Cultural Studies

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Module No. # 01

Introduction

Lecture No. # 04

Evolutionary Psychology

Hello. Welcome back to NPTEL, the National Program on Technology Enhanced Learning. As you are aware, we are in a series of video lectures or video virtual classes in the domain of cultural studies and these lectures are targeted or to target audience are the engineering students in various IITs and engineering institutions in India.

Many of you are aware that the humanities and social sciences float elective courses and there are areas, there are disciplines in the humanities and social sciences. And cultural studies, is one such course and one that I teach at IIT Guwahati. We have already been through a couple of lectures and by now you are aware of the basic propositions and the scope of cultural studies.

We also began by saying that it is not why, as many critics have pointed out, to leave out what science has to tell us about culture and hence we are also devoting a couple of lectures to an exploration of what science can tell us about culture and how also cultural studies may benefit from the sciences.

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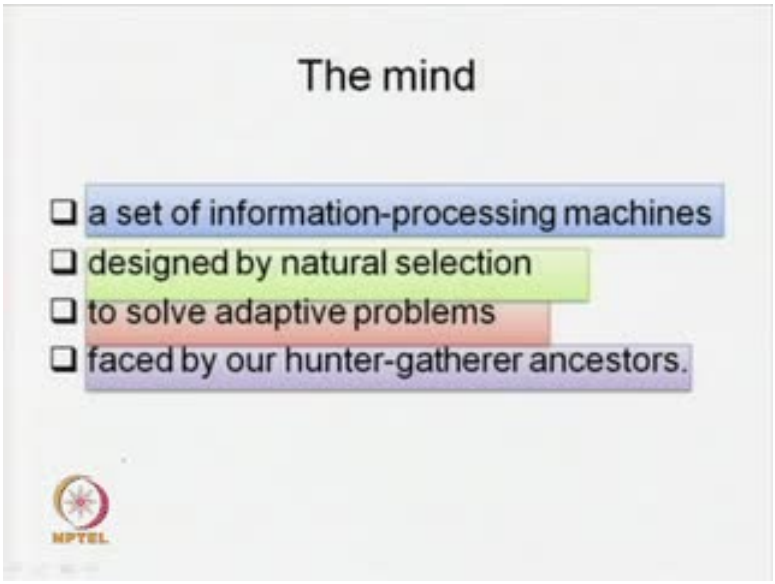

So, as always let us do a recap of the last lecture and you will recall that in the last lecture we found that incorporating studies of the mind, looking at the human mind and particularly, the weight has evolved is one of the basic requirements in cultural studies. Why because it is the mind, is it not that gives us culture, that gives us various thoughts, various feelings, various theories, and leads us to organize our socio-culture lives in particular ways. So, if you look at the slide here, the mind within this is seen as a set of information processing machines. You will see that is a definite shift here from traditional ways of understanding the mind points in different religions mind is understood certainly not as a set of information processing machines, but if we look at what study of science and biology and evolution, evolutionary theory, Darwinian theory you have to, they have to tell us about the mind are mind that forms or creates culture.

Then, we may, we have to go or to a discourse that tells us that the mind is indeed a set of information processing machines. The mind is also second as we saw, designed by natural selection in order to solve adaptive problems which you faced by our hunter gatherer ancestors and we saw the in the last lecture that it is important to realize that our minds are actually not sort of; I would not say suited, but it is not designed to solve our current problems as much as it is designed to solve certain evolutionary or adaptive problems.

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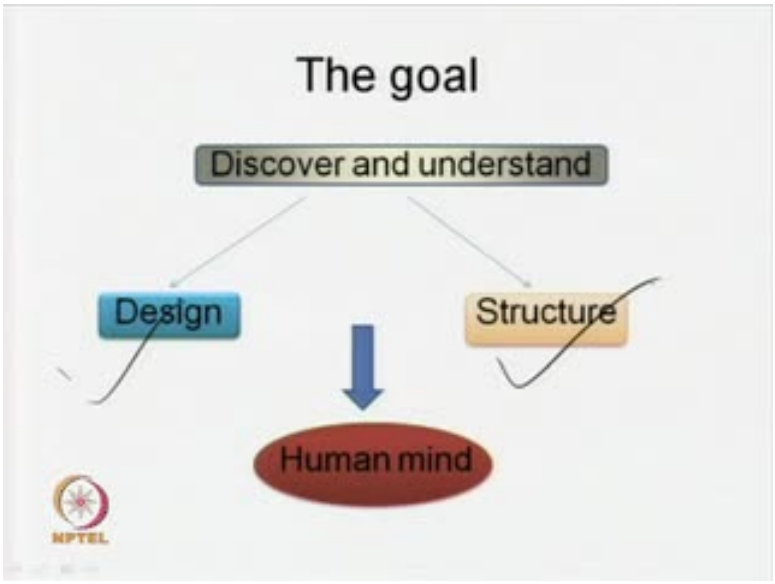

The goal therefore, of evolutionary psychology we saw, was to discover and understand the design and structure of the human mind. So, there two points that we saw; the design and structure of the human mind, this is what evolutionary psychology looks at.

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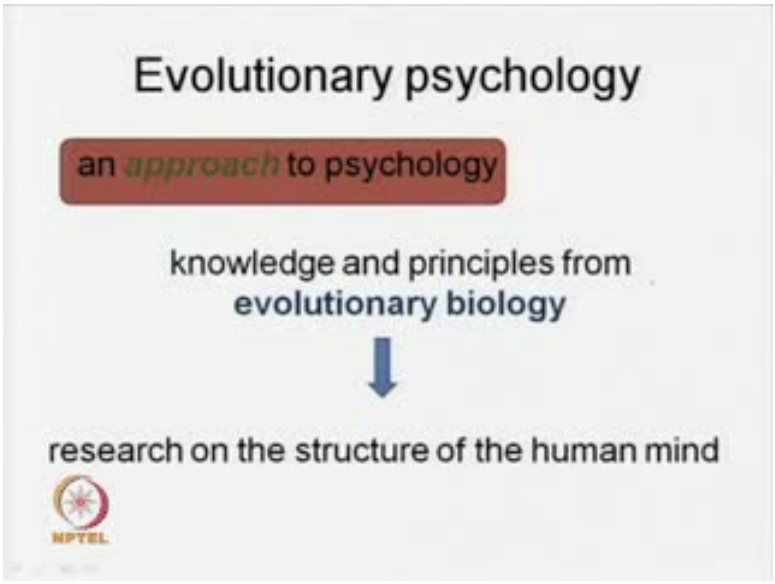

Therefore, we called evolutionary psychology after this scholars to be (( )) and approach to psychology; not really a branch of psychology, an approach to psychology, their knowledge and principles from evolutionary biology are sort of gleaned or borrowed for research on the structure of the human mind.

So, evolutionary biology, we saw was the main sort of domain from which evolutionary psychology draws its inspiration in order to tell us, in order to give us information and knowledge about how the human mind originated, about how the human mind developed over evolutionary time.

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So, well let us go to the key source text in our lecture here and the key source takes in a lecture today are Chris Barker's Cultural Studies Theory and Practice and Leda Cosmides and John Tooby's Evolutionary Psychology: A Primer.

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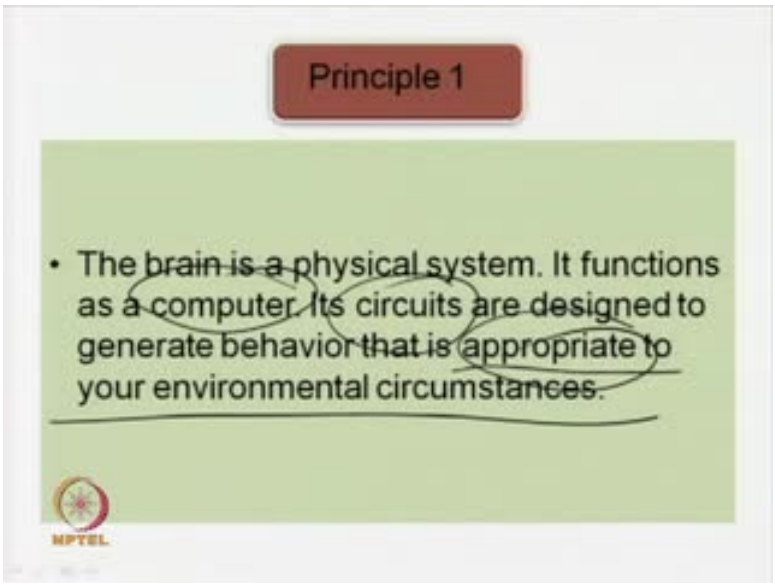

Now, we already been through some of the formulations given in this domain and we will in this lecture, quickly move on to the principles of evolutionary psychology. Well, we could even say that the lectures, that today's lecture is devoted mainly to the five principles of evolutionary psychology.

So, these principles, as I have been given to us by the evolutionary scholars, Leda Cosmides and John Tooby. Today we will really focus on the principles as have been given to us by Tooby and Cosmides.

It is not that there are not other principles, but we should I think choose one text, so that there are no overlaps when we kind of glean the principles of several texts. So, we are going to look at the principles of evolutionary psychology. The foundation of principles so to speak that has been given to us by Cosmides and Tooby.

First, principle number one: it says that the brain is a physical system. It functions as a computer. Look at the analogy with the computer. Remember just a while ago we had said that, under the domain of evolutionary psychology, we find that the mind is seen as a set of information processing machines, in the same way as the computer processes information. So, the brain within this domain is seen as a physical system. It functions as a computer. Its circuits are designed to generate behavior that is appropriate to your environmental circumstances.

Now, we need to look very carefully; indeed this principle is very carefully worded or written out or worded by the scholars a) is what the brain is a physical system it functions like a computer, it processes information and the circuits here, the circuits of the brain are for a purpose. What is the purpose of the circuits of the brain? The purpose is this, that it has to generate behavior in beams in organisms; it has to generate behavior towards a certain goal or purpose and what is it, that behavior which is generated by these sets of information processing machines called the circuits in the brain, should be appropriate to our environmental circumstances.

This also is an extremely important word and we shall see now while what appropriate means. So what is a first principle? The first principle says that the brain is a computer and its circuits are information processing machines and there is a certain purpose in these as information is received and decisions are taken. It is this that it has to generate behavior; the circuits have to generate behavior in organisms, not any random kind of

behavior, behavior that is appropriate to the environmental circumstances in which the organism lives. So, from this, it also follows therefore, that behave or appropriate behavior, appropriateness or what is appropriate behavior will definitely, even if you look around and look at different organisms species, we will understand that or it is not difficult to understand that, appropriate behavior is different from organism to organism, from species to species. What is inappropriate for a species may be very appropriate for another.

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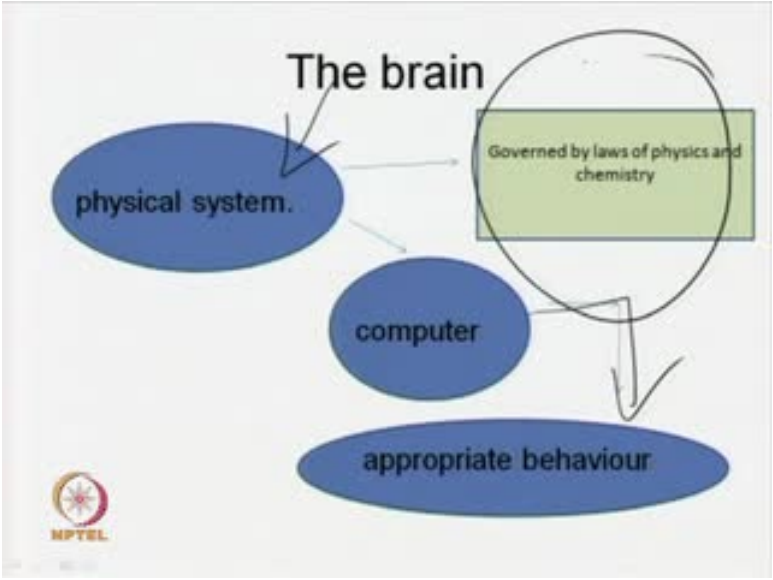

Therefore, if look at this as a diagram, the brain is a physical system which functions like a computer in order to generate appropriate behavior and the brain is governed by the laws of physics and chemistry. This may sound a bit reductionist, as sort of, we may think where all the rich contents that we have in our minds, the beautiful art products that we do when we fall in love, for instance, does not mean that these are only govern, these are all to do with chemical signals.

Indeed at this level, it is so, but it does not at all do away with the fact that, our minds generate very rich content. So in this case, we have to understand and we have to accept the fact that our brains and what happens inside our brains; this is governed by the laws of physics and chemistry.

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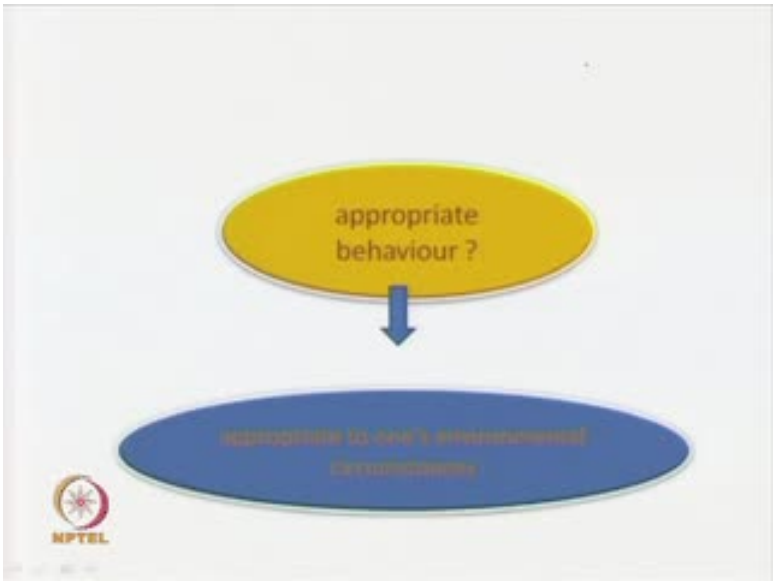

Therefore, what is appropriate behavior? I said I would come this point. What is appropriate behavior and we found initially that appropriate behavior is behavior that is appropriate to ones environmental circumstances.

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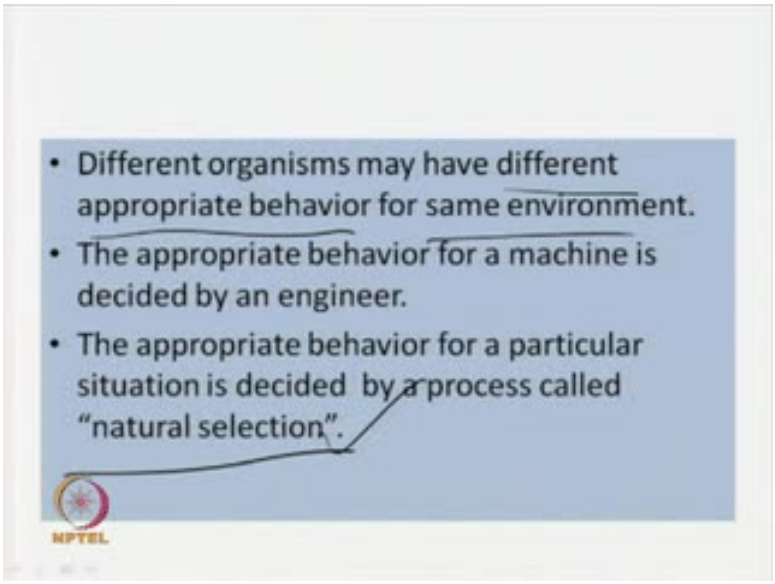

Now, let us read from Tooby and Cosmides text. This is what they have to say. a) Different organisms may have different appropriate behavior for the same environment. This is immensely important, as you understand begin to understand culture in the broadest sense of the term culture which also includes the way of living of different

organisms, of different animals, for instance, and to see how the way of living is different, how they are different from one another. So, different organisms have different appropriate behavior for the same environment. This is important. The environment maybe the same.

Second, the while the appropriate behavior for a machine is decided by an engineer. We know who makes the machine; the engineer makes the machine with a certain purpose in a mind thinking that it is going to solve a certain purpose. So, for a machine for or silicon based in a machine, the appropriate behavior is already decided by an engineer, we may ask the question, in that case who engineers our appropriate behavior.

So, this an important question to which the answer given by Tooby and Cosmides is this. The appropriate behavior for a particular situation is decided for organisms by a process called Natural Selection. So, if the engineer is the one who decides the appropriate behavior or who drives a appropriate behavior for a machine, for us, the appropriate behavior is decided by or we at least we have to respond to or adapt to what the principle of natural selection which you remember was given to us by one of the greatest scientists, that is Charles Darwin.

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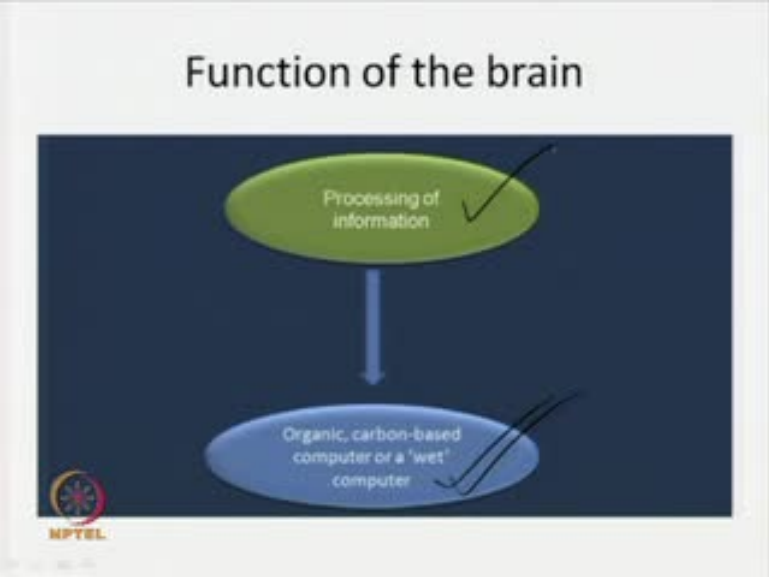

So, our brain, if you look at the slide here, the brain interestingly can also be called a wet computer. Now again this is carrying on the analogy between the brain and the computer. The brain is a wet computer. It is not a silicon based computer. It is a carbon based

computer which whose job is the processing of information and it is an organic carbon based computer or which we call a wet computer. But the function is analogous of the brain is an analogous to the function of the computer and what was it? You will recall from a couple of slides ago if I ask you what was what is the function of the brain?

The function of the brain that is the function of the various circuits of the brain is to process information to process information. The brain is a set of information processing mechanisms and this is towards the particular goal and the goal is to do what to generate appropriate behavior under environmental circumstances.

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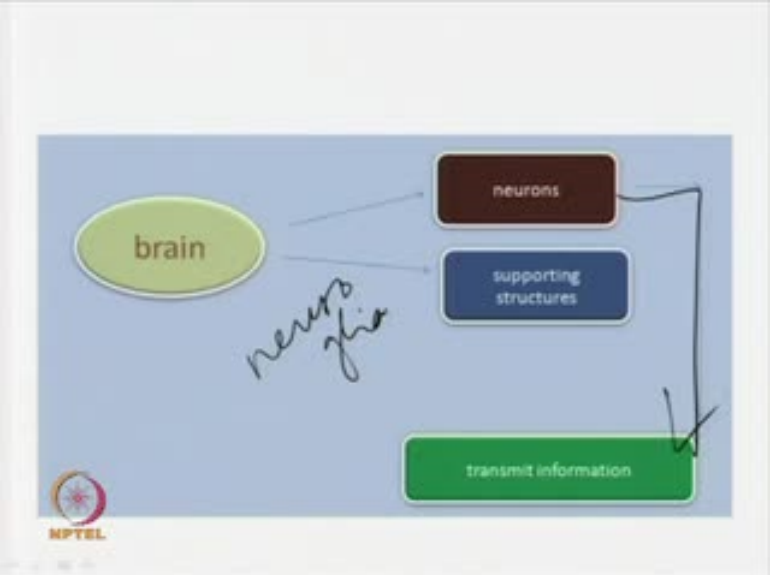

The brain, I am sure many of you aware of this, but just to recapitulate the brain therefore, comprises among other things neurons and neuralgia or supporting structures which are also known as neural glue for instance, neurons and supporting structures whose job is to transmit information.

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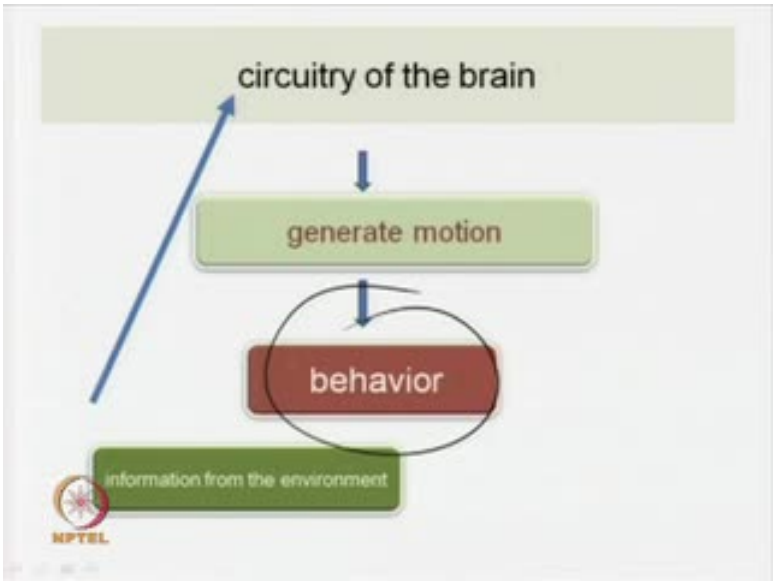

The circuitry of the brain, according Tooby and Cosmides is to generate motion. And remember, this word behavior, no matter how we understand the word behavior in our common parlance in our everyday; parlance means something very particular in the Evolutionary Psychology. Behavior here is defined as motion, this is very important. So, just a while ago we said that the brain has neurons and supporting structures whose job is to transmit information. So, we find here, the transmitting of information eventually has to lead to motion and which is known as behavior and this is again related to information that is received from the environment.

So, we are talking a bit about the brain here because; obviously, we in this domain, we believe that the mind emanates from the brain and hence, in the beginning it is important for us to see how the brain the brain operates.

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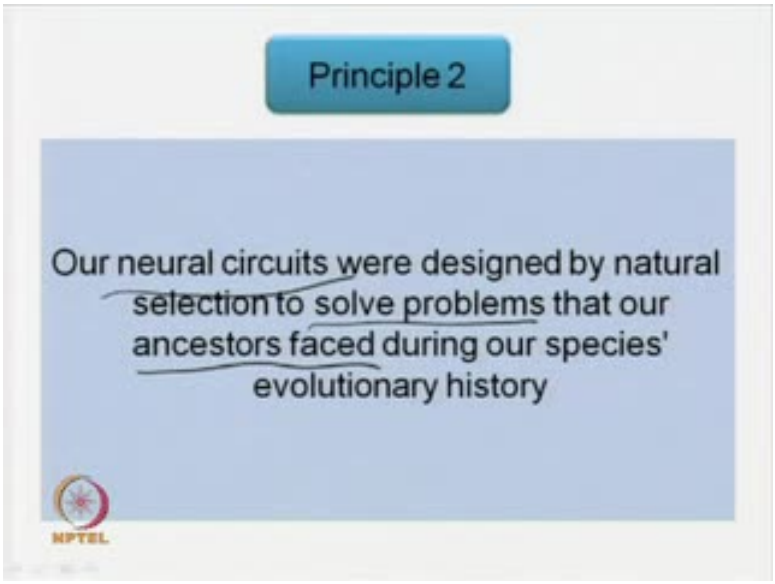

Now, we come to the second principle as given to us by Tooby and Cosmides. Now principle two as described by Tooby and Cosmides goes like this and these are their words: Our neural circuits were designed by natural selection to solve problems this is a). Our neural circuits were designed by natural selection to solve problems. What kind of problems? Problems that our ancestors faced during our species' evolutionary history. It is very important for us to remind ourselves again that evolutionary psychology is also the methodologies what we called reverse engineering and those of you who are from engineering would know this very well.

So, you sort of go, you dismantle you dismantle a product or a machine and go back in order to see how it was created. So, if we have to understand, the whole point of doing this in this course is this. If we have to understand how our minds work, then we would have to understand why it was there in the first place and how it evolved. Which means asking questions like what were the problems in our species evolutionary history for which the circuits were developed?

So, you see how principle two follows beautifully from principal one. Our circuits were developed to generate behavior with the purpose of adapting to the pressures of natural selection. And here we find that those problems, our neural circuits were designed by natural selection to solve not current problems, but to solve those problems which our

ancestors had faced in our evolutionary history. More about this and we will find that other principles will also through light on these first two principles.

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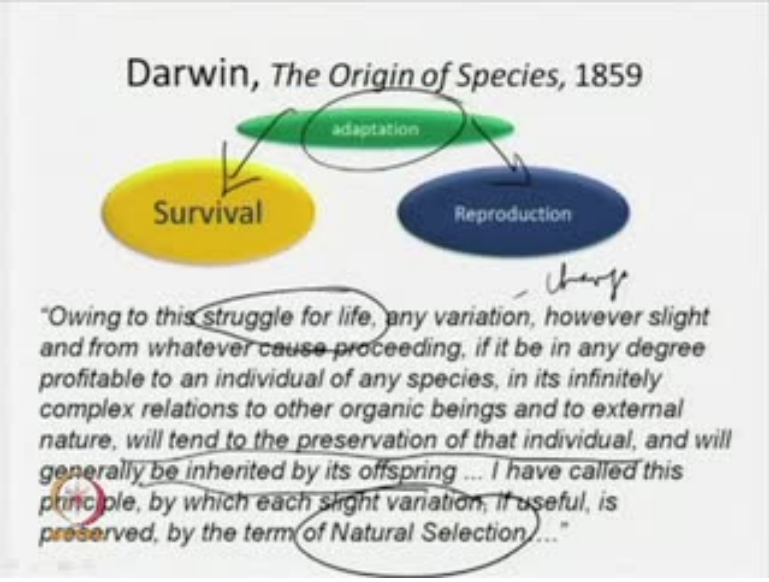

Now, quick look again at Darwin- The origin of Species which was published in 1859 and I am quoting from the origin of species because, this will make clear the principle of natural selection very beautifully put by Darwin. Certainly long sentences as going by nineteenth century writing, but let us look at the two pillars so to speak of Darwin in an evolutionary theory, that species adapt, species adapt to changes in their environment and this; had there not been two drives called survival and reproduction, whereas, species would not have adapted.

So, species therefore a) need to survive and b) they need to reproduce. So, let us read, this is straight from Darwin origin of species. Darwin said, owing to this struggle for life. This is very important, "owing to this struggle for life, any variation that is any change any variation; however, slight and from whatever cause proceeding, if it be in any degree profitable to an individual of any species, in its infinitely complex relations to other organic beings and to external nature, will tend to the preservation of that individual, and will generally be inherited by it is offspring. I have called this principle, by which each slight variation, if useful is preserved, by the term Natural Selection."

So, what Darwin is to say here very clearly is that, there is a struggle for life and enough struggle for life there are certain changes, which help us to adapt any variation. He says,

remember any variation, and if useful is preserved in the individual. a) not only that, it is also that variation is also passed on to succeeding generations. So much so, that ultimately those generation, those members or those generations which have been able to retain that useful variation, you will find more members or more people in that population than those who did not have that useful variation, those are going to be extinct or those are to die out or for instant, those are not going to succeed in the struggle for life or struggle for existence.

And then he says that will be inherited by its offspring and I have called, he says I have this principle by which each of these changes useful changes is preserved, I have named this principle that of natural selection. This is you may say as, you as scientists, as technologists, will recognize this is perhaps one of if not the at least one of the most important theoretical formulations and findings that would have been given by any scientist ever really.

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So, the main points here in Darwinian Theory which has the points which have a lot of consequences even for culture are these: they are variation, inheritance, higher rate of population and growth where a struggle for survival or struggle for life is. And importantly differential survival and reproduction.

It is not exactly survival for save that we are talking about. We are talking about differential survival. What my differential survival mean? There has to be a difference

among a group that is in the struggle for life or struggle for survival and reproduction. And whoever gains in the whoever has the differentiating so to speak element or variation in them, will survive. Hence the survival of the reproduction is known not as reproduction and survival, remember this, this is extremely important or it is also known as and more importantly we should call it a differential survival and reproduction.

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Therefore, we have to understand also Tooby and Cosmides have brought to a notice, that natural selection; it does not mean that it works always for the benefit of the species in the way, in the common sensical way that we may think it to be. It is just a process in which a trait or a characteristic causes it is own spread through a population, sometimes even leading to the extinction of the species. So, we should not think that natural selection is for process that always be useful for the benefit of the species. If the species that is not adapt or does not produce appropriate behavior for the circumstances or the changes or the selection pressures, then the species will not survive.

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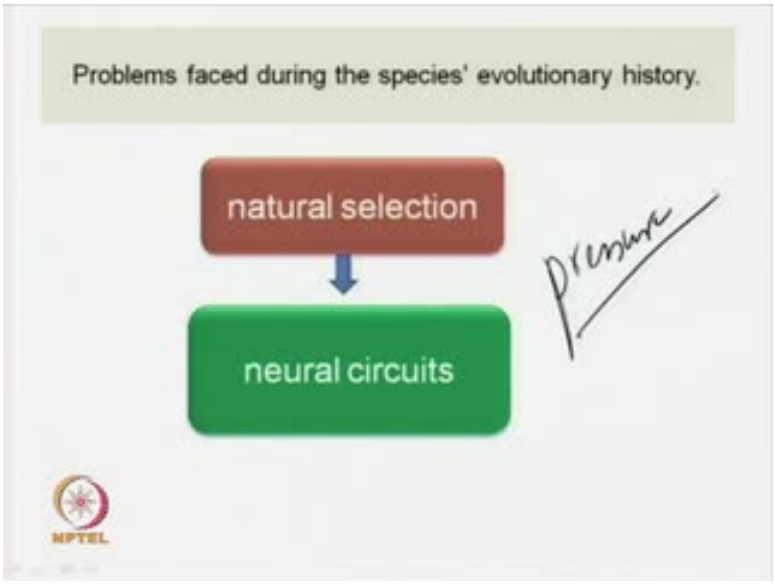

Therefore, the problems which were faced during our species evolutionary history has to do with a certain pressure. So, we used this term a while ago, the pressure is natural selection, is a selection pressure on neural circuits to do what, to produce appropriate behavior.

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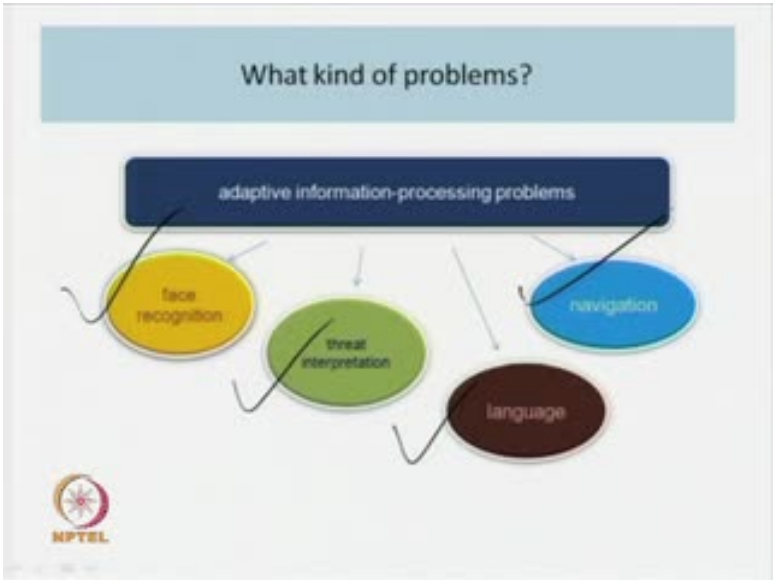

So, then we also talked about problems and we are going to ask, what kind of problems we are talking about. Remember, natural selection gives this is selection pressure; species will have to solve these problems. Neural circuitry will have to process

information and generate behavior which is towards, which are gear to what is the solving of the problems.

So, what kind of problems are we really talking about? These are spelt out by the authors. These problems are called adaptive information processing problems. We will term this adaptive information processing problems, and these are among the most important ones, are these four a) face recognition, b) threat interpretation, c) language and d) navigation. If you look at all of these, these are not simply things to do with biology, this is to do definitely with survival, but face recognition in of by members in a certain population for instance, which face is a threatening face, which face is a friendly face, for instance, threat interpretation also to be able to interpret. If you cannot interpret a threat and produce behavior that is appropriate to also threat, then you cannot survive.

So, face recognition, threat interpretation eventually language also, language and navigation, to be able to navigate in a certain territory or local, these are what I have been termed as a basic adaptive problems by Tooby and Cosmides.

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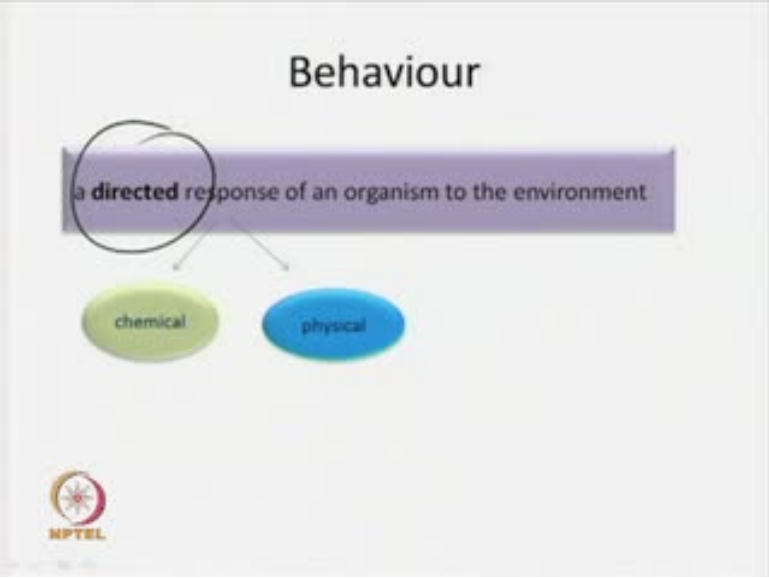

So, behavior therefore, as we saw is a directed, we will call it a directed after Tooby and Cosmides; we shall call it a directed response of an organism to ones environment and which is the responses both chemical and physical.

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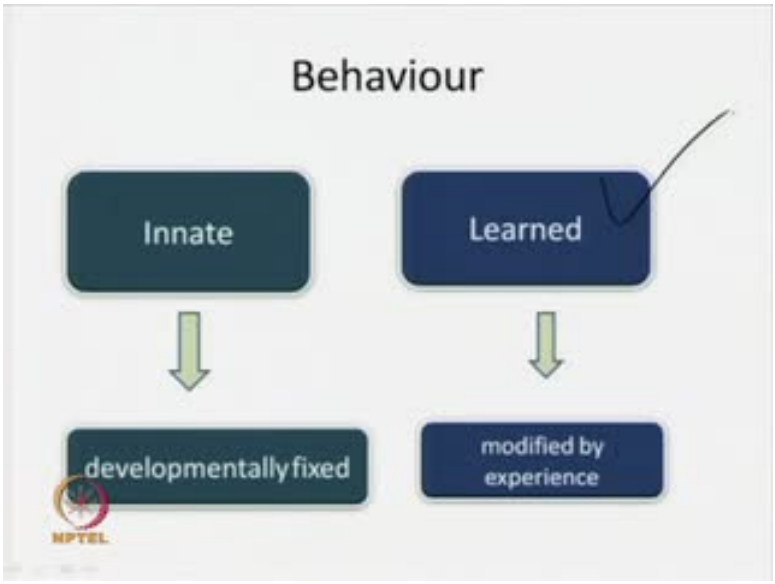

So, behavior again can be divided into innate behavior and learned behavior. Innate behavior that is developmentally fixed whereas learned behavior is behavior that is modified by experience. So, this learned behavior is a behavior, as information processing machines that are geared towards survival in a reproduction that has to be modified by experience in a changing world, or in a changing scenario. These decisions, this learning and changing is a job that is performed by our neural circuitry.

Well, now we come to principle number three. The third principle of evolutionary psychology as was given or has been given to us by Leda Cosmides and John Tooby; lets read from here.

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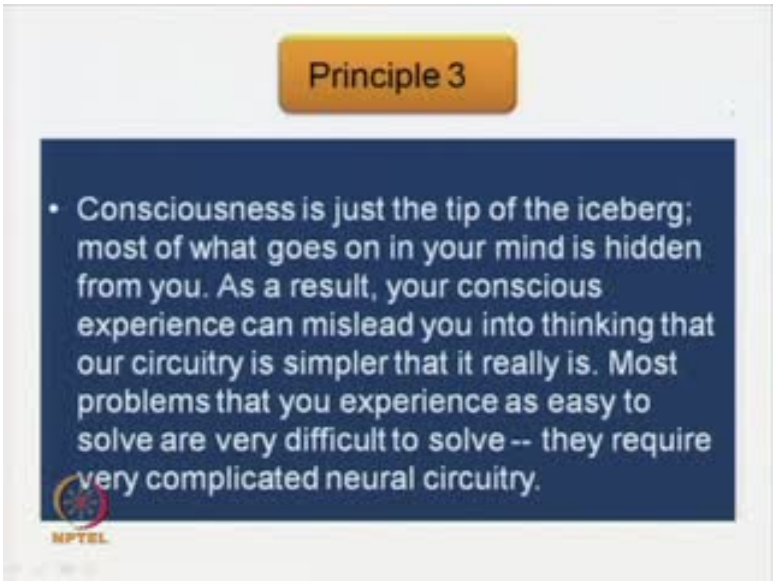

In their words, the third principal goes like this; it has to do with our consciousness. Consciousness is just the tip of the iceberg ; most of what goes on in your mind is hidden form you, this is very important, most of what goes on in our mind, something that we do not experience or we do not know or do not have access to. Then, as a result, your conscious experience can mislead you into thinking that our circuitry is simpler than it really is. Most problems that you experience as easy to solve are very difficult to solve. They require very complicated neural circuitry.

Now, what is consciousness? Now obviously, consciousness defined in different ways by people from different domains, for instance, in religion, consciousness may be defined in many ways it may be called [fl] for instance ,in the Hindu religion or it may have so many different ways of description. Many may even say that consciousness is something that is given to us by some super natural power for instance.

But we have to remember that we are speaking in the discourse, within the discourse and within the limits of science. And how do we look at consciousness here? The author say that consciousness here is what that is our conscious awareness. I am aware that I am speaking to you, that this is lecture is being recorded, that this is the virtual class going on and that you have you are listening to me.

I am aware of this. But this awareness, both yours and mine is just as I say, the tip of the iceberg. There are many processes that are going on in our brains, even as I am speaking or I am aware of my surroundings and you are aware of watching this video lecture.

There are several sets, there are several sets of information processing that I, at work at this very moment, as I speak and you listen to me and this the our consciousness or awareness of what is going on is just a fraction of what actually is going on in our brains.

So, as I say as a result, your conscious experience may even mislead us into thinking that our neural circuitry is extremely simple. One of perhaps, one of the difficulties in modeling the human mind and it is workings through computers or maybe artificial intelligence systems is also this. These are the enormous what we may call, the enormously complex ways in which the brain works and which gives raise to the mind is something which is not perhaps which has not been decoded at least in its entirety by technology, otherwise we would have been able to make machines as complex as asked.

So, as a result, our conscious mind may mislead us into thinking that our circuitry is really simple than it really is. And most problems that we experience as easy to solve are really very difficult to solve and I just say, they required very complicated neural machinery.

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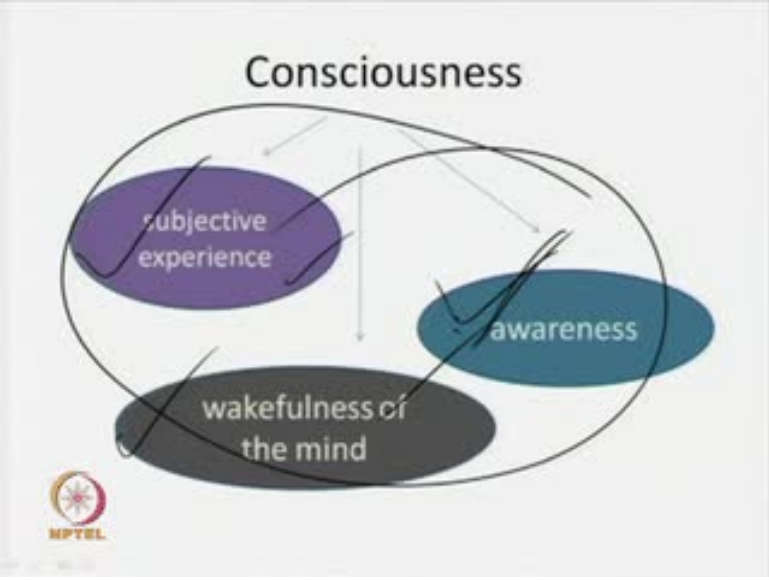

And so, this is principle three of evolutionary psychology and consciousness therefore, as we saw, we are looking at it as awareness, as in the first phases in awareness of what is going on, it is also our subjective experience; the experience that we undertake or undergo as perceiving subject, as knowing subjects, as remembering subjects, a subject paying attention to something. And finally also means the wakefulness of the mind.

So, we have to understand that in each of these different ways of looking at consciousness, the underlying circuitry of the brain and its processes by no means simple at all; for things that we experience in these domains, these require very complicated neuron machinery.

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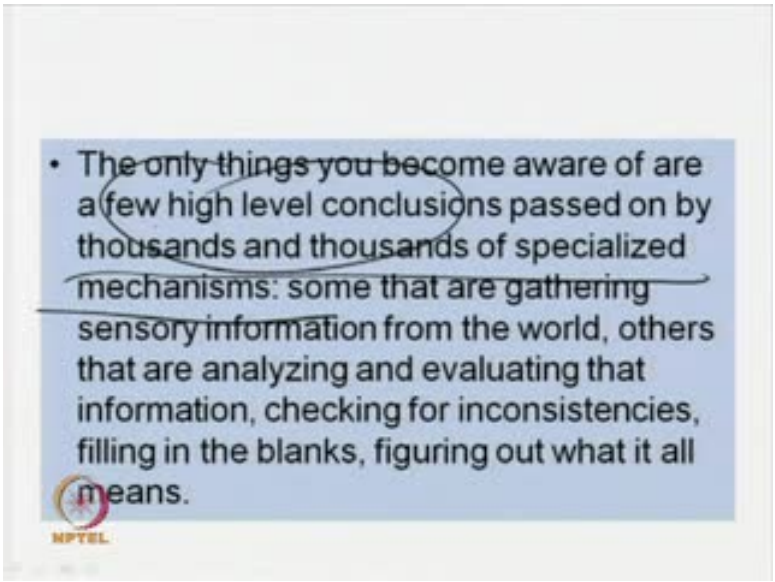

So, let us again look at what Leda Cosmides and John Tooby have to say. The only things you become aware of are a few high level conclusions passed on by thousands and thousands of specialized mechanisms, they say that the mechanisms that finally, bring things to our awareness working sort of below the surface use the metaphor mechanisms run up to thousands of mechanisms.

We are only aware of a few high level conclusions like if I am aware that, I am here in recording studio, recording this lecture, this is the high level conclusion that I am aware of. But behind this, what is happening inside my brain is something that I cannot be aware of. One of the reasons perhaps is this, is that our conscious awareness cannot

handle so much of information overload and we are not required really to know the processes. This interestingly you will understand is also survival strategy.

If our minds are overloaded, if this over information, then there are things that we will miss in this overloading of information, which may ultimately compromise our ability to survive. So, reading on again, some that are gathering sensory information from the world, others that are analyzing and evaluating that information, checking for inconsistencies, filling in the blanks, figuring out what it all means. This another example we are not bringing here, which is given in Tooby and Cosmides text. They say that when a person looks at and recognizes his or her mother, he or she is aware of just that high level conclusion that this is my mother. But they say that, in reality, what is actually going on in our brains is that, the visual system gives us an input, as what our mother looks like. Then there are, we remember the fact, the relationship with that person, so there are thousands of mechanisms. So, there several mechanisms are at work even in the simple, even every day act of our recognizing somebody as our mother. And in very unfortunate cases, where people have perhaps met with an accident or there is a lesion in the brain, what happens is at times, when one cannot recognize one's own mother for instance, it is the case where these underlying thousands of mechanisms that produced a result have been compromised in some way. In fact , one of the ways initially that one could have, that one could, the scientists could gather, or make speculations, successful speculations about how the brain works was by looking at patients who have had their brain functions unfortunately compromise.

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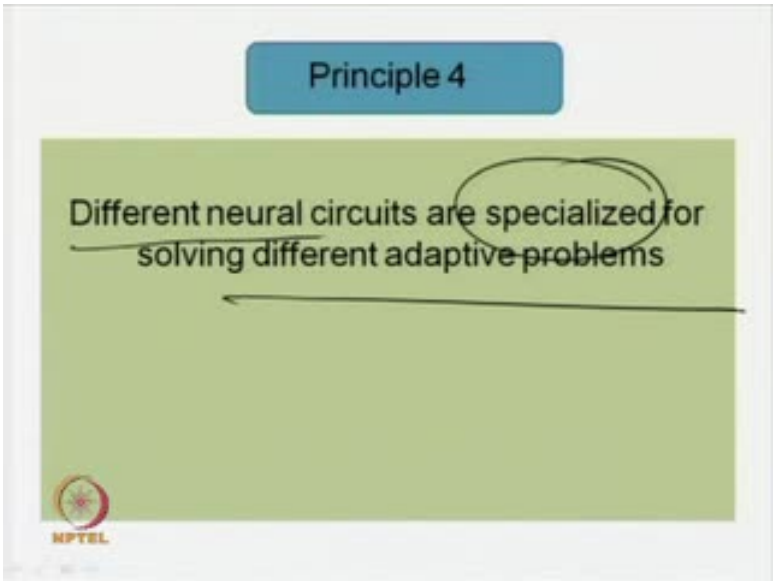

So, we are now going to principle number four and this is very interesting. Principle number four, according to Leda Cosmides and John Tooby runs like this; that different neural circuits are specialized for solving different adaptive problems. Look at the importance of this, which means that our brain is not an all-purpose machine. And as they say also in their text, really, as engineers you will know very well that an all-purpose machine is no good. As they say, a hammer is meant to perform the job of a hammer. A hammer cannot function as a saw. So, system will be successful when it is not an all-purpose machine. The system will be successful when different components are serving different needs or different goals fulfilling different goals.

So, different neural circuits are specialized, just look at this, different neural circuits are specialized for solving different adaptive problems. And again remember, we said that evolutionary biology is very important or it is the inspiration or it is sort of even the templates from which evolutionary psychology draws its conclusion or has the certain methodology.

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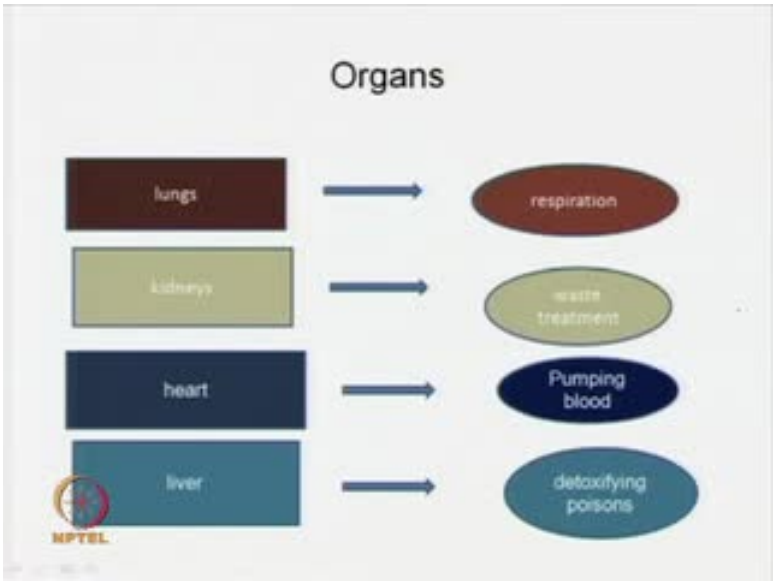

So, if you look at the human body for instance, what does the liver do for? The liver does not for here for instance, the liver is meant for detoxifying poisons; the liver does not pump blood enough.

Lungs are for respiration, kidneys for waste treatment, the heart for pumping blood and liver for detoxification purposes. So, as the body, as our body has different you may say circuits, which are the organs, like the lungs, kidneys, heart and liver to perform specialized jobs, so also it is health that our brains or our mind or brains have circuits which are specialized to perform certain jobs.

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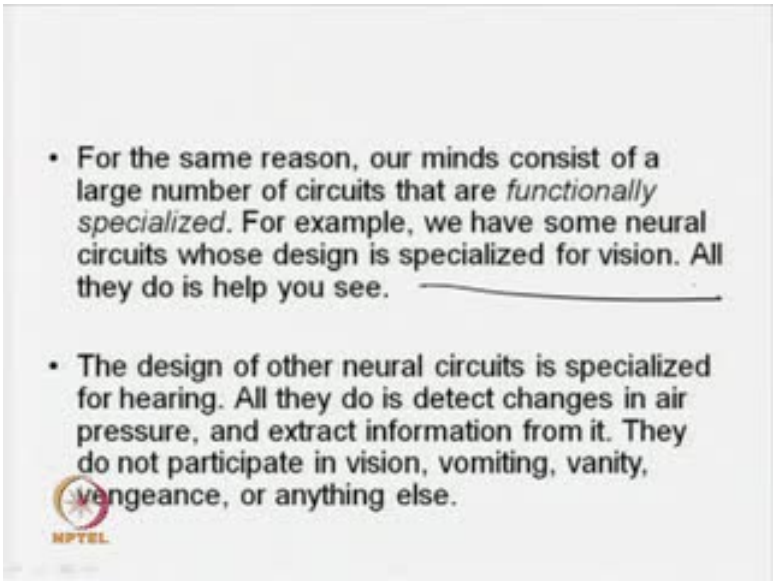

So, again reading from Tooby and Cosmides, for the same reason our minds consist of a large number of circuits, that are functionally specialized. For example, we have some neural circuits whose design is specialized for vision. All they do is help you see. In the same way, we have circuits that are designed for motor purposes, circuits that are designed for hearing, for sense, for smell, etcetera. So the circuits that are doing the job of smell enabling us to smell are not performing some other job of some other sensory input. So, the design of other neural circuits is specialized for hearing. All they do is detect changes in air pressure, and extract information from it. They do not participate in vision, vomiting, vanity, vengeance, or anything else.

So, this is just beautifully rhetorically putting it so that, just to say that, those circuits which are engaged in particular jobs are not if we may safely make a general statement, are not at least to in important ways concerned with or doing or helping in the job of other kind of conclusions; other circuits that give us other conclusions, there not specialized, that is there not spread out over different specializing domains.

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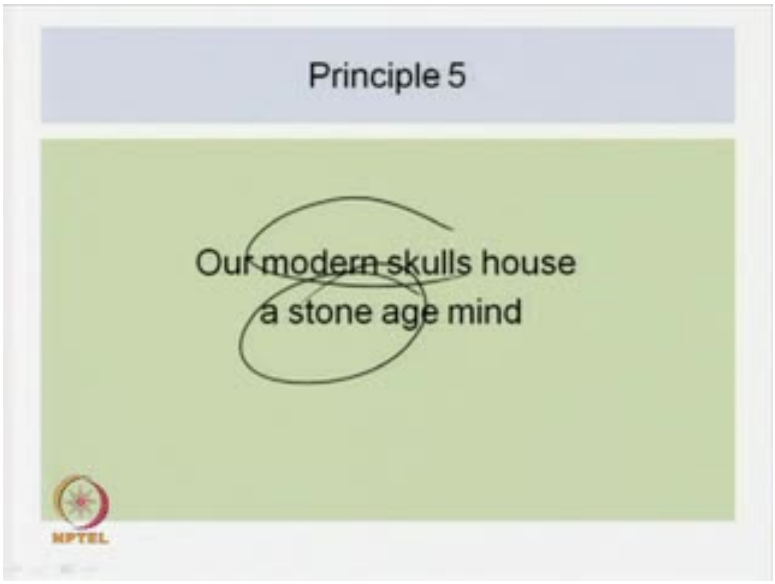

So, finally, principle number five also put very beautifully; Our modern skulls house a stone age mind. Look at this very carefully, our modern skulls house a stone age mind. Modern and stone age, it simply means this, that our minds, listen to this carefully; our minds are suited, our minds, it is not that we do not do sophisticated things, but is important for us to understand this; our minds are not suited for our current, for the current things or a current life that we lead.

Our modern skulls house a stone age mind. So the mind that we have may perform very sophisticated tasks, but actually the mind is geared to solving the old adaptive the problems that we or our ancestors had faced in our evolutionary history .This is an immensely important point.

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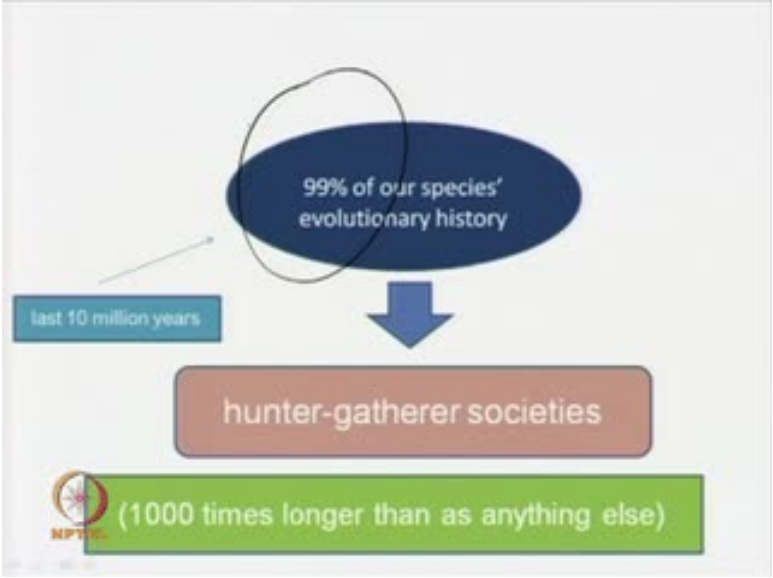

Now, Tooby and Cosmides go on to say that, in the last ten million years or in the ninety-nine percent, this is very important. Ninety-nine percent of our species' evolutionary history was spent in hunter-gatherer societies. So, the mind that we possess, that we have today, is the mind of the hunter-gatherer society. And this is a thousand times longer than as anything else. So, if you have spent ninety-nine percent of our species' evolutionary history, then obviously, this modern life that we have agriculture, then coming in of technology, and are sophisticated and very complex social systems, our cultural systems; it means that, this is what Tooby and Cosmides have called just a blink of an eye. We say the computer age, for instance, is nothing is just is a it's just a blink of an eye compared to this ninety-nine percent of our species' evolutionary history, which was spent by us, as members of hunter gatherer societies.

So, this is how they put it. The world that seems so familiar to you and me, a world with roads, schools, grocery stores, factories, farms and nation-states has lasted for only an eye blink of time when compared to our entire evolutionary history. So that we have to understand and that is why they say, that our minds are actually those that have solved the adaptive problems that were faced by our ancestors in the past. In fact, this is very important. Let me re-iterate, our minds our designed or we have minds that are actually designed to solve adaptive problems which had been faced by our hunter-gatherer ancestors.

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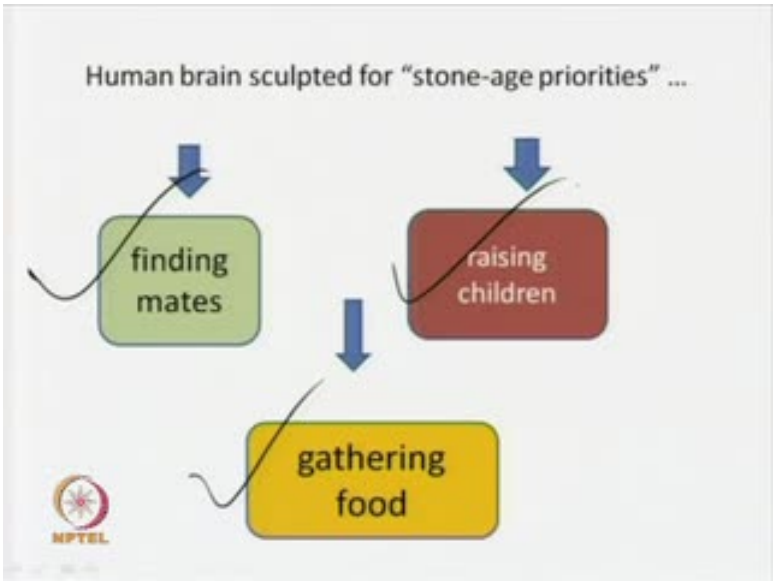

Therefore, look at this, the human brain was sculpted for what they call stone-age priorities. The stone-age priorities would be finding mates, raising children, and gathering food. You will remember when we look at the pillars of Darwinian pattern, that finding mates, raising children, and gathering food; these are related to the twin pillars of survival and reproduction of changing, of adapting, to changing circumstances, environmental circumstances and pressures. And retaining, remember Darwin's words, retaining the useful variations, not only that passing it on to progeny. So, this therefore, would include a for survival, the gathering of food, the finding of mates, and the raising of children. This is what binds us to our evolutionary past.

And our minds, no matter according to this school of thought, no matter what complex mathematics you do, no matter how what complex literary forms and books that you write, ultimately we have to understand that our minds are geared for survival and reproduction and that is why our priorities as they call it our stone age priorities are for what our brains have been. So, there is a word metaphor of sculpting, because very slow process likes wind, sculpture that has been windblown or made by the wind there several thousand thousands of years of sculpting.

So, something that taken so long, ninety-nine percent of our evolutionary history, is here definitely to stay and we are defined. That is why we need to look at evolutionary psychology. The mind that produces, the mind that produces culture, the mind that

produces different cultural forms, practices, the mind that eventually made symbolic thought possible, that mind that created sign and signifying practices is ultimately a mind that still has as its goal, survival and reproduction.

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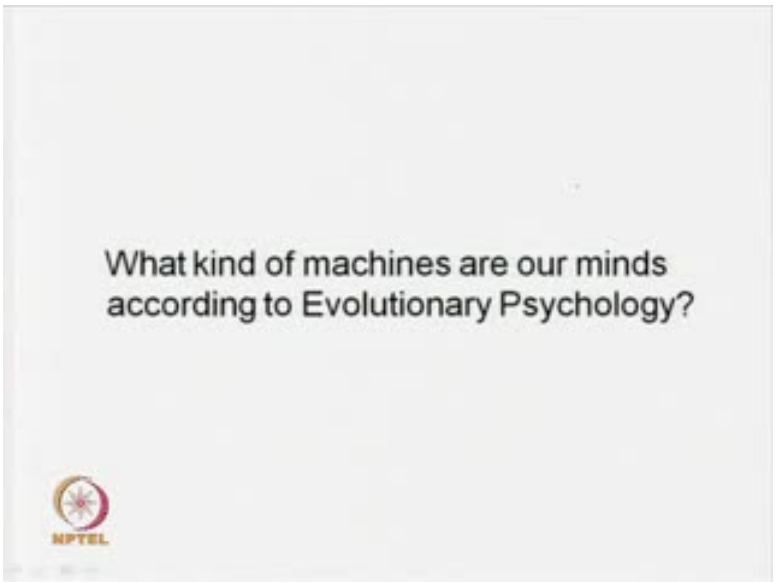

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So, we will now come to the discussion and quickly we will run through a few questions; what kind of machines are our minds according to evolutionary psychology and the answer is, according to evolutionary psychology, our minds are sets of information

processing machines and they are an analogy to the computer; so much so that our brain is known as a wet computer.

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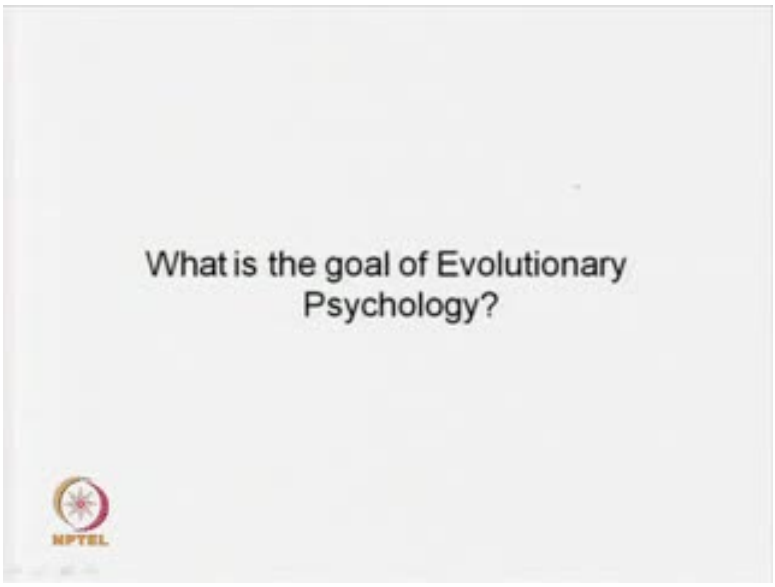

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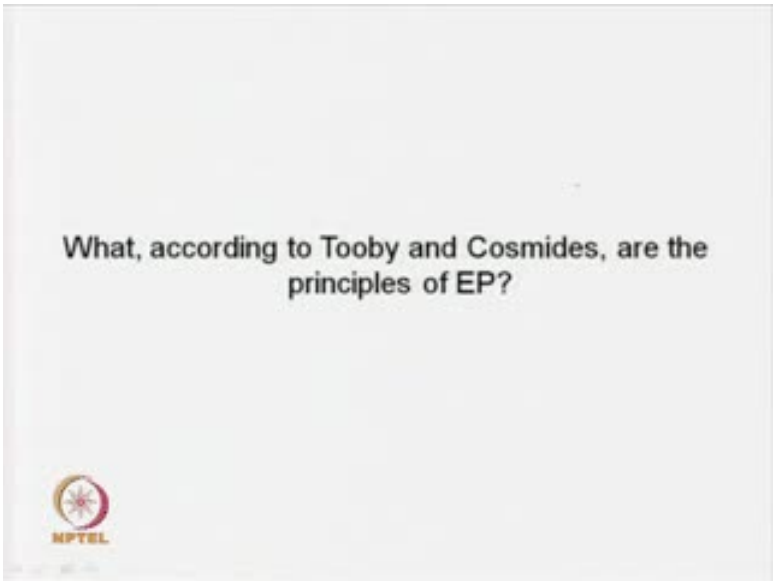

Next, what is the goal of evolutionary psychology? The goal of evolutionary psychology as we saw even in the last lecture is to discover and understand the design and structure of the human mind. Finally, what according to Tooby and Cosmides are the principles of evolutionary EP or evolutionary psychology?

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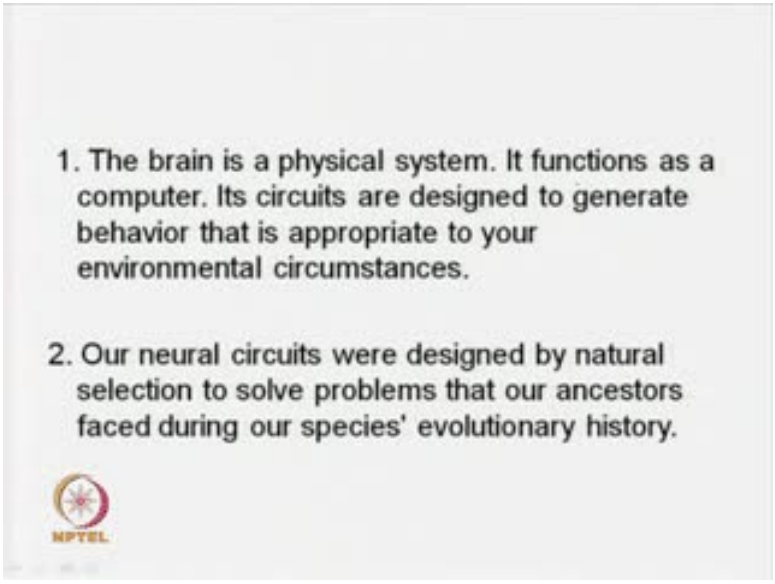

We will go through; we already discussed the principles in detail. We will quickly run through it. The first principle is that the brain is a physical system and that it is like a computer so wet computer and its job is or that this is the job of circuits is to produce

behavior or to generate behavior that is environmental to that is appropriate to our environment appropriate to your environmental circumstances.

So, principle number two is, our neural circuits were designed by natural selection, that is the engineer here, so the drive motivating factor is natural selection and to solve problems; what kind of problems that our ancestors faced during our species' evolutionary history certainly not our current problems.

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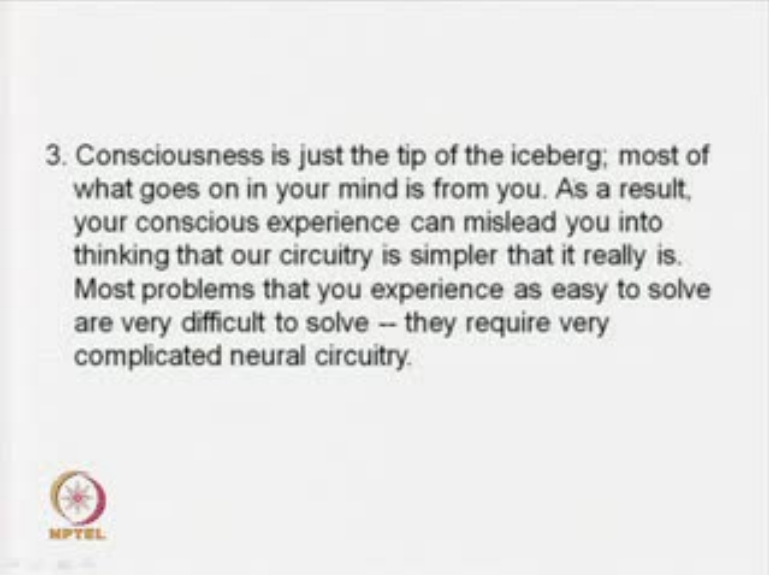

Principle number three; consciousness is just the tip of the iceberg; most of what goes on in your mind is should be hidden from you. As a result, your conscious experience can mislead you into thinking that our circuitry is simpler than it really is. Most problems that you solve, that you experience as easy to solve are very difficult to solve; they require very complicated neural circuitry.

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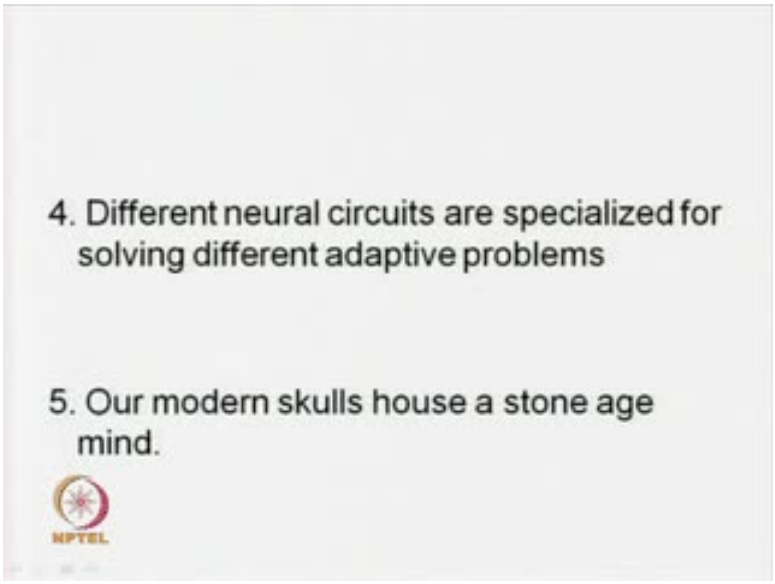

Principle number four. Different neural circuits are specialized for solving different adaptive problems. And number five finally, our modern skulls house a stone-age mind. So, if you get, if you find that there just three or four marks, then do not need to unpack these, but the way in which we have unpacked all these five principles, if you if there is a question carrying ten marks for instance, you will then have to describe these. For instance, you will have to talk about adaptive problems of four main adaptive problems.

Remember what these were? These are face recognition, then threat interpretation, language and navigation; these are things that one has to have and these are adaptive problem which are also remain with us. It is not that we overgrown or outgrown them at all. Then you need to then say what consciousness is, how it is, it could be awareness, it could be subjective experience or the wakefulness of the mind. And how you can give examples for instance, we saw the example of how even a seemingly simple process like recognizing one's mother, entails several very complicated steps processing by neural circuits and we are in a way are allowed by the pressures of survival, we allowed only the final high level conclusions. Why? The reason definitely is this that, with overloading of information, our goal of survival would not be fulfilled. There would be too much information overload if we were to be aware all the time of all those hundreds of processes that go into even the most simple seemingly the simple of conclusions.

So, I hope this has been an interesting discussion for you and to me. Go on to read evolutionary psychology, which is relatively new domain and there other things that we are going to look at for instance, we are going to next look at how the modern mind originated. We are talking about the legacy of the mind, that a legacy of evolution and the mind that you possess, but then in the next lecture we are also, we are then going to find out how the mind, that we have the modern mind originated in the first place.

The modern mind is in many ways of course different from, there are many other things that we do not just finding mates, or finding food, or raising children. There other things that you do are the more complicate things and this is what we shall be looking at in the next lecture. Thank you.