural psychology is interested in studying how different cultures react to the certain thing. For example, saying yes and no through nodding. Now if you go to the west the yes is this and no is this; but then if you go somewhere to the Asian countries this can also sometimes mean yes and this can also mean no or maybe this can mean yes. So, the different kind of acts different kind of noddings would mean different things and so this cultural psychology actually tells you what how culture has shaped certain behaviours.

For example in one culture drinking tea or walking with food is very good in the west, but walking with food in the street is not good and in the east and that is why there is a difference between these two people, and so certain behaviours cannot be expressed or cannot be combined in the two cultures. And so understanding or understanding why these cultures differ is what is the viewpoint or what is the subject matter of cultural psychology. And then, there is the idea of positive psychology. The idea says that he seeks to understand human flourishing and empirical methods. Positive psychology looks at how human beings strive to become successful.

They look at how human beings flourish and they use empirical methods and they test things like how human beings are happy; how they strive to be what they want to be how they strive to be good and so on and so forth. So, these methods the study of positive psychology looks at human beings being developed into good organisms or how human beings develop something called self worth self esteem things like that. So, it looks at the positive side of humans and that is the basic core of studying positive psychology.

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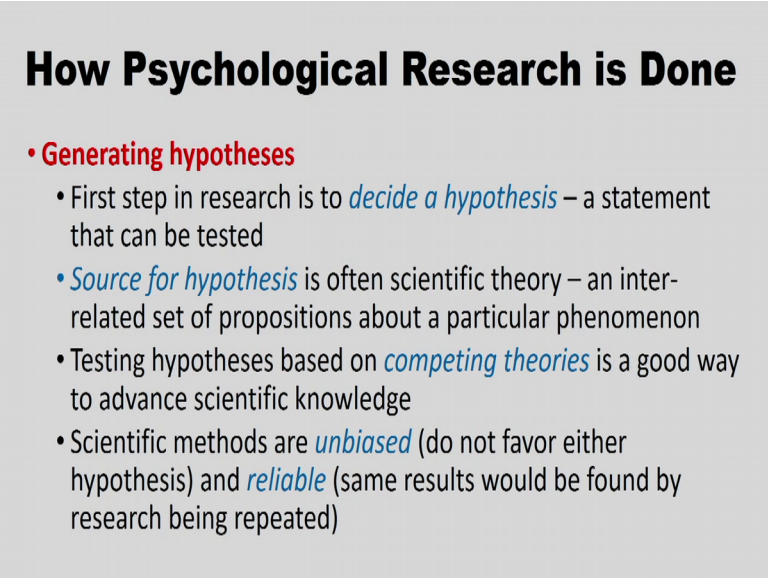

So this was generally an account of what is psychology and what are the historical viewpoints and what are the different perspectives of doing psychology or actually studying psychology. Now we get into understanding how psychological research is done or for that matter any research is done, but I will be sticking to mostly psychological research.

So, how do you do research in psychology if behavior is difficult to study, if behavior is so difficult, it is so stochastic process that it changes from person to person, it changes from situation to situation or event to event or time to time how do we study human behavior and that is what I am going to tell you in this though so there are different methods of studying human behavior.

So, the first step in actually studying any human behavior is first generating a hypothesis. You should know how to actually carry out a research. So, the first step in carrying out any research whether it is in human behavior or any other research is first finding a genuine problem. So, you have to find a problem and so, any problem for that matter. So, the first thing that you have to do is find a problem and the second thing is once a problem is there, you have to generate a hypothesis.

So, let me explain this idea by taking a problem. Let us say let us take the problem that drinking of a hot beverage actually increases academic performance. So, we have a problem which says that if there are three 2 or 3 hot beverages which are given to you

just before an exam and if you drink that and then, study then your performance in the exam will actually increase or decrease.

So, the problem here is that whether drinking a hot beverage before an exam increases your performance on the exam, this is the problem. After the problem is formulated we actually set up some hypothesis. A hypothesis is a tentative answer or general answer. So, we generate certain hypotheses and so what we do is we generate an hypothesis. In this case looking at past experiences, past theory or past knowledge, we generate the hypothesis that yes drinking of hot beverages actually increases or actually betters your performance on an exam the next day.

That is our hypothesis. Now we will test this hypothesis. I will test this answer by doing an experiment and negating the null hypothesis. So, there are two kind of hypothesis that is made; one is the negative hypothesis which says that drinking of hot beverages actually have no effect on performance on the exam next day and the hypothesis which we have created is called the alternate hypothesis which actually says that drinking of hot beverages on before an exam or a night before an exam actually increases your performance the next day.

So, the first step in generating or doing psychological research is actually finding a problem which I have stated and then, generating hypotheses let us look at generating hypotheses. The first step in research is to decide a hypothesis a statement that can be tested. So, the hypothesis that we have right now is that drinking of hot beverages actually increases performance on an exam. Where is the source of the hypothesis is open scientific theory, an inter-related set of propositions about a particular phenomena. So, how did we generate this hypothesis that actually drinking a hot beverage before an exam increases performance.

What we did was we looked at papers different papers and looked at research which points out that drinking of hot beverages actually increases arousal level and due to these arousal increase what happens is you can concentrate more on your exam or you can pay more attention to your work. And when obviously, when you can pay more attention or your system is aroused in certain way happily aroused in certain way, you actually can pay attention on your work. Remember more, learn more and can actually perform better and that is the body of theory which we have used.

Now, what we are done in this experiment as I said or what we have done in this question is that we have we have taken 3 beverages. Just to take test whether these beverages actually differ among each other in terms of efficiency or in terms of the performance that you do on the exam the next day. So, what we have done is we are taken three hot beverages. We have taken tea, we have taken coffee and we have taken hot chocolate.

So, these three beverages, now tea has a component called tannin; coffee has a component called caffeine and hot chocolate also has a component which is a chocolate related component. Now these components are the core of these drinks and so both tannin and caffeine are known to increase the arousal system and so, since previous research in biology says that tannin and caffeine actually increases the arousal of the system. And so what we are going to test here is that whether tannin, caffeine or hot chocolate increases performance. The overall hypothesis to be tested is that whether hot beverage is actually increases your performance.

So, as I said the source of the hypothesis previous research and so previous research says that both tannin and caffeine actually increases these molecules in tea and coffee actually increases performance. Now testing hypothesis is based on competing theories is a good way to advance scientific knowledge and so, there are certain competing theories some theory says that tannin is better than caffeine; some theory says as caffeine and tannin do not lead to arousal of the system or certain arousal system is not done by tannin and caffeine or coffee and tea or hot beverages actually do not lead to arousal of your system which learns. And there are some competing theories which are out there which says that no it is not that way it is another way around.

So, these drinks actually arouse your system. Now when a system is arose; obviously, you will be more active and when you are more active, you tend to be doing more work or learn more and. So, performance will be better.

Now, scientific methods are unbiased and do not favour either hypothesis and reliable, some results would be found research being repeated and so what we do is we use a scientific method to do this experiment, to do this study. And this scientific method will be an unbiased because it will not when we start the experiment, it is neither favouring tea nor coffee nor hot chocolate.

So, we are not favoured in or we are not favouring any of the hot beverages and so they are unbiased and some reliable result will come the result will actually tell you or some reliable result will come up which will tell you which of these drinks will actually work.

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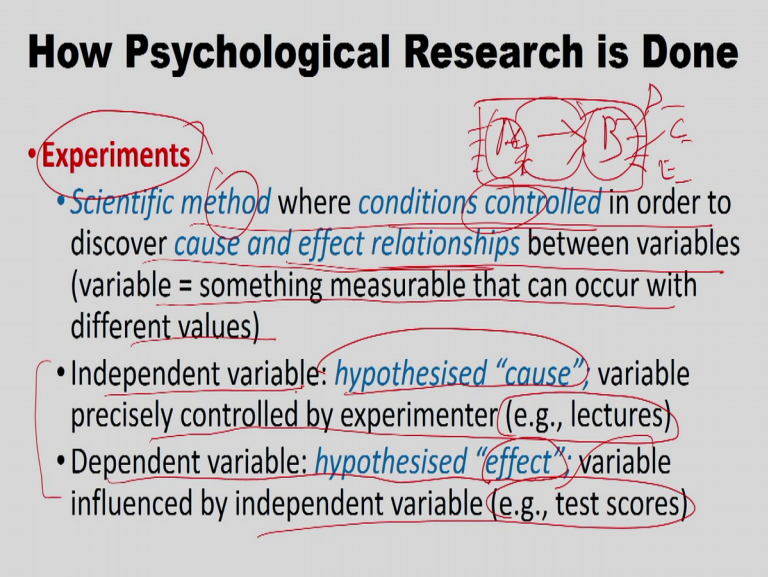

And so, the methods I have used or the experiment that I have defined the method that I am using is called the Experimental method or experimentation. Now, scientific method with conditions control in order to cause and effect relationship between variables; something measurable that can be occurred in different values. So, what is an experiment? An experiment is actually a scientific method where certain conditions are controlled so that we can define the cause and effect relationship; what causes which. So, if you have A and B two variables and if A is if you change a something changes into B.

This is called establishing cause and effect relationship because if we change a levels of A, if we change something in A, a change in experience in B this is called establishing cause and effect, because A leads to change in B. But the reverse is not true because changes in B may not lead to changes in A and this is called experimentation where we set up certain variables and the experiment of A and B is done in controlled conditions. So, that any other condition C D E which are external in nature, do not affect A and B because we are controlled for C D E.

So, what really happens here is that we actually look at interaction between A and B. Now in our experiment that we design we are testing the effects of coffee, tea and hot

chocolate on academic performance the next day. So, A B the variable which we call as the independent variable, the variable that we are manipulating is three levels or three types of hot drinks because tea, coffee and cold hot chocolate are all hot drinks. So, there are three levels of it.

So, what are we manipulating? What are we changing? We are changing the level of hot drinks and what are we measuring? We are measuring the effects of these hot drinks on performance. Now obviously, you will say that some people may be intelligent, some people may not be intelligent; it could be the some people have read before and some people are not read before; some people are lucky by hunch and not lucky hunch and all those conditions are. So, those are the variables C D and E. So, what we do is we do a control condition.

In which what we do is we randomly pick up people from certain classes. So we now, how do we do this experiment? We make 2 groups; one group has 3 subgroups A B and C, who will actually take coffee, tea and hot chocolate. And then, the other the other group that we have will have only water to drink, hot water to drink so that we can compare whether hot beverages has the effect or not or they will are just simple water to drink right. So, now, we have 2 groups; one group has 3 levels. In 3 levels meaning 3 arms or 3 different people.

So, if we take let us say 40 people; in this 40 people, first 30 people are assigned to the experimental condition. So, 10 people will drink tea, 10 people will drink coffee, 10 people will drink chocolate and the rest 10 people will just drink water. So, that we can say we; why do we have a control group? We have a control group because the control group can actually tell you when we measure the control group, it can tell you whether the effects are because of hot coffee, tea or chocolate or whether the effects are happening on it is own. So, just to negate their effects of these hot chocolate or hot drinks the control group has been taken.

Now, in any experiment you have something called the Independent variable hypothesised “cause” and variable precisely controlled by experiment. For example, lectures. So, in our case the independent variable is the level of a hot drink or hot beverage because we are three hot beverages and so, we are manipulating the type of hot beverage and so, this is called the independent variable. Then in any experiment we also

have something called a dependent variable which is called a hypothesised “effect”, a variable influenced by independent variable.

For example, test course in our case in our experiment the academic performance, the marks that you get on an academic test on the next day is actually what is called the dependent variable because these hot drinks will make you study on a control condition, where we have randomly assigned people to all the groups and so they are equal in intelligence equal in all other things. And so the only thing that we are changing for all the four groups for 10, 10, 10 people in all the 4 groups; the only thing we are changing is the type of hot drinks which is given to you.

Because everybody has same intelligence; everybody has been in the class for the same amount of time; everybody has the same level of eyesight and all those things have been controlled. So, all were variables are controlled and that is what you are saying control conditions. Now, how do we do this experiment? So, what we do is these 4 different groups of people are given now different - different hot drinks tea, coffee and hot chocolate and the fourth group is given water and then, they are asked to study.

Now they study and later on when they perform they are taken to the examination hall for taking an examination. When they give an examination, a score is collected from them and based on whatever scores they have achieved we can say that the score manipulation looking at the mean of the scores on different people.

So, 10 people on tea, how much that the score on an average; 10 people of coffee, how much score they have scored on an average? 10 people from chocolate, how much they are scored in an average and 10 people from the water how much they are scored on average? And if you just look at the average values that they have, we can actually tell whether coffee is more productive or drinking coffee is more productive or tea is more productive or hot chocolate is more productive or simply water is more productive and so this way we can either verify the hypothesis either accept the hypothesis or reject the hypothesis.

If all of the hot drinks produce good effect in comparison to water we can say that the hot drinks are perform making the performance better, but if on, but what happens is if within the drinks also if coffee is much better than tea and chocolate. Then we can say that coffee obviously is a better type of hot drink to take before an exam because it

increases performance in certain way. And so this is in the easiest explanation that you can have what experimentation and how an experimentation is done. So, this is the independent variable in our case is the hot level of hot drink and the dependent variable in our case is the academy performance that we are having.

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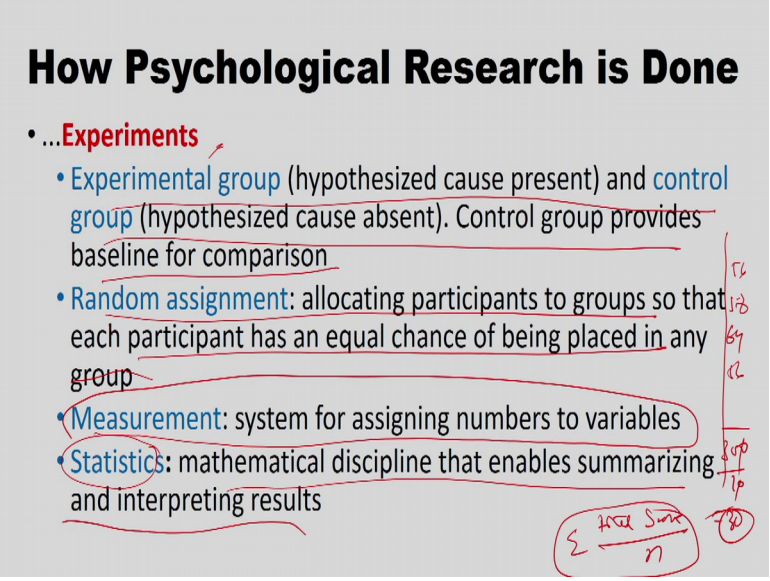

So, how do we do experiments? The experimental group hypothesis cost present and control group. So, as I said the group in which the hot coffee tea and the hot chocolate hot coffee and hot tea was given that is the experimental group and the control group was the one in which we they were drinking water. Random assignment now so that each variable is each external variable for example, intelligence, the amount of hours that they studied a particular subject or any other variable for that matter to control that what we do is we randomly pick students from a student pool and throw them into the four groups. Now, when we do that what happens is the probability that any student will be in any group is actually equal and that is what is the Random assignment.

Random assignment is randomly picking someone and then throwing them into any group, so that each group is equalized in terms of the number of people that it has. Now one thing is the measurement system for assigning numbers to variable and so how do we measure that? The measurement is done in terms of academic performance. So, how much marks you get and so there are there can be several forms of measurement in our experiment; it is very easy to measure because there are numbers, the values that you

will get. So, in 100 you will get 25 or 26. Now, there are certain kind of experiments in which you cannot have these kind of numbers.

For example, if I give you a questionnaire where you have to actually tell me whether you like a particular drink or not on a 5 point scale, there is no measurement and in those cases of a proxy measurement scale is created in which where certain values are assigned to different responses. For example, and question as you generally see values of 1, 2, 3, 4, 5; 1 being the least and 5 being the most. And so in those kind of studies, in those kind of subjective studies a number of proxy number is assigned to each responses and so, measurement is important because at the end of it at the end of any experimentation or at the end of any research, we want numbers. Because these numbers will actually tell us what is happening if it is an experimentation.

And the last thing is Statistics. Statistics is basically a way of actually finding out what is different or how to compare results across different groups. So, mathematical discipline that enables summarizing and interpreting results. For example, in our case when we found out the scores of different people from the coffee group, from the tea group, chocolate group and then, from the water group; what we did was we did a simple statistical analysis. We could do a tea test or we could just simply compare means. Now mean is a statistical tool. What we do is we look at the number of scores of all the 10 people and add them up and divide it by 10 which is because since we have 10 people.

So, let us say in the coffee group if the score is 56, 58 64, 56 so on and so forth. We add all this code together let us say it is hypothetically 300 and divided by 10, since there are 10 people in this course and so we get the score of 30 in the coffee group and similarly that is what we do. Now, this simple way of taking the total score and dividing this total score by the number of people is what is called the mean or the average and this is a statistical technique. So, statistics in is required for experimentation.

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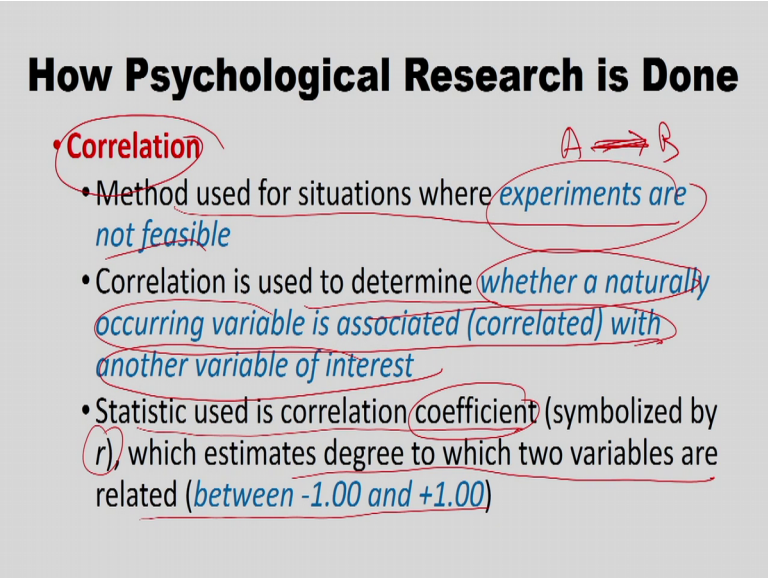

Another way of doing psychological research is using the correlational method. What is the correlational method? In a correlation method is used for situations when experiments are not feasible. When we do not know so if we have two variables A and B and we do not know whether A is causing B or B is causing A, but then there is a relation. What is the relation? If A increases or decreases, B also increases and decreases. Think of it in this way, each time there is a thunder there is a lightning and so there is a correlation. There it is very difficult to say whether thunder causes lightning or lightning causes thunder.

Each time you go to a supermarket you actually lose money. Now what happens is this is a correlation because what happens is you do not know whether the supermarket makes you lose money or you actually lose money by going into the supermarket. So, there is no cause and effect; you do not know what causes. What happens is that each time you go to the supermarket, you lose money or each time you touch something a sound occurs. Now these kind of things are called Correlational research where, 2 variables A and B are related to each other on a superficial scale, but then we do not know what causes what that kind of research is there.

For example, happiness leads to good mood. Now, we do not really do not know whether happiness leads to good mood or good mood leads to happiness or happiness can, because whenever you are happy or mood is good and so, both variables are equally

correlated. As you increase the happiness, the mood also increases. As you decrease the happiness, the mood is also decreases. When the bad mood is there, the happiness is also bad and a good mood is there the happiness is also good.

So, we really do not know what causes what and such kind of skills on a such kind of experimentation we need the correlation method. What is the correlation method? In situation when experiment is not feasible also correlations is used to determine whether a naturally occurring variable is associated correlated with another variable of interest. So, if we have two available A and B thunder and lightning and if thunder, occurs when lightning occurs to find how much they are related to each other, we use the correlation method. That will tell you how many times when there is lightning the possibility or that there is also thunder.

The statistic that is used for doing correlation is called the correlation coefficient and this symbolized by the letter r which is an estimate a degree to whether the 2 variables are related. Each time let us say there is a thunder of 10 amount 10 and if similarly causes an 10 amount of lightning. Let us give them hypothetical. So, each time 1 amount of thunder occurs, 1 amount of lightning also occurs. The correlation between them is said to be 1.

Now, when each time then, when there is one amount of thunder happening and half a amount of lightning happening, the correlation between them is said to be 0.5 and 0.5 is a weak correlation. But each time if there is one amount of thunder and one amount of lightning in the same direction, then we can say that they are positively correlate in the same direction. Also and there is what is important to understand is that correlation research not only works in terms of how much relation they have in terms of magnitude because the maximum magnitude maximum relation between 2 variables in correlation is 1, the minimum is 0. Another interesting thing to understand here is that correlation research is also in terms of direction.

For example, each time there is thunder, there is increase in thunder there is decrease in lightning. Now, this is called negative correlation. So, each time one amount of thunder increases, half a amount of lightning decreases; this is called negative correlation and so, a negative correlation what happens is if one variable increases the other variable decreases. If they decrease an increase in the same amount this is called perfect

correlation of one. But then it may so happen that thunder increases 0.75 and lightning increases 0.3 is 0.

So, the correlation here will be different. It will not be there and the direction of the correlation be negative which means that if one increases the other decreases. If you beat someone, he will stop trying; this is a negative correlation. Now if you beat someone, he increases in trying; this is a positive correlation. So, you have to understand correlation in this way.

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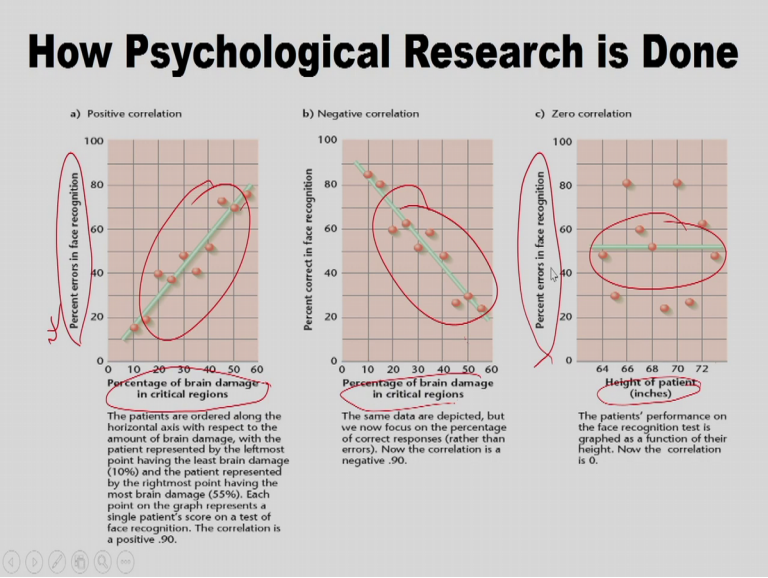

So, this is correlation and if as you can see this is positive correlation. This is negative correlation and this is zero correlation, when the 2 variables are not related to each other. The 2 variables here are the percentage of error in phase recognition and percentage of brain damage in critical regions.

So, whether brain damage relates to facial recognition, you can see a positive correlation, you can see a negative correlation and you can see the height of the patient related to the percentage of face recognition. So, critical regions of the brain in this case a negative correlation which means that the more damage you have, the lesser face recognition you have. In this case the more damage you have, the higher the recognition you have and in this case what happens is there is no relation to the hype of the height of the patient and the facial recognition that they show.

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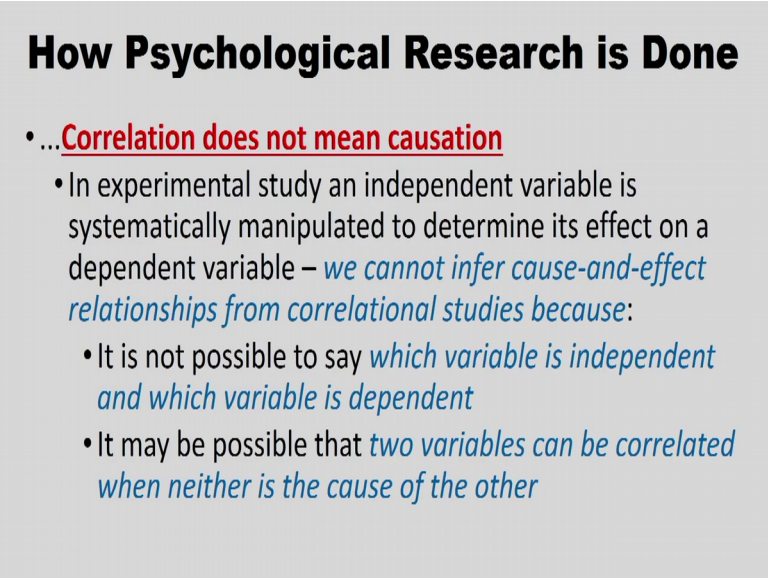

Correlation does not mean causation. So, in experimental study an independent variable is systematically manipulated determined. It is effect on the dependent variable. We cannot infer cause and relationship in correlation studies. As I said before we do not know whether A causes B; weather thunder called lightning or lightning cause thunder, the only establishment we can do is that they occur together; when one occurs, the other also occurs.

But we do not know what causes what. In an experimentations we know that hot beverages causes performance change in an exam, but in this case it is very difficult. So, in correlational studies we cannot establish cause and effect relationship. It is not possible to stay which variable is independent and which variable is dependent. Here it is very difficult so, but both variables occur at the same time. It may be possible that the two variables can be correlated when neither is the cause of the effect. It can happen that two things are correlated. So, each time you beat someone, he starts singing.

Now there is no relation between you beating someone and singing, but then they occur together and so you can say that this is correlated. It can be as simple as that each time you come to a newspaper stand the last newspaper is picked up and so this is a correlational study. It is a correlation thing you believe that each time you go there the newspaper ends. And so this is a correlational study; whereas, there is no relation

between you coming going to the newsstand and the last newspaper being sold. So, it is like that.

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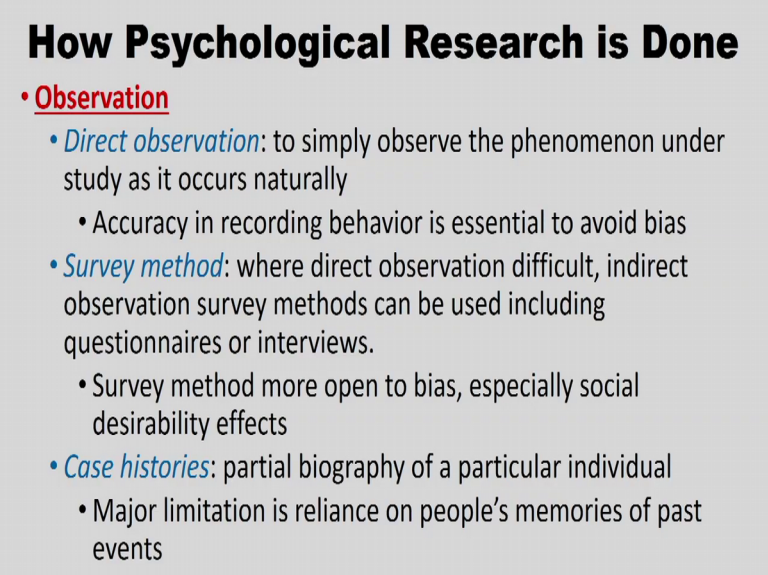

Another interesting method that is used in psychological research is called observation. Observation what we do is we actually do not get into what the psychological phenomena. We stay somewhere out and we actually look at how the phenomena is occurring. Now there are two types of observation. We have something called direct observation to simply observe the phenomena under study as he talk us. Now accuracy in recording behavior is essential to avoid bias.

Here what we do is even a phenomena is occurring suppose you want to study zoo animals. Now if you want to study zoo animals; one way to do is direct observation, will go to the zoo, stand outside and actually look how what a tiger does for certain kind of situations. And we can report that and that is called the psychological method of observation for doing a psychological process or how tigers leave in a habitat if that is your question or what some other question for that matter.

Another interesting way of doing psychological research is called the survey method, where direct observation difficult; indirect observation survey method can be used for including question as an interviews. One way of doing psychological research is using survey. For example, if I want to know whether certain people are happy with a certain

product, what I can do is actually give them a survey. Give them a questionnaire whether you are happy with this product.

So, the survey will or the questionnaire will have certain questions about the product. The people will tick these questions whether they like or not on a 5 point scale; 1 being the least and 5 being the most and they will send the survey back to you, send the form back to you. You might have got so many surveys in your life.

Now, what these surveys actually do is collect your opinion and so when opinion collection which is difficult to actually look at people using a particular product or using a involved in a event a survey is laid out. Now survey has certain question is related to that even and the person who gets the survey fills up certain answers and send back and that is how you collect the data. Survey methods more open to bias, especially social desirability effect. Now survey is more open to bias and the reason that people who actually collecting the survey or actually looking at the survey they can interpret the survey in the way that they want and so it is open to all kinds of social desirability, all kinds of misinterpretation or bias by the experimenter for that matter.

Another experimental method that can be used in psychology is called case histories. These are partially biographic of particular individual. Now, in case histories what happens is called a single person experiment or case experiment. So, suppose I want to study how does brain damage influence the production of speech? In this case I cannot have groups of experimental and non experimental people or cannot do observation in correlation.

Why because we do not have that many people who will have brain damage. So, we just take one person, do his interview, collection data from him and based on that give interpretations of certain results and those are called case histories in which the biography of one person or a particular individual is there is the store for any kind of data or is the source for any kind of data. So, these are called cases histories. Now major limitation is reliance on people's memory of the past even.

So, if one person is giving the answer, then it may happens at some; some of it may be true, some of it may not be true.

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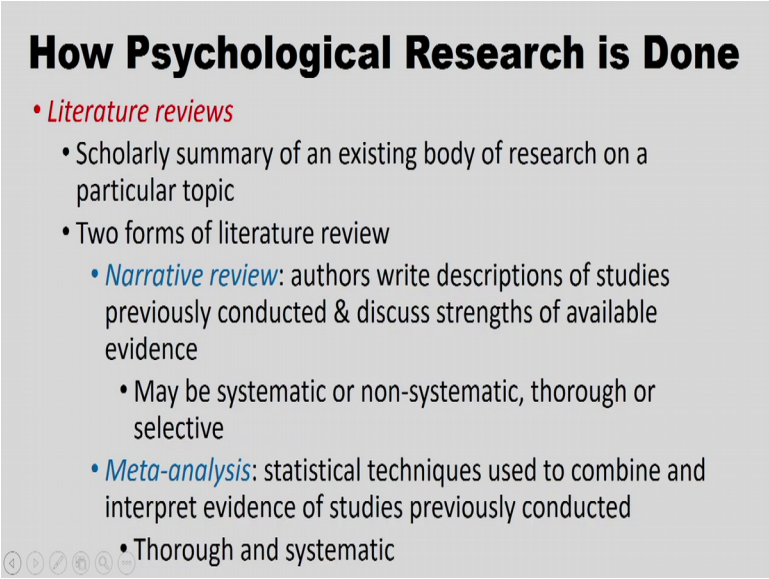

Another way of doing psychological research is using literature review. So, scholarly summary of an existing body of research and a particular topic; two forms of literature review; so, one way of doing psychological research is just review. Looking at past experiments which have been done and from that comparing some review. The first kind of review is called the narrative review, authors write description of studies previously conducted and discuss trends and available differences, may be systematic or non systematic through selective analysis.

So, here it can be research papers or review papers. In review papers, what happens is the reviewer actually looks at all kind of studies happen that has been done on that field and then discusses the good point and bad points about all those studies in the review paperm and this kind of thing is called the narrative review.

There is also something called the meta-analysis in which statistical technique used to combine interpret evidences are studying previously conducted thorough and systematic. Meta-analysis is a statistical technique, what happens is they look at all the studies that has been done before and do a simple statistics on them saying that how much of the statistics is favouring a particular result and how much of the statistics or how much of the results variants a favouring some other result and so on and so forth.

Based on that they create a statistical table, based on that the statistical table you will come to know how the previous researchers or what the previous researchers have said in

terms of the particular phenomena under study. Now, one important thing in most psychological research is ethical Ethics of the psychological research.

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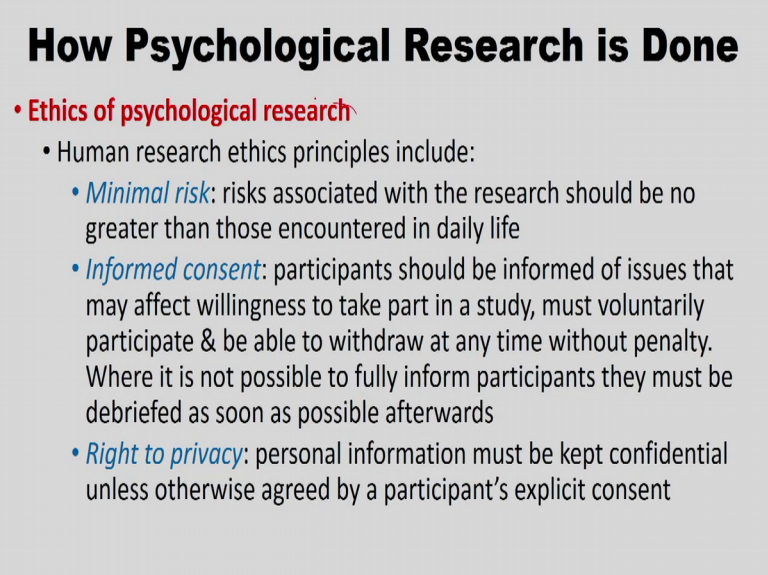

Now since psychology includes humans and animal research; both human model and animal model are kind of ethics or some kind of ethics has to be followed in psychological research. The ethics means that there are certain limitations or the certain kind of rules which have been laid down for doing psychological research. First for the human research certain ethical principles have to be followed. So, when humans are involved in doing research whether it is experimentation, the kind of work that I do in my lab includes humans. So, doing EEG in humans or doing some kind of brain measuring brain activity or doing brain stimulation is what we do in our lab.

So, when I do that kind of thing, I had to involve human participants and when we do that certain kind of laws or certain kind of ethical restrictions have to been followed and that is what we have done or that is what we follow. The first ethics that we have to follow in doing human research is something called Minimal risk. We have to assure that the experiment that we are doing whether it is a brain stimulation experiment or whether it is an EEG experiment or whether it is an MRI experiment, minimal risk of the individual should be taken care of.

So, risk associated with the research should be no greater than those encountered with daily life. We cannot stimulate someone with a higher current more than 0.15 ampere; if

we do that with a with a higher voltage, what will happen is certain regions of the brain will experience certain kind of discomfort or people will experience discomfort. So, we have to accept these norms where the risk involved with humans should be minimum.

We cannot reverse the current in an EEG or we cannot use closed chambers or we cannot just push people into an MRI for that matter for doing research. So, the minimum risk has to be followed. Then, Informed consent, before doing an experiment we have to tell the participant whose in experiment; what is the experiment about; what we are going to do; what is it is the benefit that is going to get out of it and whether he agrees with free will to do the particular experiment.

So, participation should be informed of the issues that may affect willingness to take part in the study must voluntarily participate and be able to withdraw at any time without penalty. Where it is not possible to fully inform the participants they must be debriefed as soon as possible afterwards. So, in debriefing so sometimes it is very difficult to tell the participants what is actually what is actually the experiment about. So, we debrief after the experiment is finished, we tell them what it is. So, we use some kind of deception, a little deception, but this deception should not be very high.

So, what we do is we first tell the participant about what is being done in the experiment; what is the risk which is there and whether he is willing to do the experiment based on what is the risk and what is the benefit is going to get out of it. Also we promise him that without any consent, without any kind of an aggravation from our side, the person can leave the experiment when he wants, wherever he wants and you can also apply that the data that he has should not be or cannot be published. Now these with these freedom, we give he gives his informed consent.

Now in if you are using some kind of deception. For example, some kind of if it is a test of attention. Now, if we tell the person that pay attention, he will never pay attention and so, we have to use some kind of a deceptive method where we have if you are measuring up attention, we actually have to use some deceptive method. And so this as soon as the experiment ends, we tell the experimenter or we tell the subject whatever the experiment was all about and details in with all the scores that had been obtained and this is called the informed consent. This is the informed consent, where the subject willingly knowing that the risk and the benefit from the experiment takes part in the experiment.

With a consent that he can leave the experiment at any point of time and if he so wishes, he can pull out his data at any moment without any restriction. Now, the Right to privacy; this is another kind of an ethical issue which we use in a most experimentation. Personal information must be kept confidential unless otherwise agreed by participants information concern. Even till date whatever experiments, we have done in our laboratory we cannot identify who is the person who took part in the experiment because there is a double blind study.

The person who actually conducts the experiment, the person who recruits person and the person who designs the experiment are 3 different people and they have no relation whatsoever, they do not know who's been recruited. And the recruiter does not know who goes to which group and the person whose doing the experiment, he does not know whose coming to the lab and that way there is total privacy in the sense that who is the person; what is his age; what is his gender and so on and so forth. Gender of course, you can see. But then this kind of information cannot be leaked and this is called the privacy maintenance.

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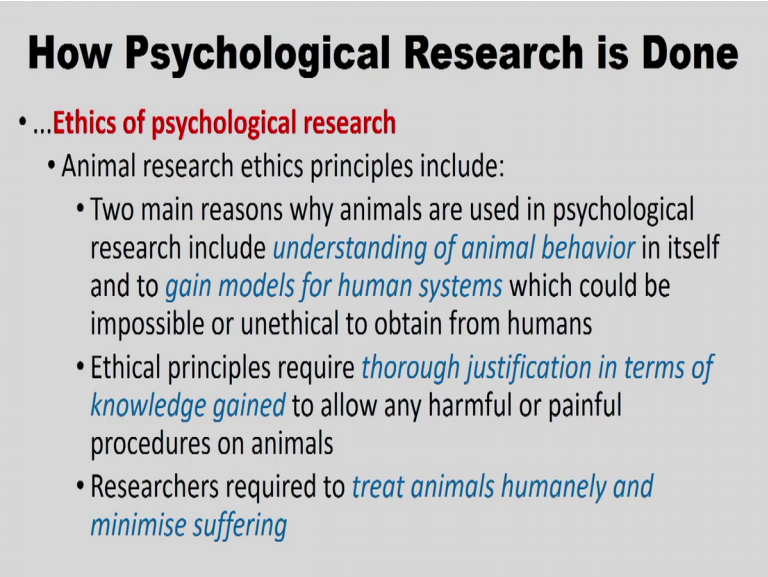

When we are doing animal research there are certain kind of ethical proposals which we have to follow. For example, in animal research also some animal research which we did at some at some point of time. Two main reasons why animals are used in psychological

research; why animals use first of all? Understanding animal behavior, some kind of human behavior cannot be study. For example, how does it drug progress in humans.

Now for that you have to do exactly the manifestation of the drug or certain kind of drug or tests on the animal or certain behaviours for example, aversive conditioning you cannot do it in humans. So, you do it on rats and test the very conditioning on rat because by looking at how animals behavior with that drug or that kind of a conditioning or devising scare tactics if that is what it is we have to test it first on animals and then use it on humans.

In itself and also why does so for understanding animal behavior we do that and secondly, to gain models for human system. Once we do it on animals, we come to know what is the way in which this behavior progresses and how the brain responds to it. And then, we can take this behavior or test this particular experiment on humans which could be impossible or ethical to obtain on humans. So, if a certain experiment is unethical to do on humans, we first test it on animal model and if it is successful; then we take it on the human model.

So, any kind of surgery, any kind of electric shock therapy or drug testing, we do it first on animal models and animals lower animals and based on these animal models we actually then test the drug on the humans or use the drugs on humans. Ethical principles required through just thorough justification in terms of knowledge gained to allow harmful and painful procedures and animals. And so, whenever a procedure is done on an animal whenever a rat is given; so, for a cancer developing medicine, what happens is the rat is first made to develop cancer and then a treat the treatment drug is given to it to lessen the cancer.

Now, whenever we do this kind of a thing or when a rat is given cancer and then, the medicine does not work he is killed and then certain regions of the brain are studied, what the brain response and how the brain response to understand the cell physiology of it. Now, when we do that we have to be very strict in terms of what knowledge are we gaining for it and no harm should be provided the animals. So, you should be keen in a pain killed in a painless manner all food and drink and whatever he requires should be given to it and no kind of discomfort should be provided to the animal.

Also researchers required to treat animals humanely and minimal suffering. Even if you kill the animal, there should be minimal suffering. You should not be torturing the animal and then, you have to treat the animals in a very human way and so, these are the ethical things or these are the ethical conditions which has to be followed when you are actually working with animals. So, this brings us to the end of this section not this lecture on introducing psychology. A quick recap what we did today was, we actually looked at what is the different perspective of doing psychology.

So, starting with the psychoanalytic perspective, to the way average perspective, to the cognitive perspective, to the subjective perspective and coming up to the behavioral perspective. So, all these perspectives we looked at and these perspectives are actually viewpoints of looking at any psychological behaviour. So, we looked at all these perspectives and based on these perspectives we defined behaviour. Then, we went on to look at how the biological perspective, psychological perspective of related together. After that what we looked at is some newer perspective; for example, the idea of cognitive neuroscience; the idea of newer sciences which has come into psychology and how these newer sciences are actually explaining psychology.

Further to that we looked at how is research done in psychology and we looked at experimentation method. We looked at the observation method. We looked at the survey method. We looked at the correlational method and we looked at the case history method. All and review a literature review method. So, all these methods, we looked at and we compared these methods of how psychological research could actually be done or how is psychological research done.

Towards the end of the lecture we actually focused on if the different ethical principles that has to be followed while doing psychology or while doing psychological research and we outline the human the ethical methods that is followed for human and the ethical method that has to be followed for animals and we listed a number of methods and these methods are these principles have to be strictly followed when you actually doing psychological research. So, all in all, the first lecture and second lecture actually encapsulates or surrounds what a psychology; how it is to be done and what are the various branches of psychology and so on and so forth.

From the next lecture onwards will take on psychological phenomena's or sensation, perception, memory learning and things like that and then, break them up and try and teach you what these are all about. Because studying these will tell you how to interpret human behavior and that exactly friends is the goal of this course on human behavior. So, from here now is goodbye.

Thank you.