

Social Behavior and the Brain: An Introduction to Social Neuroscience

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Week - 01

Lecture - 01

Hello and welcome to the first lecture of the course Social Behaviour in the Brain and Introduction to Social Neuroscience. I am Dr. Ark Verma, an Associate Professor at the Department of Cognitive Science in IIT Kanpur. Now in this week, we will spend some time understanding the representation of self and others in our brain. but before we go there let me give you a very brief overview of this discipline that we call social neuroscience and the course is going to be an introduction of that now what is it that we aim to study in this course what are we actually after because a lot of you would be wondering that there is already a field neuroscience there is already sub fields called cognitive neuroscience which are focusing on the mental functions and the neural basis of those and then there is also a field called social psychology which studies in detail the social processes how do individuals interact in social environments how do they interact in the presence of others and also influences of the society on themselves and so on so what is it that social neuroscience brings to the table and why should me and you worry about or care about social neuroscience at all let us start with the most basic thing that we can do the term social neuroscience can be divided or you know read as sum of two parts social and neuroscience what do each of these terms imply now the social term implies to the world around us all right it starts from your immediate family and extends to even the most distant influences that may happen on individuals for example It could extend to your teachers, your friends, it could extend to let us say influential members in your colony, in your society, in the country. And for example, nowadays what is very interesting to see is that there is a lot of social influences on individuals from news, from broadcast, from social media, from our OTT platforms and so on.

What is it in this social world that influences human behavior and how does it do so? Also interestingly if you will see I am saying that you know these influences operate not only in geography that you know people are influenced people in India can be influenced by people living in the United States of America or Australia or New Zealand or you know even far off places. So these influences do not only operate across geography but also timelines and also history. For example, a lot of us might have idols or might have people that we follow that are not present in this world anymore. People from 50 years ago or 100 years ago or 500 years ago.

For example, a lot of us might, you know, idolize leaders, you know, who are participating in the freedom struggle of the country. A lot of us might idolize, you know,

religious figures who have been here way before that we are in this current time. So, all of these things together form our social world and our social world places influences on us that determine or let us say highly you know define how we are going to behave. For example, our moral codes may sometimes be derived from religion and religious figures and their doings and their teachings. Our social behavioral code or say for example our ideologies may be defined by people who have been on this earth just few years before us.

For example, political leaders that have been involved in the freedom struggle, political leaders of the world and so on. And interestingly, our... the way we behave, the way we perceive and think about the world can also be influenced by very immediate influences like, you know, your siblings, you know, your brother or your sister or your mother or your father or for example, you know, people that you see in the movies every day, people you see on the social media, on YouTube or Instagram and so on.

So, social world is a rather complicated but it's a rather pervasive world all around us. I don't know if it would be hyperbolic to say that the social world is basically something that has a huge role in how we grow up as individuals and previous psychologists have actually talked about that. People have you know like Carl Jung have talked about the fact that our behavior in the current times is not only you know determined by our immediate mental and physical states but also as an outcome of evolutionary states. For example, the archetypes that Carl Jung talked about. So, one of the things that we would be trying to do in this course, and I don't think that we will be going down the evolutionary line a lot, but one of the things that we will be trying to do in this course is to try and understand the influence of the social world on the behavior of the individual.

Remember cognitive psychology or cognitive science predominantly talks about the antecedents of individual behavior and the basis of that the neural basis of that but if you sort of you know take a step back and try and examine this individual behavior also does not happen in isolation yes you can think or you can study and investigate a person's individual thinking their thoughts their emotions experiences their decision making but if you really sort of want to understand the antecedents of these things you will understand that these are derived from a lot of social influences So, I don't know but I feel like the fact that understanding individual behavior cannot be complete unless we also understand how this individual behavior is moderated by our social circumstances. A very interesting example comes to mind from the 1970s is when psychologist started viewing you know, people's behavior through cultural lenses. For example, for the longest time, the people of the West have been called an individual society, whereas people of the East have been called as having, as members of what is called a collectivist society. The individualistic society places different kinds of demands and different kinds of expectations of the individuals and they sort of, you know, turn out to be living the ideals of individual freedom, individual importance and so on to some extent. And the collectivistic society,

for example, teaches the young to grow up into individuals who care about not only their family but their society and are sometimes heavily influenced by them.

It is not that either of the two societies are exclusive of each other or the traits of collectivism are not found in individualistic societies and traits of individualism are not found in collectivistic societies. But why I am giving this example is to emphasize on the fact that the social world has always had a huge influence on individuals and any story that seeks to explain or understand this whole puzzle of human cognition cannot get around by ignoring or cannot get around by not understanding what or how the society or the social influences shape or moderate individual cognitions. So that is where social is and we will keep talking about this as we go ahead. But then this other term is neuroscience. Now I am sure everybody understands what neuroscience is all about.

Neuroscience is about understanding the neural basis, the brain basis of human behaviour. Now you could ask why is it that we need to study neuroscience or social neuroscience separately than cognitive neuroscience because whatever might be happening say for example things like learning, perception, action, memory, motor behavior, language and so on whatever we study in cognitive neuroscience. is also already very well understood and there is a lot of research going on in those areas. So what extra are we going to learn in social neuroscience? Now this basically comes from the fact that our focus in social neuroscience is slightly different. in social neuroscience we are mainly concerned with the neural basis of what we call social behavior or the neural basis of how individuals behave in presence of others or under the influence of others around us as i have defined this so the social influence or the span of influence can start from uh you know your immediate caregivers your family your parents your siblings, your grandparents and it is sort of you know starts expanding to your relatives to people living in in your vicinity people living in the state, in the city, in the country and so on.

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00 : 08 : 46 : 193 basis of what we call social behavior or the neural basis of how

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So, social neuroscience is basically going to be a field that is going to understand and investigate and find out the neural basis of social behavior. What else is there? Now, this term social neuroscience was actually coined by social psychologists to combine different strands of research aimed at understanding the neural aspects of social psychological processes. What are these social psychological processes, if I may ask? Now, there are several examples of social psychological processes. For example, our attitudes towards others. For example, there are several social issues that are going on.

For example, a lot of people feel very strongly about being vegetarian or non-vegetarian or vegan. There are a lot of people who feel very strongly about climate change and how the world needs to respond to it. And our attitudes towards these things are shaped by social influences, are shaped by whatever we read, what kind of information we have access to and also partly how we feel responsible or not about these things. Interestingly, so attitudes is one but then there is also things relatively more personal to us like this phenomenon of impression formation. Impression formation is basically when you meet a person for the first time, what is the impression you gain of them, what do you sort of infer about their personality, their attitudes and so on.

Attitudes towards us, impression formation, why and how we get attracted to others, what are the things in the society that tempt us, all of these things broadly come under this definition of social behavior. But social behavior can also be looked at from the angle of how we view ourselves. So where does social actually start? It is interesting that the study of social psychology or social behavior actually starts from how do we understand ourselves, how do we view ourselves. It is interesting because this is a question that is not

new and this is a question that several people have asked for centuries, not only people who are engaged in academia or academic pursuit of knowledge, but also people from different kinds of religious perspectives, philosophical perspectives and so on. So social neuroscience or the subject of social neuroscience can start from how we view ourselves to how we view others and also to the fact that how do we behave personally when others are close by in social settings and as compared to how do we behave when we are alone.


Remember, even when we are alone, it is not that the social influences are not acting on us. So these are these three or four things that I would like you to remember and understand and analyze every time we come across an experiment or an example, view this with a perspective of how do we view ourselves, how do we view others, how do we behave when we are alone and contrast that with how do we behave when others are around us in a social setting. Now, this field, the field of social neuroscience has been picking up recently with advancement in methodologies available now to the researchers that were not available few years ago. For example, Harman Jones and Inslecht in their book talk about the fact that social neuroscience basically seeks to examine how the nervous system, both central and peripheral nervous system, the endocrine system and the immune systems are involved and bring about these social psychological processes, some of which I was just mentioning to you. All in all if you sort of you know try to bring everything together social neuroscience seems to be an integrative or an interdisciplinary field that wants to investigate and understand the underlying mechanisms for social behavior utilizing a mix of experimental and social approaches.

Now, something that is very interesting about psychology or behavioral sciences is that they derive a lot from the kind of methods they are inclined to use. Social psychology for the longest time has used qualitative methods slightly different from the ones that we use in our lab, but equally effective at uncovering different strands of knowledge. For example, correlational methods, ethnography, surveys, and other kinds of qualitative studies. But the interesting part here is social neuroscientists on this other hand are actually inclined to use not only these methods but also get out and you know try and stimulate some of these social processes in the lab. So they are also keen on using the methods established by experimental psychology or cognitive psychology where you are actually typically doing you know computer based experiments, reaction time experiments, experiments that involve eye tracking, experiments that involve you know neuroimaging and so on.

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So it is a field that has at its disposal not only qualitative methods that allow for you know wider understanding of social psychological processes but also processes that you know are keen or say for example are suitable to measuring things in the lab. Also, you know, the social neuroscientists have at their disposal a bunch of new technologies that is available now that was not available years earlier. So there is an entire field called social neuroscience which basically talks about processes related to the self, brain imaging related to the self, how does an individual interact to other influences and so on. So social neuroscience is an integrative interdisciplinary field that has at its disposal both experimental and social approaches and has a much wider area under its cover, much wider area under its interest. So here is a brief, a very sort of superficial overview of what you might expect when we go through the other lectures of this course.

Now, where does social neuroscience come from? Is it a very recent phenomenon, something that we are seeing in the last three, four decades or something that has been around for the longest time? Now, interestingly, social neuroscience or this idea that biological or neural processes have a bearing on our social behavior is not something new. It is as old as the ideas about neuroscience or as old as the ideas about social behavior. For example, Erasistratus, a Greek physician, once measured the heartbeat of a young man in the presence of an attractive female to conclude that attraction or love and not a physical illness were the cause of this man's supposed illness where he was experiencing discomfort, raised heartbeats and palpitations etc. So it seems that indeed presence of others or the way we view them say for example as friends, as love interests or as enemies or if you are jealous of people, things like that, they actually have a bearing on our social states. Now take a moment and pause and look around yourself.

Suppose, you know, you are sitting in a room and let's say you're going to have a coffee at your favorite restaurant and somebody walks in who is your dear friend and you've been sort of meaning to meet them for the longest time. You know, does it not make you

happy? Does it not sort of allow you a degree of physiological arousal where you're happy, excited and you're trying to sort of, you know, go and say hello to this person? Now contrast this with you are in a place where you are going to have coffee and you are going to have some kind of relaxation and enjoyment and suddenly one person walks in the restaurant who you have bad memories with, who you have never had a good experience with and whom you have sort of been seeking to avoid all the time. Again, what does this do? It makes you feel bad, it makes you even physiologically nauseated at times. Sometimes if you really dislike a person and they come to you, you might feel nauseated as well. So yes, there are all of these evidences, anecdotal or not, all of these evidences that tell us that yes, social behavior or presence of others does moderate the way we experience and the way we think about this world.

Also, for example, in the middle of the 20th century in the United States, social psychological researchers started to rely on biophysiological responses to measure things like racially prejudiced attitudes in the white Americans towards the members of the colored community. Now, again, this is something that you would say that, okay, you know, how accurate these things are or say, for example, is it even possible to do this? But for example, if you are aware with biofeedback, if you are aware with say for example physiological responses, you would be aware that you know our neural states or the states of the nervous system actually change in response to stimulation. If you are nervous, if you are excited, if you are you know.

Pleasantly excited or surprised then the kind of skin conductance response you know that can be gauged will be slightly different from when you are really afraid or you know extremely angry or disgusted or envious and so on. So, these researchers around in the 20th century were faced with this problem of you know checking for you know who are these people who are sort of driving this racial hate towards the colored Americans. And they could actually measure and verify based on these biophysiological responses that yes, a person feels averted or experiences an aversive response when they come across members of the other community. Again, all of these things are always need to be interpreted with a pinch of salt, need to be interpreted within the whole context, but the point here is to just give you an example of the fact that yes social behavior determines or say for example social behavior has a bearing on how we experience the world, it has a bearing on our neural states, mental states and basically once you sort of connect the two, you are doing what is called social neuroscience. moving on say for example researchers have also relied on psychophysiological measures to investigate you know subconscious or unconscious mental processes and things that have been difficult to sort of measure through other methods you know sometimes overt responses are not you know very informative and in those cases psychophysiological measures like galvanic skin response and some of these others can actually tell us a little bit more about persons mental states

so all of these methods are available and are you know frequently used by people who call themselves social neuroscientists.

Now, one of the very interesting things here is that even some of the earliest findings in the neurosciences have been linked to, for example, how a damage or change in the condition of somebody's brain can lead to a change in their behavior towards the others. A very celebrated and a very well-known case for all students of neuroscience or cognitive neuroscience would be the case of this railroad worker, Phineas Gage. Now, Phineas Gage was a rather pleasant railroad worker who used to sort of, you know, is basically involved in the business of laying the railway tracks and one afternoon what happens is that he sort of, you know, fails to get away from a rig where they've placed dynamite to sort of clear the road and, you know, start laying a railway track. So, what happens is an iron rod, you know, enters through his cheek and goes through the ventral, you know, medial cortex, sort of it enters through his cheek and takes away the initial, the frontal part of his brain. Now, after this incident, interestingly, Phineas Gage's personality and his social behavior changed drastically.

A man who was once supposed to be, you know, pleasant, sort of held back, began, you know, uttering profanities in front of, you know, females in front of his friends and became more and more unpopular and, you know, cruel and, you know, all of those negative attributes started showing up. Before the accident he was perfectly fine. So what people would do is they could deduce the fact that the injury in whatever part of the brain that has happened is probably causing this drastic change in the brain. Later it was discovered that it was a part of the frontal cortex that is responsible for social personalities and it is that part of Phineas Gage's brain that was damaged and that led to this drastic personality change in Phineas Gage. Also, you might have heard about what is called the Kluver-Boussy syndrome and Kluver-Boussy in 1939 actually reported that if you remove the temporal lobe of the brain in the rhesus monkeys, it reduces their ability for emotional expressions and also changes their sexual behavior slightly.

So again, there is a lot of these evidences that are strewn around that tell us that yes, the brain is involved heavily in the social aspects of our behavior and that we need to understand and connect the two. Now, why am I offering this course, for example, and why are you enrolled in this course? Why is social neuroscience important? Why is there a lot of research in this field over the last 30, 40 years, and the research is rising and trying to answer all sorts of questions? Now, if you sort of look at this in this way, social neuroscience research can actually help us in resolving existing debates about different aspects of our social behavior or the foundations of our social behavior. Also, what social neuroscience affords you know as compared to say for example just social psychology or just neuroscience is that it is able to combine the methods and the paradigms of social you know psychology and cognitive neuroscience bring them together to allow for the measurement of brain activity as well as you know contingent to different aspects of our

social behavior. So, for example, if you are measuring attitudes, you are asking the about you know how people feel towards certain topics in some sense by surveys or by let us say even reaction time studies for example, you know if you are asking somebody to judge the attractiveness of a face and so on, you might be doing a bunch of these you know experiments, surveys and other things, would not it be interesting that you sort of you know are able to measure the person's brain states, neural states when these kind of behaviors are happening. So, social neuroscience affords us that this interdisciplinarity or the combining of the methods that allow us better to understand social behavior and its neural basis.

Also, social neuroscience research can also tell us about the important variables in social psychological behavior and things that we would otherwise typically ignore. So, yes I mean I cannot stress the importance of this you know that social neuroscience is a very important field and it is imperative for us to be able to understand the whole puzzle of cognition and it cannot be done unless we also understand how individuals behave in influence of others or in presence of others. Now you can ask, okay, has social neuroscience really contributed? Has it told us anything that we did not already know? And you can see that, yes, in the last few decades, there has been really a surge of social psychological studies that have utilized the methods from cognitive neuroscience to understand the neural underpinnings of social behavior. For instance, things about attribution, how do we attribute you know events or actions or you know happenings to other people. Say for example, very recently there was a pandemic and you know I am sure all of you sort of I hope you know all of you survived and your families survived and you know while it is passed, but there is a very interesting phenomena that was there.

You could see that a lot of people started making different kinds of attributions. They started blaming, you know, for example, the Chinese, for example, their eating habits, they started, you know, attributing it to, you know, different people, their hygienic habits, this, that and so on. people always need to find you know cause for something, people need to attribute for example events and actions to somebody, may be the attribution is not direct, may be the attribution is indirect, may be it is not 100 percent validated, but it is very interesting, it is very typical of us to sort of attribute events and happenings to others. Also, as I said earlier, impression formation. What do we think about the world? How do we think about other things? How do we think about other individuals? How do we think about, say, for example, different events? So, for example, what are your views about things like homosexuality or what are your views about environmental conservatism or what are your views about different kinds of political ideologies? What are the impressions that you form when you first meet an individual of a different ideology or a different race or religion and so on.

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00 : 25 : 29 : 448 Also, as I said earlier, impression formation.

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00 : 25 : 32 : 250 What do we think about the world?

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So social neuroscience actually allows us to study these things in much detail and also understand whether our brain and to what extent our brain and different areas in the brain are involved in this. Now remember we have evolved to be social animals. Humans have for the longest time been living in societies. So it is not so much to say that our brain must have involved taking in or accommodating those social influences also. So it will not be surprising if we find in the later studies, in the later chapters that there is a degree of dissociation between social cognition and non-social or individual personal cognition.

Again, these are a lot of terms which might confuse you, but I am sure as we go ahead and as we keep doing these different lectures, a bunch of these things will dawn upon you and it should make you sort of think and understand why the studying of social neuroscience is important. Now, finally, what kind of insights have come from combining neuroscience with social psychology in social neuroscience? For example, just look at this. It has been observed that aspects of social cognition actually elicit a different pattern of neural activity than those elicited by non-social cognition in the brain. What is non-social cognition? What is social cognition? Let me be very honest and tell you that these are terms or abstractions that are there for trying to tease these things apart or basically for the reason of conceptual understanding. The human brain is involved in everything we do.

It is involved in things that we do personally, thoughts that we have personally, but is also involved in everything that we do involving others. So broadly, it is not that certain areas of the brain will only respond to social stimuli or presence of others. socially and certain other areas of the brain will only and exclusively involved to involved with or respond to personal issues it is not like that but understanding of this fact is very important that if is that there are certain aspects of our social behavior that do involve areas of the brain may be differently to you know other areas or different to a different extent than the areas of the brain that are involved in individual behavior or having our

personal thoughts, emotions, expressions and so on. So it is very important for us to note that there is a certain degree of dissociation or difference that people have found in neural activity when it comes to comparing social cognition and non-social cognition. It implies very simply that mental operations that are behind or leads to social behavior are not simply just adding on top of the general cognitive process like perception, learning, memory and so on, but they actually depend on another set of processes that are specialized for social thought, that are specialized for let us say attribution, that are specialized for impression formation, that are specialized for let us say deeming people as members of their in group versus members of their out group.

So, social behavior is something that is very, very, you know, pervasive. It forms a large proportion of what we do and it only, you know, is logical that the areas of the brain that are involved in making these social judgments, say for example, how do you decide somebody is a cheater or somebody is an honest person? How do you decide if it is upon you? you know to let's say forgive somebody or to welcome somebody into your closer group what are those calculations that people do how do you evaluate people oh this person is worthy of being my close friend how do you choose you know your girlfriends or boyfriends or husbands or wives In India, we have always had this societal arrangement of having arranged marriages and our parents and our relatives will choose mates for us. But it has been changing and people are constantly evaluating their mates or live-in partners or girlfriends or boyfriends. What are the calculations that these people are doing? And do these calculations actually rest somewhere in the brain? Is there a specific area in the brain that you take these social problems to and it tells you, oh, I should forgive my girlfriend or boyfriend for a particular mistake or I should not forgive them and I should trust this person or not trust this person? So again remember that while obviously having an understanding of how our cognitive processes work is very very important, it is also equally important to understand how our cognitive processes evaluate our social decisions, our social world and our social circumstances. Another very interesting thing that comes from the contribution of social neuroscience is this idea of neuroimaging.

Now, neuroimaging work has allowed researchers to investigate the mechanisms that allow individuals to, for example, infer other people's mental states. You might be aware of this concept of theory of mind which allows children and adults from a very early age to infer other people's intentions. It is very, very important. Say for example, for an infant that this person sitting next to me is having a caring attitude towards me or is going to harm me. There is this is something that must be hardwired to preserve oneself and to protect oneself in presence of others so obviously at all points we need to be certain we need to continuously evaluate that okay let's say on a public transport you're sitting next to somebody you might be making these you know calculations unwittingly that oh who is this person what is his background or say for example you know is he going to help me

harm me something like that Obviously we don't have a lot of time these days because everybody is busy in their lives but it is absolutely important for us to be able to evaluate when we are looking at a person when we are having a transactional communication with them.

Say for example you deal with all kinds of sales persons every day. You are constantly trying to figure out is this person going to dupe me. And again there is a very interesting phenomena that is going on say for example these social media these you know how serious these social media scams that are happening people will call you from phone say oh you know a parcel has been discovered it has your name on it and there are illegal substances in it and you are calling and talking to that person. How is it that you are able to in some cases and not in other cases evaluate that this person is saying the truth or not saying the truth and just trying to scam me. So, there are these processes that you know we will try and study within social neuroscience that how do we do this, how do we navigate this very complex social world that we live in.

And finally, just moving on slightly from here, social neuroscience research has actually been able to establish that the areas of the brain responsible for social behavior have a privileged or a special status in the brain. And these areas are active also when the individual is at rest. For example, when we are having a quiet moment in calm and we are thinking about the world, it's very interesting that these areas also elicit activity at those points at a lot of times a large proportion of when we are even thinking to ourselves it might be about other individuals it might be about let us say your loved one it might be about a teacher for example the teacher scolded you in the classroom and you are wondering why did this person behave in that particular manner or it might be about other things for example you might be thinking about religious figures political figures figures from the film industry and so on So all of these things together basically tell us that yes social neuroscience research is very important, social neuroscience as a field is particularly important and there is a lot to learn from social neuroscience in the way of not only understanding ourselves but also understanding others and finally to a certain extent how do we navigate the social world. So that is all for this course, for this lecture. I will see you in the next class where we will start our discussion about understanding our self and so on. Thank you.