How The Brain Creates Mind

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Lecture – 01
Brain – 1

Hello, I am welcome to this fresh MOOC course titled, "How The Brain Makes Mind". Before embarking on this course, let us take some time to orient ourselves. The need for this course arose from the previous MOOC course which I took (Refer Time: 00:40) and overview, and in the first week when we were discussing and talking about the anatomy and physiology and the way we investigate the brain. It was a glimpse of larger subject and I thought that probably talking about this whole process of brain is worthwhile.

So, there will be some overlap, a little bit overlap between the first module of previous course and this. But with the same information set, the purpose here is different. If you notice I have not given a statement as a title. The statement that let us explore brain or we know brain or pseudoscience's. I have posted a question how the brain makes mind, and if you ask me the answer; the answer is that we do not know yet, but we do not know is not to disparage you or discourage you or discourage myself from understanding.

The basic purpose is to bring forth, whatever we know and we know a lot, we know a lot the plethora of that I so much that it may really become difficult. And if you just look at the just type in the Google pseudoscience's or the way you understand brain or we just type any topic on the brain, within few seconds you will get millions of papers and they are pouring in and in and in.

So, partly this is because pseudoscience is no more discipline; which is a prerogative of biology or medical science, it is pseudoscience is one of the foremost interdisciplinary or cross disciplinary subjects which is come up. Physicist, mathematicians, computer engineers especially, those working in an artificial intelligence and brain and computer interface, biologist, medical scientist, psychiatrist, neurologist, geneticists everybody and you must have read in the newspaper about Obama declaring it the brain project and decade of brain. And so huge amount of money is being pore in, and the output is huge. In fact, sometimes I personally feel that the output is so much and not only scientific articles, the number of popular science books, the number of articles in physics, journals,

in other journals, it has become so much that it has become difficult for one person to synthesis it. And you will really cannot know what all that is going on a pseudoscience's.

So, we have blocks of information, lot of information, but if you still ask me whether somebody can give a comprehensive theory or equation of the brain that is still very very far. So, few things which I wanted to share with you before we start as I said. So, we what the plan of this janava course is, that I am not going to give you in a text books fashion, where the lot of good text books available; some of them which I have mentioned in the information template and we will discover more has we go on. It is journey which we can make together, so there may be more questions at the end of presentations. There may be new things which would come to your mind and we would love that, we share with each other. The hope is that some of you will really pick up pseudoscience is a career, some of you may actually get questions and which may decides future brain research for next 100 years or 50 years.

So, what is required is not you will have to probably live your school approach, where you want to look at slides and mug up and give assignment. I invite you to get involve into this journey. Think go to the video again and again, go to look at the slides and keep thinking, and whatever questions some of them may be answer during the course of presentation, some of them will not have answers, and if I do not have answer you can provide answer to me. So, it is a journey as I said and so open your mind which essentially an exercise to give you a state of the heart pseudoscience which may not be complete, but whatever we know opens up new windows to explore.

As I had mentioned in my introductory brief video, I hope some of you who are attending this course may have gone through two basic courses which have been recorded and already uploaded on NPTEL site. One of them you can keep referring back to that, one is a biological basis of behavior given by Professor Braj Bhushan from IIT Kanpur, it is a video which is already there on NPTEL site. Another is a lecture by me on which is label that is a fancy name called “Beautiful mind” which I have picked up from the movie, “Beautiful mind” that can be your reference point. Plus there couple of other books which I will mention is the book called by Eric Kendall is a very well known neuroscientist of principle of neural sciences.

And there is another book on cognition brain and consciousness by bars, some of this are available on internet; and otherwise in hard drew. So, let us embark on this and helpfully this becomes interesting journey for you and opens a new path. So, some questions at the beginning, the title itself is a question how the brain makes mind and the other question what makes us sapiens, you know how body sapiens is homo sapiens.

So, this may sound as a very very big question, the general question that it may belong to evolution; it may belong to anthropology, but just connected to this is a different question which I am sure every human being in his life time will ask and that question is who am I some of you would ask, some of you may be happy enough to not to ask it all your life, but some where a long a line you ask this and the second question which is almost on the flip side of this is why do why do what I do, I ask myself, all of us ask.

So, let us put this question at the beginning, what do we do you all know that is behavior; why do we do what we do and if you look at it, just ask yourself, just take few minutes to think you question so many things, which see there lot of wars in history as whole record of distraction, but the same time there is stories of love, there is stories of fashion, why have been human beings doing like this, and at seemingly if you pick up a newspaper or listen to TV news; how the time you keep wondering why did this person do this.

But you really do not have the answer, they may be explanation from social reason, they may be explanation from economic reasons, but they are all higher level of explanations. A child who has to study does not study, a student who has to focus before the exam is panicking, people who marry each other thereafter some years start fighting people kill each, there lot of terrorist activity going on, the wars which are going on, there is a whole disparity of poor and rich; this is the old drama of human life; although there may be theoretical explanation, but the basic question if you keep taking a reductionist approach and come to the basic why are we doing it; it all is a creation of human mind.

When I say this, there may be debate on this question, but I will address those debates a side as I move. So, let us basically look at, when there were no human beings. So, we had cousin you see it here.

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The chimpanzee, as we whatever you know of evolution it says that, we separated the line of Homo sapiens separated from chimpanzees. 6 million years back, and the story of modern man comes to say around 200,000 years back, or as the new theory says that 74000s years back, there was huge volcanic bus; which almost destroyed everybody and there was this family in the deep in Africa. So, there was 1 human and from their lot of migration happen, migration went to Europe to Asia to china, this as some fact because this is studies had been done by mitochondrial DNA.

Mitochondria some of you know who biology will know it, but mitochondrial small organ ail within the cell, and the DNA within mitochondria is different from the DNA; which is available for other studied from the nucleus. So, mitochondrial DNA is somehow as preserve the number of migrations, which has happened in the human race. So, when seeing the changes one can tell how many migrations somebody has undergone, from Africa. So, in one way all humanity which are existing now can be trace back to probably 1 women in Africa, that as some I mean it is not a fanciful story, because that is some substantiation.

Because we all share the genetic pool, more than 90 percent may be a rough data between 97 to 99 percent genes roughly are shared by all human beings. So, that means, genetically we are the same. So, there is some trust to one peoples everybody is 1. It is a very small percentage of gene which clears the difference and probably this also explains

that most human beings behave in the same way, though their language may be different, their culture may be different, their dressing style may be different, food habit may be different, but those are all external things; when it really comes to the basics, we are the same, we cry in the same way, we laugh in the same way, all cultures laughter is laughter he always have to gain, when you laugh.

You cry you cry in the same way, you eat in the same way. So, present human race which as Homo sapiens, this is shares common genetic bullion that is our basic template. So, any kid who is born will talk about the how the brain develop and will you see a what similarity it as, but there are differences, so we all have to hands, eyes, ears, same structure, now heights may differ, the eyes of the color of the eyes may differ, the skin may differ, your face may differ, but these are small genetic variations; which have created a small genetic variations can create such a variety. So, nature is very economic.

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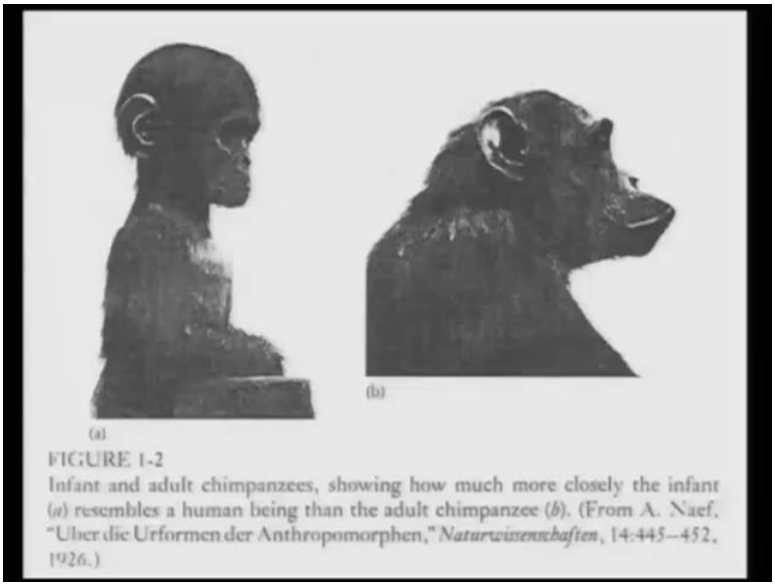

FIGURE 1-2
Infant and adult chimpanzees, showing how much more closely the infant (*a*) resembles a human being than the adult chimpanzee (*b*). (From A. Naef, "Uber die Urformen der Anthropomorphen," *Naturwissenschaften*, 14:445–452, 1926.)

So, but let us look, are we the only is species like this, or their other species. You look at this picture, this is the very interesting 1926 if you look at this left thing which is infant chimpanzee and it is written here, the infant looks much closer to human, but as it grows up the chimpanzee is start showing different from human beings, now this is how the genetic enforce, it is not that the environment as made the chimpanzee like this or the human infant is like this, it would becomes to this is the genetic program. So, we all know that genetics is the nature.

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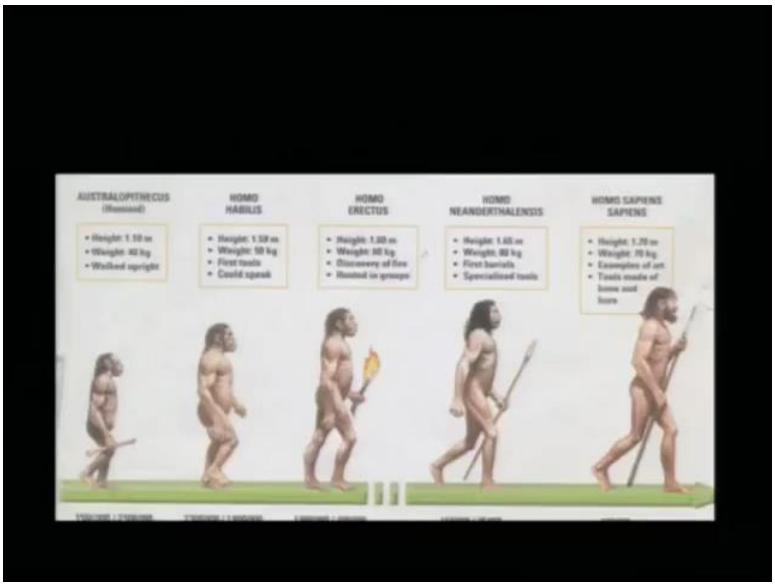

There was a point of time. In fact, when this almost 5 this species of homos will living Australopithecus, Chablis, erectus, neanderthalensis and homo sapiens, but somehow see the last one, homo sapiens it as survived, it means we have survived, it means you have survived, how and, in the survival we have become like, what we have become, why did not we may like chimpanzees or do chimpanzee have some behavior like us, the data shows; yes, this is a common gene pool and chimpanzee shares lot of genes with us, but we are different, we did not; we all like chimpanzees, all those some chimpanzees in some anthropology experiment have been trained to speak, they did pick up some words, there has been some behavioral similarity with human beings like sometimes group violence like sexual behavior, but human beings overall have crossed all those limitations and have proved to be more complex species over time.

Now, have we have become different, but we share the genes with other animals, so where do we strand in the whole nature, we just to mentioned by the way that; it is not a very charitable history, human beings have actually homo sapiens as known for group violence, and terminating some other species like we were still doing, here we have killed so many species, but somehow together we have survived. So, man is a social animal may not be a really sociologically statement, it may very well be a biologically statement and when we discovered; how the brain functions, you may you may actually we able to prove that it is.

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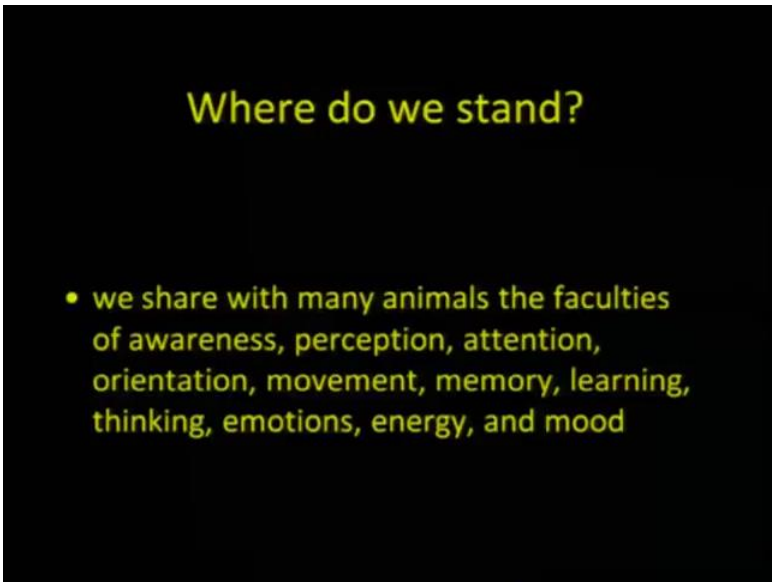

So, we look at it where do we stand, we share with many animals the faculties of awareness, perception, attention, orientation, movement, memory, you see all animals do this. They are aware of the surrounding, and when I am talking of awareness, I am not talking of consciousness in the philosophical science, they perceive things, they pay attention, and they orient themselves, movement, memory, and thinking. I have written here, but we really do not know, whether think, and if they think whether the think in words or language because nobody else is known to have the verbal word language like, we are known to have birds, have a language, they cooing sound; this is a very very complex sound which they can create.

Other animals are known to signal to each other by nonverbal movements or by verbal movements, but animals are known to have different energy levels and moods. So, what I would suggest you can close your eyes for a second.

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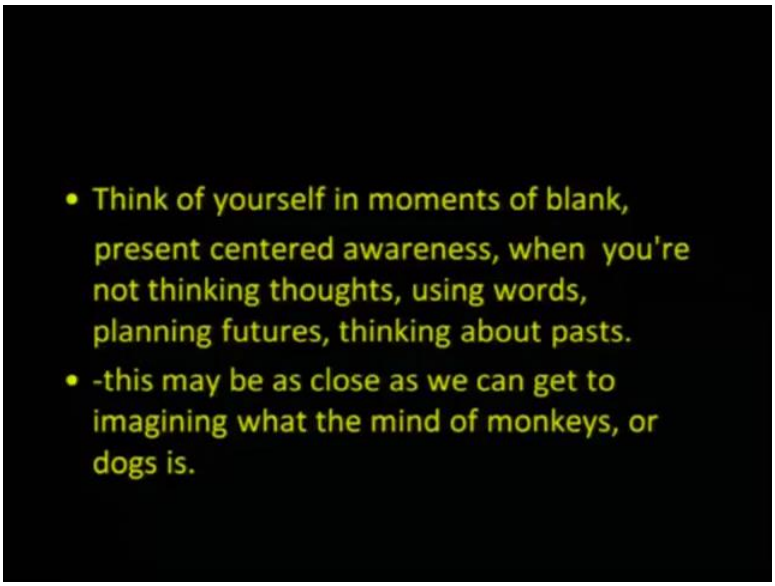

So, think of yourself, when you close your eyes and sit in the movement of blank, just focus on the present; when you are not thinking, you are not using words, you are not planning futures, you are not thinking about pasts. In that movement of blank, probably you may get as close to as mind of animal which is a word free mind; the images may come, you do not know whether they thinking images, they thinking images I lot of experimentation have prove, because there may be the pattern; which goes into their head house, otherwise they would not remember, dogs remember, other animals remember, elephants remember, probably with we do not know whether they have words which are going into their head and they not speaking or their images, which are going into their head to which they react, but if you stop word and thinking and conscious awareness of your plans and all that, you make had just glimpse of what it is all about.

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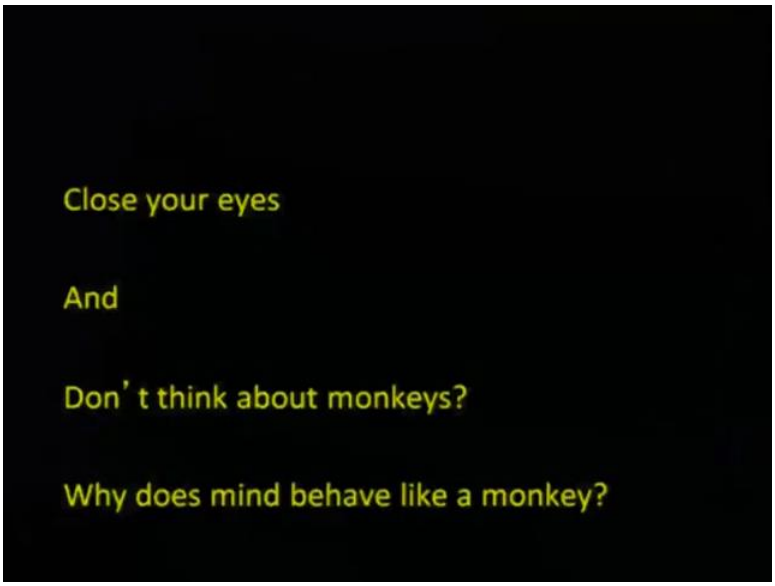

Now, if I ask you to close your eyes, and do not think about monkeys, right, just close your eyes and do not think about monkeys, what did you experience? I am sure, what would have happened for most people is, if I had not mention monkeys they would not have been any monkey in your head, but the movement I said monkey, some monkey would crop up in your head. Is it monkey which creeping into your head, or is the mind which is behaving like a monkey; now this is the million dollar question, with all the drama which happens in human life, why does your mind behave like it.

And also ask yourself another question, what quality has made you reach here, you all listening to this book course, you may be engineering student, or a doctor or somebody interest in brain, why did not your dog come here? What is made you survive in the competition against other humans? not all human beings have reach to a level to go and understand brain or make a rocket or make a bomb or some people are surviving at very basic of earning they bread and butter, but even that earning bread and butter is very complicated in life, that is the behavior.

If you widen this whole thing, what is made you reach to this human thing? is our brain the best, ok let me tell you some facts, our brain can hear sound between 20 to 20000 hertz, dogs can hear frequencies outside this, there are animals which can see further then u, their animals who can move in darkness, you have a guess you must be knowing how do the birds from Siberia come to lakes in India, or how does a bird go, birds mind

is already oriented like in a GPS system, with the a geomagnetic field and it moves in those geodesics and does not miss out.

Birds have memory, dogs have memory, fish the colors, you can ask; why does nature have to have so many things. So, there some animals have extreme qualities; when it comes to the sensory think, like hearing, like visualizing some animals are very very robust in mussel power land for that matter or elephant in size. So, there are animals who were larger than us, there are animals who were more assail than us ,there are animals who are more sensitive, if you see a solar eclipse, if you would have seen it that, even before the discharge becoming dog, the cows terms back and it start going their home, they would have sense that.

Animal have been used to sense earthquakes much before it is coming, but human beings have been restricted in these sensory motor capabilities, we have limited power, we have a limited range, where we can listen there is limited range, which we can see and. So, our brain as already done it, it has come with our posture change also, like we were on all force and human beings have really stood of direct; it as change the sexuality it as change the way of reproduction, it has change the way you look at it, animals which have on force and they have eyes on the site to scan the whole environment for the predictors, as we have stood up our eyes have coming to the front.

So our visual field is restricted than most animals, but something else has happened in the brain, what is happened is that was restricted, has been given like a new dimension of thought of abstract, thinking of, judgment of, exploration of being able to fiddle with nature and creativity. Creativity is a new thing, which has evolved in the human brain and its functioning it is also the complexity.

So, this is the broad background on where we are living, this whole need to understand brain, what I am not sure, whether animals is whether they are really bothered about understanding themselves or they though I do not think this sudden philosophies and why I am doing this or why I learn things why am I going to go and hunt and eat buffalo, I was to eat when feels hungry it satiates itself and then it will not do it, human beings have developed new style of living, like human beings do not live alone, there were hunters, from that hunter, they got fire, they develop tools, then they started hunting, then they started living together made family produce kids, develop farming lands, then they

created villages, cities, town and the whole comport of life. We also started hording, we also started bothering about future, and we also started putting in efforts to store food, to money, to makes security. Animals also do this if you look closely, but they do it in a need based and almost in tandem with nature, which season the beeriest to high bred, it feels need to go and eat and store.

Lion will hunt, take food, as long as long as tummy food full it will not get out, birds make their nests, pigeons let me give; I mean it is all entertained, if you think it all separate not that, pigeons have huge memory of patterns, huge memory, and them they can store some something into 75, 100 or that type of patterns, no wonder pigeons come and make their nests, on the7th floor and 8th floor of apartment, who knows there was a tree there.

So, that pattern is already established. So, that movement, but this all entwined with the electromagnetic, geomagnetic field of the earth, seasonal variation, temperature variation, animals get into sexual activity only, when there is extra cycle ,when there is a homology change within the body, human beings somehow, the way they have evolved and it is a brain which has evolved like this, has somehow separated themselves from this conditioning of nature, they are still with nature, they have their rhythm and all which will discussed towards the last lectures; when we try to discover sleep, but human beings have largely they have freed themselves and. So, they have a capability to folk the nature and decide what they want to do this decision making, this will the conscious, will the attention. The whole array of human activity; which has given some control over life that is typically human.

So, will try to explore this, because this all comes from this thing which is closed within brescal called brain; the 1 point 3 kg of pink substance, now the way I have devise the lecture, they have not categorically separated them, all that some point it may be there, so one lecture will telescope into another and with the time limitation will try to separate them. So do not bother, if there is no clear beginning and clear end, because I want you to do and what I wish to tell you; is the way it as grow, on the way it is evolved, which some history magazine.

So, it will keep going telescoping into one another, but will try to make a continuity, we can always flip on and off there may be some repetitiveness and overlay with other

things, but do not bother about it too much and hopefully little bit clear to you. So, keep this general background in mind, and then if you will see how the whole things functions and try to keep correlating with the general questions which will help you orient.

Thank you I will see you in the next lecture with more specific thing about brain.

Thank you.