Human Behaviour
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Lecture - 13
Intelligence – I

Welcome friends to this 13th lecture on the series on Human Behaviour. Now, the course as I have explained in many previous lectures is looking at how to study human behaviour? So, the basic of human behaviour or the study of human behaviour can only be done through the science of psychology. And so what I have done up till now, the past 12th lectures is make you aware with the science of psychology, the very basic concepts, and the very basics methodologies, where psychology uses to study human behaviour.

Now, let me try to link all these material that we have done up till now, the past 12th lectures into how does it actually help in studying human behaviour. So, we will take a quick look back on to what we have done up till now. And we will introduce a new topic a very interesting topic today, which is again one of the basics of studying human behaviour.

So, we started off our discussion by looking at the basics of the science of psychology. Before, we start using any science to study human behaviour, we should know its basic, we should know its concepts. So, what I explain to you in terms of what is behaviour is that behaviour is the reaction and we had a good discussion on the 1st lecture of why we should be studying human behaviour and what is human behaviour for that matter.

So, we started off by looking at the basics of the science of psychology, we started off defining the historical routes of what psychology is defining psychology in itself. And looking at the other schools of psychology, the various view points of psychology, which is used to study human behaviour. Then as a end of this we introduced to you some of the methodologies that we used in studying human behaviour. So, we introduced the idea of experimentation, the idea of correlation, the idea of observation and so many other ideas the methodologies of studying psychology. So, once we are acute; once we may acute with science, we started into the journey of studying human behaviour.

Now, every behaviour starts with stimulus or starts with an event an external event, now behavior's of course can also be generated because of an internal events. But, since the study of psychology mostly concerns with external or a good way to study psychology is to look at external events. So, in the next set of lectures, we started looking at those apparatus those processes and structures that humans have for encoding the physical stimulus, the physical world in the psychological element.

And there we did some work on sensation, defining what sensation is the parameters of any sensory system. For example, sensitivity and sensory coding, sensory coding as the process through which sensory stimulus is are encoded, then we looked at how human beings detect signals from the noisy environment that is external to it and that is internal to it.

So, two kind of noisy environments, external environment or the physical environment outside of human beings are always noisy. And in fact the human brain also plays a lot of noise, so we looked at the idea of signal detection theory. And after that we introduced model systems which is the eye and looked at how this model system functions in terms of sensory process. Now, once in understanding human behaviour, once we have detected or once we have witnessed an external event, this leads to us interpreting this event in the psychological domain and that is where the idea of perception came in. And so in perception, we looked at how the perceptual process really functions.

Now, perception is making meaning to what the sensory? Sensory systems are delivering to us. And so we looked at perceptual systems, we looked at two view points of the perceptual system to models of the perceptual system and we further looked at the five stages of the perception. Starting from attention to localization to recognition, then abstraction, and constancy, these processes actually help you in making meaning of any external stimuluses, which are coming to you to the sensory system.

Once we know that a certain event has happened in the external environment and we are able to encode and make meaning out of it. To the perceptual processes, we learn something from it right. So, we why do we learn or why do we keep these external stimuluses or these external information within us, so that at a later point of time, when we encounter these stimuluses or certain situations. We do not have to work over for generating the appropriate response.

And so for doing that a process which is called learning is required, and so then we started look looking at what is learning? So, we started off by defining two basic forms of learning. The first form being the non-associative form and the other being the associative form. So, we looked at simple learning's, which is learning like habituation and sensitization. Reflex learning where one item or one event, leads you to learning.

Then we looked at the associative forms of learning, which is associating many stimuluses or stimulus response and based on that acquiring knowledge. So, we looked at classical conditioning, we looked at instrumental conditioning and we looked at observation learning. So, this is basically the different kind of learning that we looked at and that we read in the chapter on learning and conditioning.

Now, once we have learned something, once we have gained knowledge from whatever perceptual interpretation, the perceptual system has made. And this knowledge has been learned or this knowledge has been acquired, they need to be stored somewhere and that is where we started dealing with the idea of memory. Memory is a system which acts not only encodes the information, but it stores and it also helps in (Refer Time: 07:21).

Recalling this information later point of time to decide, which is the best response to a particular event stimulus or situation. Memory then we looked at the idea of memory from two informational viewpoints or that king Stephen the neural network model. And there we also focused on the idea of what is long term memory the what is working memory and how does long term memory and working memory, they talk to each other.

What kind of information can be stored in working memory and in the long term memory and what kind of the memory systems are there, for example we have the declarative and the postules systems. One system which we can access and other system which we cannot access and so different kinds of memories or different kind of stores and different kinds of information which is stored? We also looked at several factors which decide, how information rules stored, which information will be stored, how it will be forgotten, where it will be forgotten, and that kind of thing?

Now, once we store the information, which is learned in our memory systems, in our human brain, we need to exchange this system or exchange this information between people, because one of the ways that is what that is where we divided between memory

and higher cognitions. So, memory is a lower cognition process, sometimes considered a higher cognitive process. So, we separated from there in our lecture series.

So, then we started looking at higher cognitive processes. So, once we have information within us in memory, we need to express this information or we need to communicate this information through our behaviour. And so one is non-verbal, the other is verbal. So, basically when two beings talk to each other or person behaves in a certain manner, he communicate certain ideas.

And so we looked at the next section looks at what is communication and what is language? So, we focused on the idea of what is language and so we focused on written language, we focused on the difference between communication and the language. And in focused on the basic idea of the English language, so what it what it comprises of and that kind of a thing.

So, we looked at what is the basics speech sound and then how these formed to combined together to form the word and then from there the sentences and how it is communicate a sentences are communicated and what how is meaning generated, and whether language is in it or is it learned and can animals also learn language? So that is what we did.

And further to that once we have language, this language actually represents information. So, how does this information stored also, whenever we have some information within us or processed by the brain, we need to act on this information. And one of the ways in which we act is something called thinking. So, we then looked at something called thought process of what is thinking. And so we looked at two basic type of thinking language of the mind or language of the thought, the propositional thought, and the idea of the imaginal thought.

And that is what we did in the last lecture; we looked at what is propositional thought, what is imaginal thought? Within the propositional thought, we looked at what are concepts, because concepts defined propositional thoughts. And what is a process of classification, then we looked at what is reasoning. So, reasoning is how we think, so thinking involves some kind of a reasoning.

So, many arguments and a conclusion when these come together and when we start thinking on them or we start reasoning why a certain event, we start giving reason to why certain events happen or we start thinking about, when we should act in a certain, when we should not act in a certain way. The very process of thinking involves reasoning. So, we looked at in deductive reasoning and we looked at the idea of inductive reasoning.

Then we moved on to the idea of imaginal thought, how the non-propositional thought, but the imaginal thought also access in thinking. And further to it look at the idea of problem solving. Because, once we have language and once we have thought process, this thought process is implied or it is used to solve problems. What is problem? A problem is basically situation which you cannot solve. So, human beings behave, and they do not behave in a very mechanistic manner, they think before behaving.

So, human beings behave in certain manner, and they learn that some behaviours will reward, and some behaviours may not reward. But, even situation like previous situation occurs, but it is not similar to the previous situation in some ways human beings need to think and solve a problem into how we should be behaving in certain ways or what kind of behaviour will be showing to certain stimuli, whether in the it is in the external world or the internal world and solve problems which the environments presents to us, so this is what we did up till now.

Another interesting thing that we are going to do today is something called intelligence. Now, this is very important psychological ability and is been much talked about. So, before we start, let us look at what is intelligence? And what will do in today's lecture is I will I will try and an explain to you what is intelligence and look at some of the basic theories.

And maybe then afterwards, what I will do is I will introduce to you how intelligence is measured, and take up a model system which is emotional intelligence, and explain to you what it is all about. So, let us start with a story. When I used to go to school, I had a friend who was very intelligent, and he used to beat me in everything. I used to call him super intelligent x, y, z, I will not name him, because there is no way to it is not good to name someone right.

And so this person where who was working with me or who was in my class used to be brilliant, now be it academics, be it sports, be it anything, he would beat me and I it

would wonder and I would wonder or friends of my would wonder, how is it that he is able to beat me in so many things. Look at anything good in marks, good in sports, teachers favorite, parents favorite and all kind of things. So, he is good with everything right. And I used to wonder always that this person would be the best from my school and he would he would do good in life and some day he will be the most intelligent person, because we would call him the brainier or the most intelligent person. So, intelligent here is what we would call him.

Now, years has passed, and so I started doing, what I did I finished my doctorate degree, post-doctoral degree and then joined my job. And then years after like three or four summers before, I went to my hometown from where I belong. And I suddenly or out of some curiosity, I not even in actually curiosity, I was doing some shopping.

So, I went into a mall and in this mall I saw shoe store which was a very good shoe store, and unfortunately I liked a particular pair of shoes revealing that right, so not of shopper that way. But, then I liked this pair of shoes and I decided I buy this pair of shoes. And so I went into the shoe store and then suddenly I saw the shoe clerk and he vaguely seem to be familiar to me. I did not remember him after so many years, but he remembered me, and he said oh you are so and so and so and so we used to study and it was like a shock to me. This is the same person, I studied with.

And so here is what he is doing in a shoe shop? I always thought that he was so brilliant, he would go become a professor somewhere may be Hayward Stanford Princeton now at a where very good in academics, very good in everything. And so I thought that, he would do good things in life, he would become very popular in life. And so he was not doing anything, he was in a shoe store. Now, I quickly when I talk to him, I quickly understood, where the problem was.

Although he was very intelligent what was happening is the conversation that were happening, it was not stable. This person was jumping from one conversation to another conversation, jumping between ideas not comprehending thoughts had his own mind, had his own thought processes, so he was not able to contemplate anything, he was not able to focus on anything.

And so when I took this shoe from the shop and went out I went out cursing myself telling myself that look, what has happened to intelligence. This is person was thus most

intelligent person and so this story actually tells you what intelligence is all about. Intelligence is not something which guarantees you success and achievement in life. Intelligence is a property so by the definition of it or by the idea that you have intelligence, you do not get guarantee that you will be a success. And so many intelligent persons are known to be failures in their life look at Albert Einstein look at a Sigmund Freud, look at any person for that matter they have been highly intelligent life.

Similar to this there is a story of Woodrow Wilson, who had been the 28th president of United States. And he started off as being the most intelligent person in his town. And so later on he joined he got very bad grades, he passed out somehow he joined Princeton and from there, he became what he became. So, he became a very popular writer first, and then won the election and within the world war 1 he took America to its success.

So, these are two stories basically actually tell you that intelligence is not something a property, which is which you are borned with first of all. And then even if your intelligent it guarantees you know success in life, it guarantee it does not guarantee you that you will be highly successful.

So, let us look at the definition of what intelligence is and let us start the psychological interpretation. Now, how it is related to studying human behaviour, because one of the things in human behaviour is always talked about we talked about its intelligence. So, let us look at what is intelligence. And how to study intelligence and what role should be we should be think intelligence has in terms of defining human behaviour.

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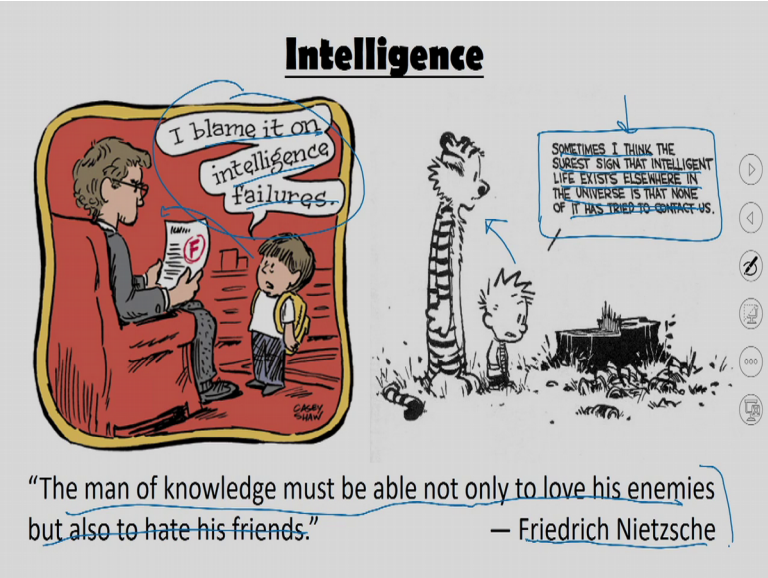

So, first let us start with a definition of what intelligence is and so I have some very nice frames here, which will talk you about intelligence. Let us look at this, now this small kid, who actually gets a f in his exam and he says that I blame it on intelligence failures. So, he says that see its not me who is failing it basically my intelligence. And so what he means is that the it comes out of the heredity, and so the father is stupid and so he stupid, then he is nothing do with him, he is nothing do with the fact that he actually did not study for the exam.

Look at the other one its Kelvin and Horbs from Kelvin and Horbs and so if you if you look at, it is very interesting it is says it is seems that, so Kelvin says to Horbs that sometimes I think the surest sign that intelligent life exists elsewhere in the universe is that that none of it has ever tried to contact us. And so this is another very funny way of looking at.

Intelligence so basically he says that we are unintelligent people in the very fact that they have not contacted us is shows intelligences. So, there are several definitions of it. And then I will have a code from Michael Nietzsche, Friedrich Nietzsche, who says that the man of knowledge must be able not only to love his enemies, but also to hate his friends and so that is what is intelligence the definition of intelligence?

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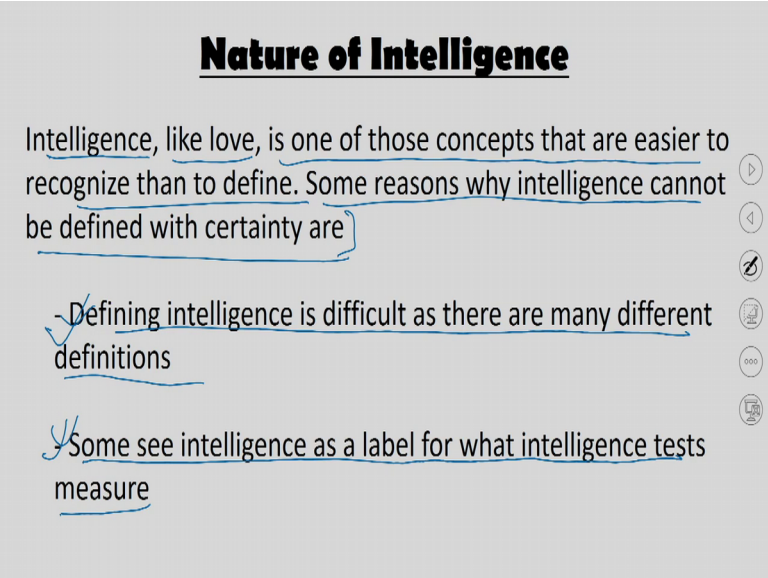

So, let us quickly look at what intelligence is the definition of what intelligence is all about? Now, it is said that intelligence, like love is one of those concepts that are easier to be recognized than to define. Just like love is a feeling that you have that that you can feel that you that you are aware of and that you can express, but you can never be sure of it.

Similarly, intelligence is a property that you can be aware of that you know that somebody processes, but then you can never be sure about it. And so there is no correct definition of intelligence, there is no way to actually define what is intelligent and what is an intelligent, which system is intelligent, and which system is not intelligent.

And let us look at why is this problem coming. So, some reasons why intelligence cannot be easily defined is with certainty are, so one of the reasons is that defining intelligence is difficult as there are many different definitions. So, what we will do is we look at some of the definitions of intelligence. So, there have been a some number of psychologies number of people, who have defined intelligence in different ways.

For example, the earliest definition of intelligence comes from Galten, who actually used the idea of Charles Darwin. And so he define intelligence as a property which is processed by people. So, some people are superior, borned superior. And he believed the doctors, engineers, they come from families, who are superior than other in then other families who are inferior. So, accountance and clerks are not borned in superior family.

And so when he did his testing, and so he believed that intelligence is in terms of how much the length of your head is or how much your perceptual ability is or how quickly visual acuity is how quickly your response time is and so he believes that these are the definitions of intelligence, but that that is stupid to look at. And so when he did his work, where he tested in a London conference around his time, he tested peoples some 1600 people, who were know who he believed to be intelligence. And none of the factors that he had any correlation or any kind of gave any kind of result similar to what he predicted.

So, basically what he predicted was not true. And so one reasons why intelligence is difficult to define is that they are many reasons of or many definitions of intelligence. Now, the second definition or the second reason why, intelligence cannot be defined is that some see intelligence as a label for what intelligence tests measure. So, on one end we have people defining different different ways in which intelligence is.

On the other hand some people believe that intelligence is what intelligence tests measure, but then you must be aware that they are the intelligence tests which actually measures, everything the whole intelligence of yours. People might be intelligent in academic sense or they may be stupid in some other field, people might be intelligent in social or connection in social world and they might be the unintelligent in academics, people will be highly creative, so they will be intelligent in creativity and may be stupid in some other things and so there are several definitions and so.

The idea that intelligent stress is what is intelligent is wrong, because there are different kind of intelligence test, you have an academic intelligence test, you have a intelligence test which measures your emotionality, there are spiritual intelligence test so on and so forth. So, if what is intelligence? Defines by intelligence test the definition is wrong.

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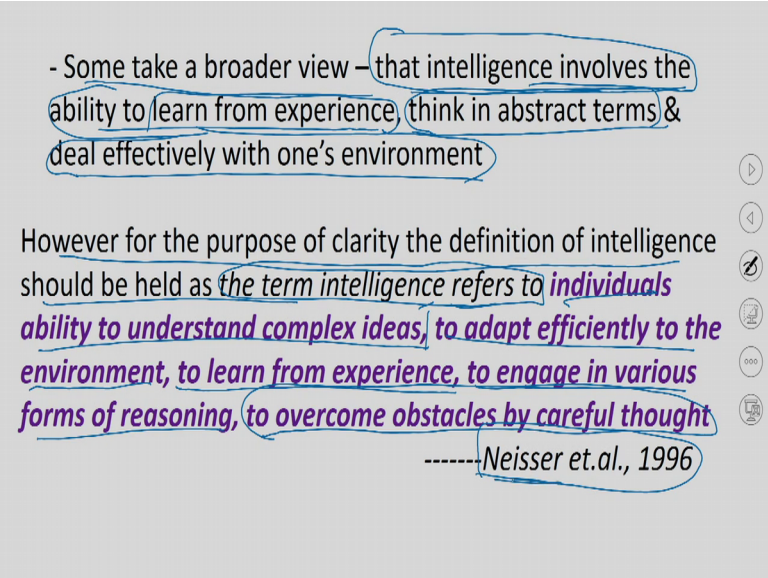

And then some take a broader view that intelligence involves the ability to learn from experience, think in abstract terms and deal effectively with one's environment. And this is the most suitable view of intelligence. And what it says that intelligence involves the ability to learn from experience. Intelligent are those people, who actually learn from the experience, who actually have the ability to see, where they have committed a mistake in their past and learn from them and use something called observation learning.

So, they observe their own behaviour, and see that which is not recorded or which is not rewarded in the one which was rewarded and selects the most optimal behaviour for any event or situation. Similarly, this people are also able to think in abstract terms, these people can think in think in abstract terms can think in abstract ways can create abstract meanings, they can tolerate the idea of uncertainty right. They can think in terms of in terms of things which do not exists.

And so they can do that kind of a thinking out of the box thinking and they can deal with effectively with one's environment. And so one of the other things is that whenever an environment changes or some environment near them changes, they are able to effectively deal with it.

So, once you change an environment from one environment to another, for example moving from school to college or moving from college to job, when you need to change this environment. So, moving out of house to the school, when you are doing all these,

then a change in environment is there. And so how effectively can you deal with it is what is intelligence?

So, let us look at a definition of intelligence then. However, for the purpose of clarity and the definition of intelligence should be held as the term intelligence refers to. So, then we have the final definition of intelligence and what is it individuals ability to understand complex ideas. Intelligence is how quickly can you understand complex ideas, if I give you a complex idea or if I give you complex term, if I give you something abstract a little abstract can you actually understand that; that is what is intelligence. So, can you is it that only you understand simple ideas or deal with simple structures or can you actually understand complex ideas.

Then to adapt effectively to environment, how quickly or how effectively can you deal with environment. For example, if you move from a so let us say that I am travelling from or I am travelling by flight and my flight gets delayed. Normally speaking, I have a very nice office or a very nice home and so when I am travelling, I get the chance of visiting an airport which has a lot of sound and I do not like too much sound. So, can I effectively deal with it is it that I will rush to a longue and sit there in the longue in a quite place, because I do not like too many people, I do not like too much sound and so my place is quite. So, can I effectively deal with it is what is intelligence can I effectively deal when I move from one environment to the other environment.

Also to learn from experience, how quickly can you learn from experience or can you learn from experience at all. So, whenever something has happened in the past or some event has happened, can you learn from it. So, let us say the any event a, b, c has happened and that has lead to several responses right in the past. So, can I actually learn from it saying that response one was the one, which gave me the maximum satisfaction. And then that is the most optimal and not response two and three, because as I said human beings give multiple responses to the same stimuli at different points of time. So, can I learn to select the best possible response to a particular the stimuli.

Also to engage in various forms of reasoning, can I reason another interesting thing in terms of intelligences can I reason; can I reason like why something has happened, can I reason why 2 plus 2 is 4 and 4 power 4 is 16 and 4 into 4 is also 16, 4 power 2 is always 16 right.

So, when I for example, can I reason why harmonic mean and arithmetic mean are two different things or geometric mean and harmonic mean are two different things, can I reason that can I reason why, something happens why that goes wrong or that kind of these are very simple reasoning, but complex reasoning can I do that. Can I reason why, I do not get the same treatment everywhere; can I reason that and that is that is another interesting thing to look at.

And also to overcome obstacles by careful thought, can I use thinking propositional and imaginal thought to overcome obstacles. Can I design equations, can I think of ways or can I imagine whole situation in a certain way, so that I can move out of obstacles or not get into obstacles, so that is what I can do, then it is what is called intelligence and that is the most premier definition or the most art definition which is given by Neisser. So, once we are done with the definition of intelligence, let us move forward.

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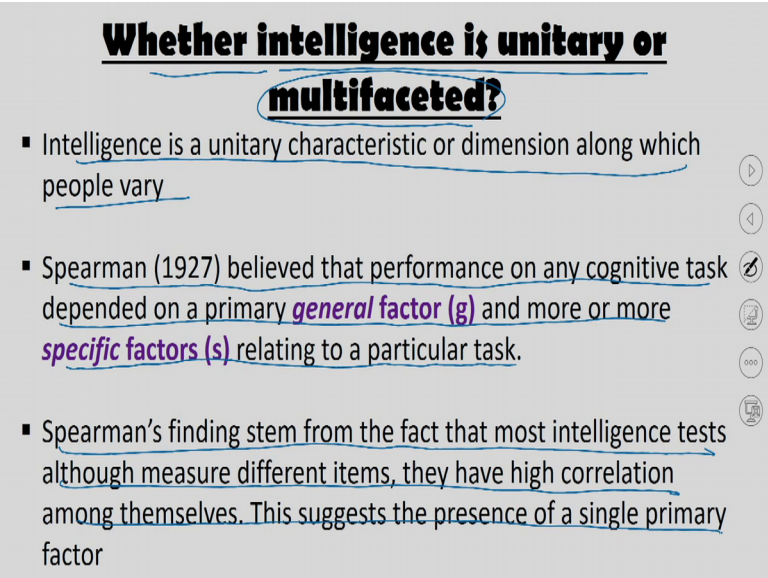

To the question that whether intelligence is a unitary or multifaceted. Now, there are two group of people; one group of people believed that intelligence is a unitary thing, and there is another group of people, who believed that intelligence is the multifaceted thing. Intelligence is just one property or one processing system is one group of people believe that and there are other group of people who actually believe that intelligence is a multiple factor thing or a multiple property system or system which has multiple processes into it.

So, let us look at that first of all. So, there are two ways the single view that intelligence is the single process and a single system process is or single process system rather is basically what is spearman's view. And Thurston believes on the other hand that is many system many processes actually comprises the idea of what is intelligence. So, is it intelligence a unitary characteristics or dimensions along which people vary.

The idea is that whether intelligence is just one characteristic on which people vary or is it that there are multiple dimensions on which people vary. So, intelligence could be composed of multiple facts. For example, intelligence is not just what intelligence, intelligence should be how quickly you speak, how quickly you read, how quickly you solve problems, how effectively you deal with environment is that what is intelligence or intelligence is just one particular thing saying that if you are intelligent, you will be doing good, you are not intelligent, you will be doing bad is that doing good or bad in anything is that what is intelligence.

And so let us look at what these things actually say. So, spearman 1927 believes that performance on any cognitive task depends on a primary general factor g and more or more specific factors relating to a particular task. Now, spearman's finding stem from the fact that most intelligence tests although measure different items, they have high correlation among themselves. And this suggests the presence of a single primary factor.

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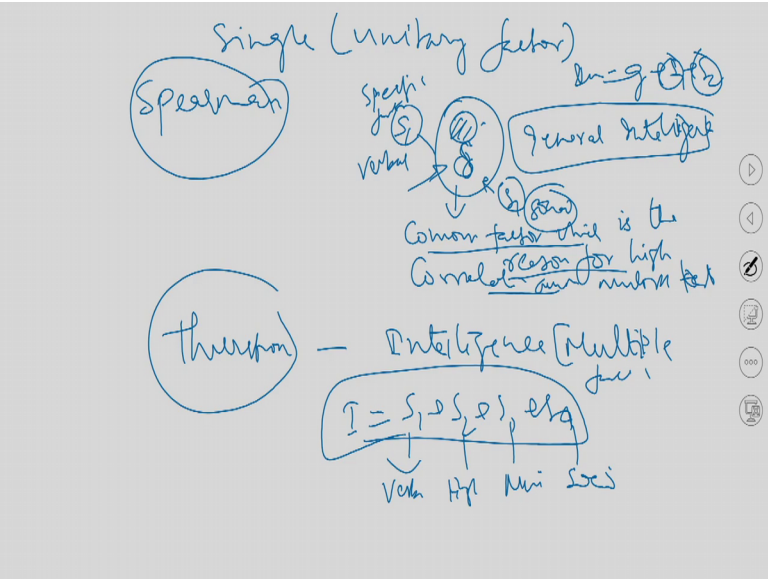

So, let us look at the single, the idea that intelligence is a single or unitary factor. And so the idea of spearman, what spearman believes is there is a single factor which is called g, and this is called the general intelligence. So, what spearman believes is that this g or general intelligence is what is present in most people and people have to be compared on basis of this general intelligence.

What is this general intelligence? This is something which is present in most people. And the variation of this the variation of this general intelligence or this system defines, if we are stupid or we are intelligence. And so he believes that intelligence is comprised of one unitary system or one system, which is called the general intelligence. And may be a couple of other systems, which are called the subsidiary systems which are specific factor.

For example, this could be the verbal factor of intelligence. So, intelligence is general intelligence one factor, and we could have a verbal factor, and may be a social factor. So, two more factors are there. And these S 1 and S 2 comprise with g, so intelligence is basically g plus S 1 plus S 2 or may be just S 1 right.

Now, how does the idea come that intelligence is just one factor one system and one process. Now, what spearman did was he looked at the idea that most intelligence test, if you take intelligence test for several things. For example, take intelligence academic intelligence test, then take creative intelligence test, then take intelligence test for performance, then take intelligence test for physical ability.

And take all these intelligence test and if you see the correlation among all the items, you will find that they correlate among themselves very highly. So, intelligence many intelligence test actually correlate among themselves very highly. And so he says that this correlation that they having among themselves. Because, if they are different factors if different intelligence tests measure different factors, then there should not be a correlation among themselves. But, then since there is a correlation among themselves, then there has to be unitary factor, there has to be a common factor which is causing this high correlations and that is what is said is g.

So, he says that g is that common factor, which is the reason for high correlations among multiple intelligence test. So, multiple intelligence test the high correlation among multiple intelligence tests represents that there is a g factor, so that is what spearman's

actually believe. And then there is the view of Thurston, who believes that intelligence is not just one specific factor, it is multiple factors. So, intelligence I is S 1 plus S 2 plus S 3 plus S 4, where S 1 could be my verbal intelligence, this could be my linguistic intelligence, this could be my intelligence in music or this could be intelligence in social skills and so on and so forth.

And so that is the difference, so Thurston idea and spearman idea. Spearman believes that there is one intelligence factor, which is called g and based on that people can be compared. And then this g factor is what is responsible for or what is the reason for your intelligence and then might be other some common S 1, S 2 specific factors which lead to intelligence. On the other hand, there is someone called Thurston, who believes that no it is not true, what happens is that there are multiple factors. And these multiple factors actually lead to the idea of intelligence.

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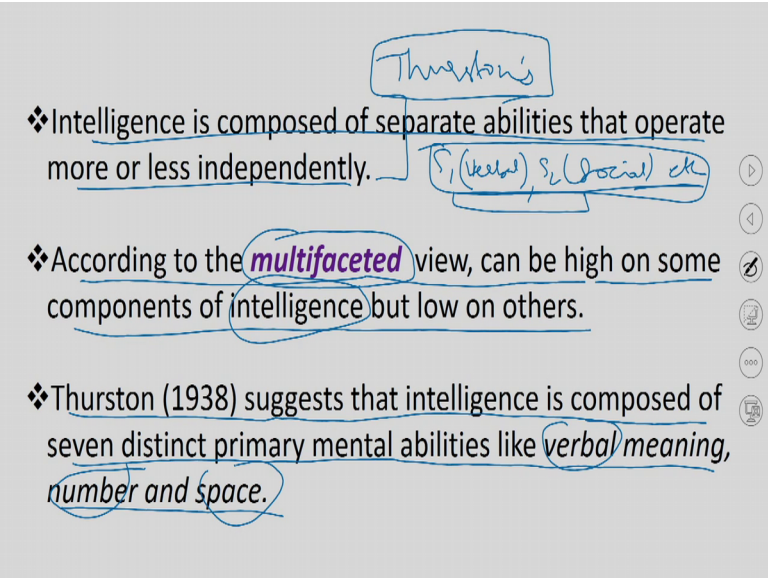

So, intelligence is composed of separate abilities that operate more or less independently, and that is what is Thurston's view? Thurston's believe that intelligence is abilities intelligence is composed a several abilities that operate independent of each other, so it could be S 1 for example for verbal, S 2 for your social skill and so on and so forth etcetera. So, different skills combined together to form your intelligence.

Now, according to the multifaceted view, intelligence can people can be high on some components of intelligence, but low on others. Now, if you look at the idea what

spearman said if you are high on g factor, then you will be high on other factors, because g is the one which is deciding a intelligence. But, the multifaceted view has a interesting view point, it says that it is it can be possible for people to be intelligence on some so for example some abilities and low on other abilities, for example look at academics.

Now, if you look at academicians, they are very good at verbal skill, they are very good at arithmetic skill and so on and so forth. But, when it comes to social skill, they are very bad at that. Look at the case of Albert Einstein and so he was very bad at social skills not a very good people or for that matter look at any academician, they are not very good in social. So, very high on academic ability, somehow predicts that you will be bad on social skills. And so this is this is what is feature, which is tolerated by the multifaceted group. And it believes that intelligence is it is composed of so many parts or so many systems combined together. One can be high on one component, and low on other component.

Thurston 1939 suggests that intelligence is composed of seven distinct primary mental abilities like verbal meaning, number and space. And so what Thurston says is as I told you the Thurston is one of the proponents of multiple intelligence theory. So, he believes that intelligence is composed of seven distinct primary types; one being the verbal meaning, the other being the number meaning and then space and so on and so forth. So, 7 different abilities, they combine together to form the idea of what is intelligence.

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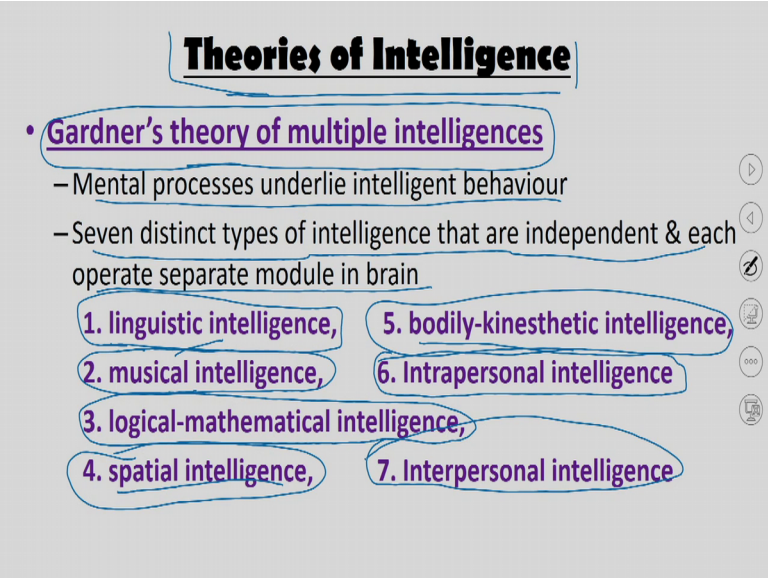

So, then let us start looking at some of the theories of intelligence. Now, one of the most primary theory of intelligence is called the Gardner's theory of multiple intelligence. And so what Gardner said is that intelligence he believes or he is stuck with the idea that intelligence is basically a multifaceted view, intelligence is a property which is composed of or intelligence is the system, which is composed of multiple components or multiple processes.

And so what Thurston believes is that mental processes underlie intelligent behaviour. Now, what he says is that intelligent behaviour, since it is defined by multiple processes or multiple mental processes. So, this different processes actually signify different components or different abilities and so, this different components or different processes, actually combined together to form intelligence. So, people can be good on one factor and people could be bad on one factor, and that is toleratable or that is tolerable.

So, he believes that there are seven distinct types of intelligence that are independent of each other, and operate in separate modules of the brain. What Thurston believes is that, the brain has 7 different modules. And people may have some other modules or may not have all the modules and then people have 7 distinct type of intelligence. All these intelligence types are actually independent of each other, they are not dependent. And they can be functioning as a separate module as separate developed module. And so what he says is that any person may have all of these modules or may not have some of the modules, but one of the module has to be in most people.

And so he defines the seven modules in terms of linguistic intelligence. So, the first type of intelligence, the Thurston defines is called the linguistic intelligence. And so what is linguistic intelligence, what Thurston says is that linguistic intelligence is that part of intelligence or that type of intelligence, which actually make you good in terms of verbal vocabulary, you are able to speak well, you are able to talk well, you are able to comprehend sentences well, you are able to write well, read well and that kind of a thing.

So, very good in writing, very good in reading and so women generally are tend to be having very high linguistic abilities. So, how nicely can you write, how good you are in your grammar, can you write complete sentences, can you write perfect sentences, can you talk effortlessly, do you feel afraid while talking. Now, how fluent you are in your talking, and so that comprises of the linguistic ability.

Then there is something called the musical intelligence. People with musical intelligence can find music anywhere, you might have seen friends of yours were they start drumming something; they start drumming a board, and creating music out of it. So, people who can hear music from any external environment or of any external thing on can see music in the world or can see music, where it does not exists or so musical that they can actually find music in the in the environmental sound. These people are musical intelligence. Say they are borned with a very sharp ear and very sharp idea of what is music.

Then there is a third type of intelligence, which is called the logical and mathematical intelligence. Now, these people are the same people, who are very logical talk to them, they will give you a reasoning for everything. They talk with logic, they are the same people if you if you talk to them or if you give them any kind of explanation, they will be returning arguments in terms of logic, they use some kind of a logic.

And these are the same people who are very good in mathematics, give them many number, give they can play with numbers, they can represent anything in numbers, they can manipulate numbers, they can come up with equations. And solve many problems using equations, they can use logic to predict uncertain environments, they can do all kind of things with numbers and with arguments and premises and draw conclusions out of it. And so very good in terms of reasoning in terms of providing arguments providing correct arguments or providing arguments of why should something be there, and why should not be something there and what kind of behaviour is appropriate when and so on and so forth.

Then people good in spatial intelligence, you might have a offence in a people offence of yours who actually never forget a space, which basically means that take them anywhere in the city or in your town any town. And show them the town once; they will never forget that town. And these people are known to be very good in spatial intelligence. What they do is they use something called the cognitive map and so what they do is store these spaces in the brain in such a way that it is easier for them to go back into space or they are very good with lefts and rights.

Now, most of us I have actual problems, when we talk about lefts and rights, so sometimes we say left, and we go right, and when we say right, we go left, so it is very

difficult to understand space. We ever tried reading a map, it is quite difficult, which says you are here and then there is some definition or when Google gives you some kind of a if you ever used maps, Google gives you some kind of a definition or some kind of an instruction.

So, how good are you in following those instructions. I do remember one of my recent journeys and I was in Viana. And so it actually Google gave me some instructions turn right from a particular signal, and go round about. And what happened is I actually followed, it is it is it is path. And a place that was very near to me, very right next to me, I took a very long distance following Google and following incorrectly Google, I rather I would say to reach at the place.

Whereas, the friend of mine who was accompanying me, she could reach the place much faster than me, because she was not she had a good spatial intelligence. So, for me it was very difficult, because I have to go about around about and come to the place. Rather had a friend of mine who was travelling, she was very fast in reaching the place, because this idea of spatial intelligence the idea of spaces or the idea of how you make a movements and spaces that is what was good with her and so she had a good spatial intelligence.

Similarly, there is something called the body bodily-kinesthetic intelligence. So, this is the same thing where people are able to know, what their body wants or how kinesthetic or what kind of function can be done or how push, you can do what kind of push you can give it to the body. So, sports person have very good bodily intelligence. These people are aware of the fact that what can be achieved with their body, what can be the achiever or what can how they can pull to the body to the extreme. So, these are the same people, who know their body well. Who know how what to eat? What kind of work to do? How it to be done? And so on and so forth. So, with the body actions they are very good.

Now, intrapersonal intelligence; intrapersonal intelligence is whether you understand yourself, so intrapersonal right. Intrapersonal is when we actually can talk to other people or how intelligent we are when talking to other, but talking to the self how good you are in knowing yourself, do you know who you are, do you know can you read yours bodily symptoms, can you read what your body is wanting, can you read what your mind is saying. So, how good you are or how aware you are in knowing yourself, and dealing with it, and taking care of yourself is what is intrapersonal intelligence?

How good you are in understanding yourself that comprises the interpersonal intelligence and then there is something called the interpersonal intelligence as I had defined. This is the ability to deal with other people, how good you are in dealing with other people. So, if there is a friend of your who is asking for your help, how good you are in talking to him and deciding, whether he needs help or not or how good you are in understanding social situations and defining social situations and that kind of a thing. So, how you good are you in doing these kind of things is what is the interpersonal intelligence.

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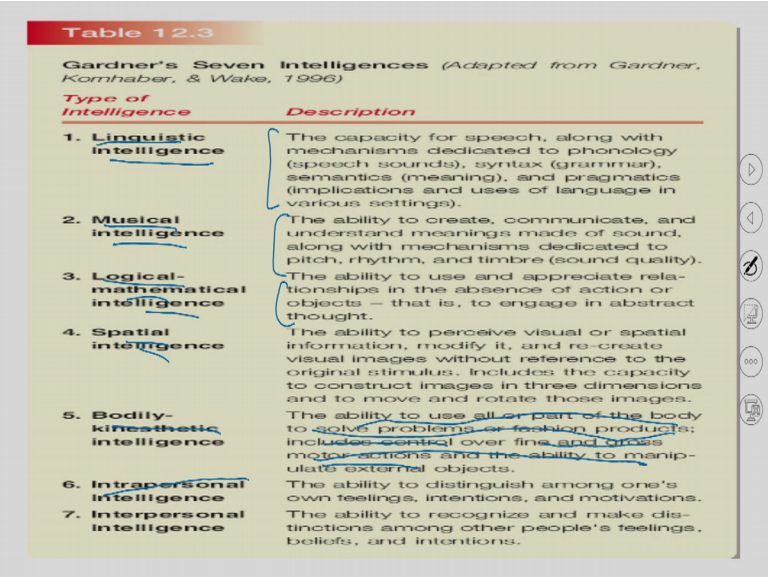

Table 12.3

Gardner's Seven Intelligences *(Adapted from Gardner, Kornhaber, & Wake, 1996)*

Type of Intelligence	Description
1. **Linguistic intelligence**	The capacity for speech, along with mechanisms dedicated to phonology (speech sounds), syntax (grammar), semantics (meaning), and pragmatics (implications and uses of language in various settings).
2. **Musical intelligence**	The ability to create, communicate, and understand meanings made of sound, along with mechanisms dedicated to pitch, rhythm, and timbre (sound quality).
3. **Logical-mathematical intelligence**	The ability to use and appreciate relationships in the absence of action or objects – that is, to engage in abstract thought.
4. **Spatial intelligence**	The ability to perceive visual or spatial information, modify it, and re-create visual images without reference to the original stimulus. Includes the capacity to construct images in three dimensions and to move and rotate those images.
5. **Bodily-kinesthetic intelligence**	The ability to use all or part of the body to solve problems or fashion products; includes control over fine and gross motor actions and the ability to manipulate external objects.
6. **Intrapersonal intelligence**	The ability to distinguish among one's own feelings, intentions, and motivations.
7. **Interpersonal intelligence**	The ability to recognize and make distinctions among other people's feelings, beliefs, and intentions.

So, these are the definition linguistic intelligence, this is the definition of linguistic intelligence. Then musical intelligence, then logical and mathematical intelligence, then spatial intelligence. Body-kinesthetic intelligence, the ability to use all parts of the body to solve problems of fashion products includes, for example fashion products which include control over the finer and gross motor actions, and the ability to manipulate or external objects. And then we have the intrapersonal intelligence, they distinguish among one's own feeling, and intentions and then there is interpersonal intelligence; this good idea to go through this table.

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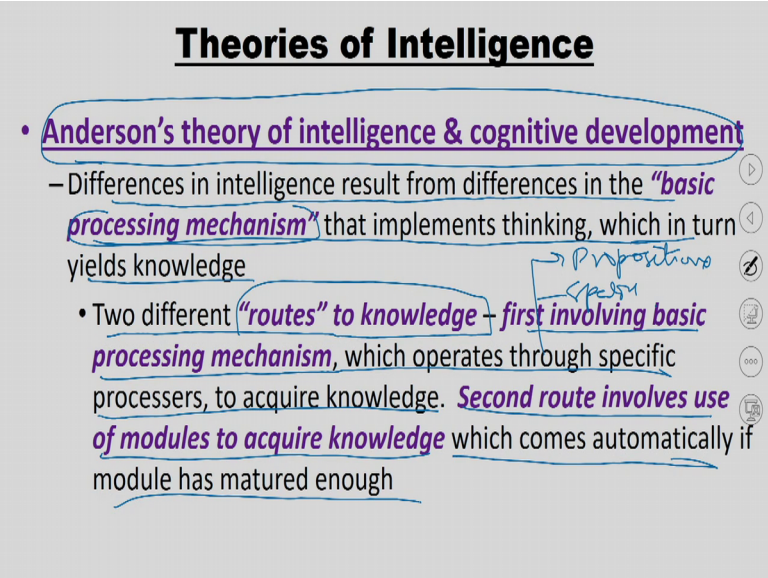

The next class of intelligence or the next definition of intelligence comes from the idea of the information processing theory. Now, we have dealt with information processing theory. And so what does information processing theory actually say is that there are stores and there are processes. So, these stores are where information is stored and there are processes active processes, which actually move objects from one store to another.

Also information processing theory suggests that there are three steps in information processing. The one step being encoding, where information is encoded in a particular manner; then it is stored somewhere at a storing system and then it is retrieved. And these three processes combine together with the idea of how information or what kind of information is stored and how they are moved from one store to another within the store. So, the idea that how information moves within the store and how information is encoded and retrieved this is what is the basic of information processing theory.

And so Anderson's theory is actually in extension of what is the information processing theory. So, Anderson's theory of intelligence and cognitive development. What does Anderson believe Paul Anderson believe, what is intelligence. Now, what Anderson believes is that the differences in intelligence released from differences in the basic processing mechanism that implement thinking, which in turn yields knowledge.

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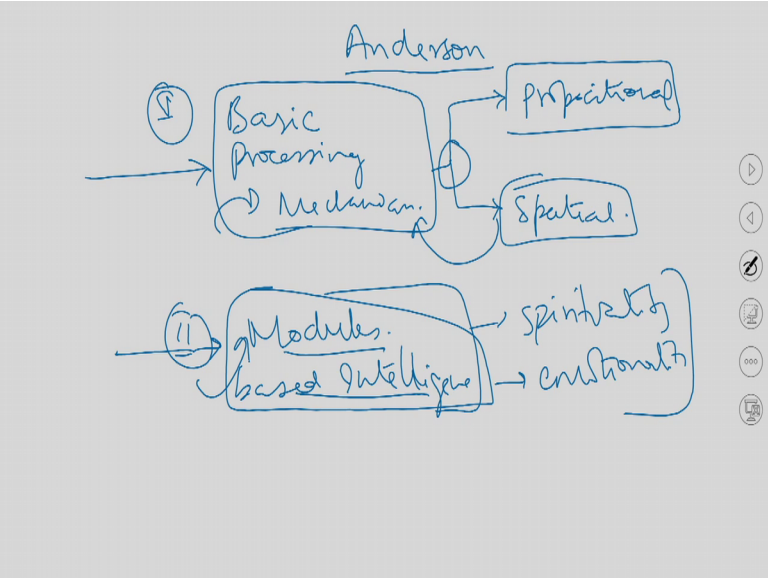

So, basically what Anderson believes is and so why I am doing this or detailing this is that. Anderson believes that intelligence is a two part process there are two types of intelligence two part intelligence. One is called intelligence through the basic processing mechanisms and the other is called module based intelligence.

Now, this basic processing mechanism is composed of two different processes the spatial process, and the propositional process and within the module. And so intelligence is what Anderson believes is intelligence is this part and this part is not generally called as intelligence. So, what Anderson believes is that intelligence is how easily or how fast, can you take in an information and operate on it. How quick you are in taking an information and understanding an information and operating with it.

The basic processing mechanisms of understanding any problem, take it any examination. For example, take the JEE or g mat or sat. The idea here is that it is the time mount test; it is the three hour test or the test that you will be taking after this course. Now, this is the three hour test and so it depends upon how quickly, you can actually see a question not only see the question, relate it from where this is section or which chapter it is coming from. And not only that can find out, what are the possible options which have been given and then can recognize which of the answer is correct, and which of the answer is not correct.

Now, the problem with multiple choice questions is that there are four answers right, and all of this answers compete with each other. One good of thing about multiple choice questions is that there is always a possibility of 25 percent chance that you are correct. But, given the fact that if you do not have negative markings, there is always a 25 percent chance that you will be right, because one of the answer is correct right.

But, the task here is to recognize is to find out which of the answers is correct, because all of them are competing. If the answers questions have been made in a good way, all of the answers work is competing. So, your job in a test like a 3 hour test is basically, depended on the basic processing mechanism. How quickly can you see the question, not only how quickly can you see the question can you find the relevant part of the question. A question may have so many things right.

But, what is the relevant part, what is the part that is actually of use can you pick that out. Once you can pick that out, can you actually use that part and find out an answer, find out from where in the test this question is coming from. And then find out all the possible answers and then be confident about what answers you have looked at that is called the basic processing mechanism. And that comprises of two things basic processing mechanism comprises a something called propositional system and the spatial system.

In propositional systems, the systems actually look at what kind of logic has given, what kind of argument, what kind of statements has been given and can be the statement verified or not, and that kind of problems. The other is spatial; so, looking at spaces, looking at diagrams, looking at certain two or three three-dimensional areas how quickly can you navigate from one place to another or how quickly mentally you can navigate or so questions like if somebody starts from point a goes 6 kilometer here to the left 3 kilometer to the right, then turns around to the right, left and that kind of a thing and how far he is that kind of questions are special questions.

So, can you actually mentally rotate yourself in certain ways, do spatial manipulations, and come up with answers. And so if you can then and if you can do that fast, because it is 3 hours test. So, the more faster you can solve problems like that the better you are in terms of basic processing mechanism, and the better your intelligences.

In addition to this what Anderson believe is there is something called module based intelligence. And what is module based intelligence; there are certain type of intelligence. So, given the fact that if most people are given enough time, they will be able to solve the question that you have solved. The reason being that they are not able to solve it time based, they are slow.

Now, certain kind of intelligence, for example intelligence in terms of emotionality, intelligence in terms of spirituality, how spiritually intelligent you are, how emotional intelligent you are or whether you are honest person, so honest in honest intelligent based on intelligence. These factors are not very fast honestly does not develop very fast. And so for honesty to develop, it requires some time.

And so these properties or these factors are dependent on certain modules in the brain, and it develops over a period of time, honestly does not develop very quickly. If I give you a question and solve it and you would not have you would not be honest, but you would be very good and quick in terms of dealing with mathematical properties, but not in terms of honesty not in terms of empathy. And these kind of factors or emotionality or spirituality, these things are something which develop over a period of time.

And they have they developed using something called module or they develop as a module. And so most people have module based intelligence, which is these kind of things for example spirituality or emotionality for that matter. All these factors are module dependent, and they develop over a period of time. So, intelligence according to Anderson is composed of this basic processing mechanism. But, then there is another kind of a intelligence which is called module based intelligence and people do not actually work on that.

So, what Anderson believes is the differences in intelligence between people results from differences in the basic processing mechanism that you were talking about that implements thinking which in turn yields to knowledge. So, how quickly can you think, how quickly you can do propositional manipulations, and spatial manipulations and come up with the answer.

Now, what Anderson believes is that there are two different routes to knowledge. So, knowledge is basically composed of two routes. The first involving the basic processing mechanism, which operates through specific processes to acquire knowledge. As I said

the basic processing mechanisms uses both the propositional process; the propositional process as well as the spatial process.

Now, the second route involves the use of modules to acquired knowledge, as I said this is time dependent developed with age. And so intelligence can also be module dependent which comes automatically, if module has matured enough. So, certain modules, for example the idea that how honest you are, the idea that how emotional you are or how spiritual you are, they develop with time, and they matured with time. And so people are not compared generally people are not compared on that particular intelligence type.

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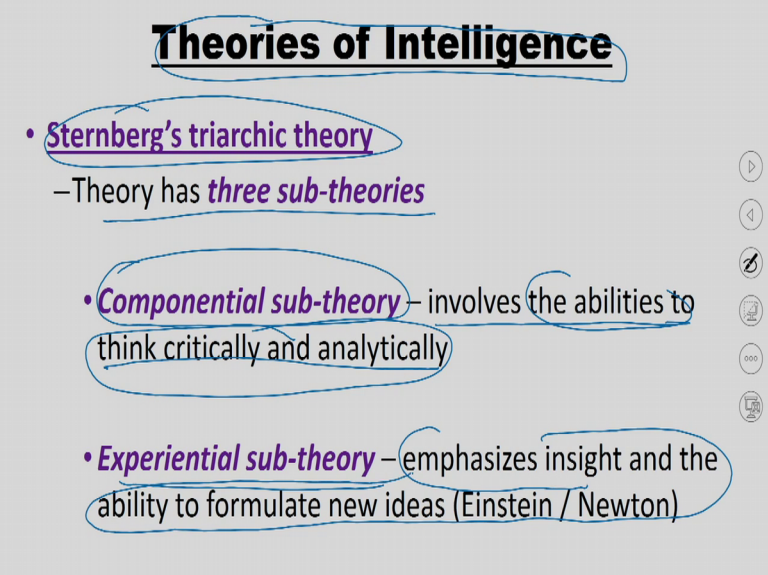

A third theory of intelligence is basically called Sternberg's theory of intelligence, it is called the triarchic theory. And the theory has three sub-theories. The idea that intelligence is not just the basic processing mechanism or whether it is just three systems interacting with each other. Sternberg believes that there are three types of intelligence or three sub-theories.

For example, one is called the componential sub type of intelligence, which involves the ability to think critically and analytically. Can we think critically, can we solve problems quickly, can we read our own feedbacks, how quickly can we solve problems, how quickly can we read our own feedbacks, how quickly can we do certain jobs? For example, if we are planning dinner for people, let us say I invite some friends to my home for dinner.

Now, for that purpose for achieving this dinner, I have to know certain facts and I have to calculate certain facts. So, how good I am in calculation, how much food should I make, how much food do I believe somebody will eat, what should I order, what is the environment. So, can I plan ahead in time, can I plan a what kind of food I will be ordering, can I do this kind of all these and so that that kind of thing is called componential intelligence or sub-theory, whether abilities to think critically and analytically is the core of it.

Then there is something called the experiential sub-theory. The experiential sub-theory emphasizes insights and the idea to formulate new ideas. Experiential sub-theory basically says that intelligence, some type of intelligence are experiential in nature, it comes with experience. For example, look at Einstein and Newton, these people had intelligence was the experiential type with experience the intelligence developed Einstein was the clerk.

And so if he had no experience or if he had not involved in the kind of work that he was doing, he could not have been intelligent. Assuming that intelligent Einstein became a clerk all his life and never studied physics would he have gave a theory of relativity. So, this kind of intelligence says that the more experience you have with the particular domain or a particular field or a particular science, the higher intelligent you would be and so this is called the experiential idea of intelligence.

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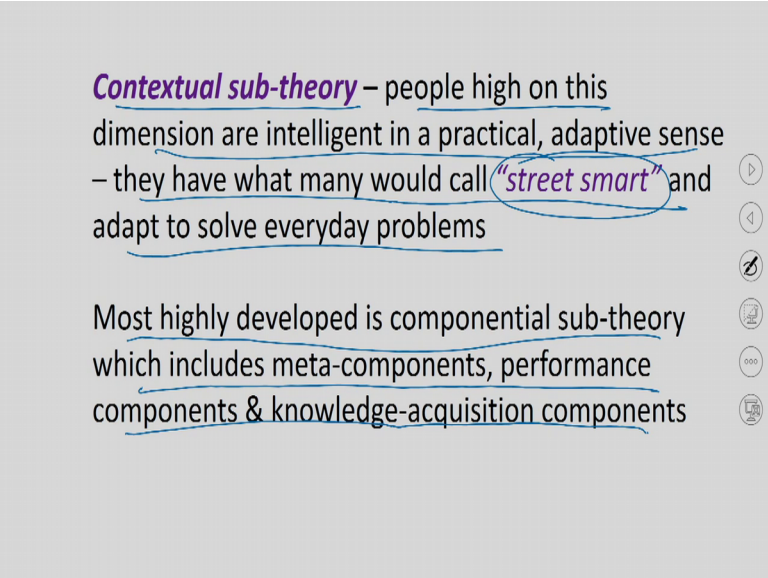

And then there is something called the contextual sub-theory. The contextual sub-theory says that certain kind of intelligence is dependent on the context. Now, people high on this dimensions are intelligent in practical and adaptive sense, they are what many people called street smart and adapt to solve everyday problem.

Let us say that you go in a train and so you lose your ticket. Now, very high intelligent people, people who are very high intelligent and a people who have done highly intelligent things, they will freeze. They do not know how to deal with no tickets situation. Now, assuming that you do not want to spend too much money, and here the ticket is very expensive; so, how to deal out with the situation like that right.

So, highly intelligent people do not actually know, they are the very stupid, they get cought and so how to come up with the situation like that or if you are in a situation which requires your ability to deal with people to deal with social skills. So, if you are very good in logical in or mathematical intelligence or a verbal intelligence, you may never get out of this situation like this. So, how to use people how to manipulate people, how to manipulate situations and environments, how to adapt to the situation environment and get out of the situation like this is what is called contextual intelligence.

And some people have this intelligence, which is called which is called or which is being called as the street smart intelligence. And so depends upon context, it depends upon what context it is you are coming from, what kind of situation you have been coming from, and depending on the context can you actually change. So, most highly developed is componential sub-theory, which includes meta-components or performance components and knowledge and acquisition based components.

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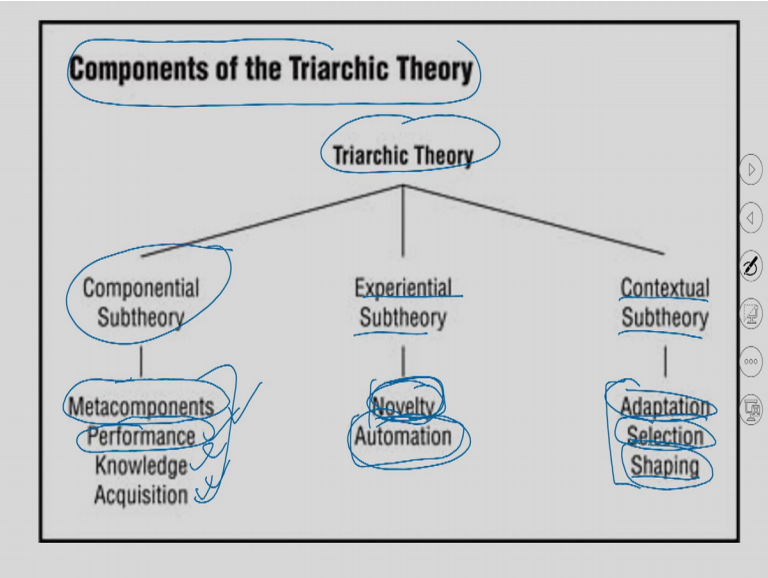

So, let us look at the component of the triarchic theory. The triarchic theory says that there is something called componential and sub theory where how you think and act analytically is what it is. So, it has certain meta-components, for example performance. As I said inviting someone for a dinner party, you have to think critically and analyze similarly to do this party. And so the meta-component is performance, how good you are in performing, how good performance do you have, so how good you are in doing things like acquiring in much needed information for cooking the dinner for everyone.

Then knowledge, how quickly can you turn knowledge, how quickly can you store ideas about who can eat what and who cannot eat, what and that kind of a thing. And then acquisition, when you have this knowledge of somebody is veg, somebody is non-veg, and how many people eat what and so can you do that can you do a feedback thing kind of a thing, can you monitor your performance, can you change, so enough food is there can you get dispersed of it. If less food is there, how do you take care of the situation like that and that is what is the componential theory and these are the metacomponents of it.

Similarly, the exponential sub theory has two components on novelty and automation, for example, in the exponential theory where experience makes you become intelligence. Novelty is a good part. So, how novel you are in your approach and how automatic you are to common day problems that will define your experiential intelligence. Because the more experience you are with the particular field or a particular field of research or a

particular field of expertise, you will become the more automated you will become, simpler problems will become automatic and s, your solutions will be novel. Whereas, for a common people there will be only attached to simple problem.

Similarly contextual sub theory has three parts adaptation selection and shaping on a contextual sub theory has pass like how quickly you are able to adapt to situations not only that how quickly are you selecting those situations or those context which actually a beneficial for you. So, it is rewarding for you and not giving you any kind of problem. And the third is shaping. Can you shape situations according to you, so that you have maximum gain and minimum loss.

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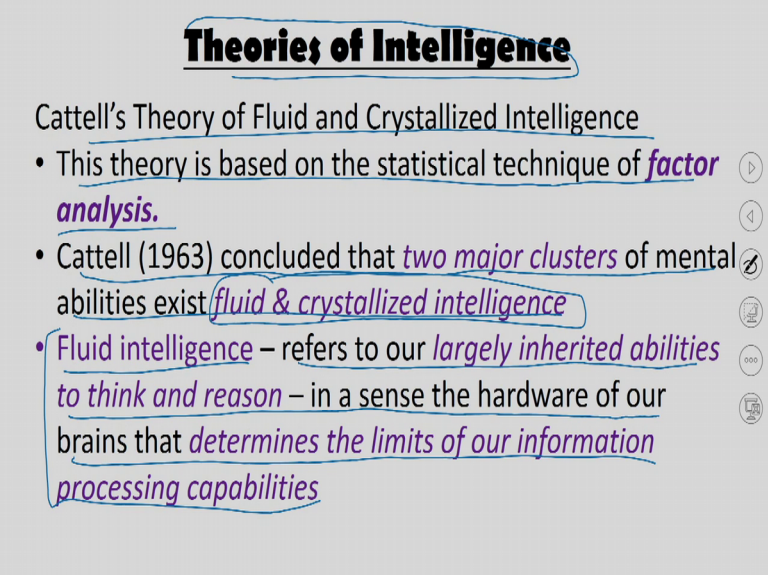

The fourth kind of theory is called the Cattell's Theory of Fluid and Crystallized Intelligence. And so this is a very simple theory. So, this theory is based on statistical technique of factor analysis. So, let us first see what factor analysis is very simply. So, in factor analysis what we do is a lot of data is there. So, a lot of data is pulled together and so meaning is interpreted out of the that data.

So, how do we do that what we actually do is that we find commonalities. So, if you have a thousand of data and we do not know how to interpret, it the best way is to five commonalities or correlations between them. And factor analysis is a basically a technique of finding how much data points correlate among themselves. So, if lot of data points correlate among themselves and form clear cut groups, then these groups are

called the factors and this is what is factor analysis. So, this theory is based on factor analysis.

Now, Cattell 1963 concluded that two major clusters of mental abilities which is called a fluid and crystallized intelligence. So, what the Cattell says is there are two types of intelligences the fluid type and the crystallized type. Now, what is fluid intelligence, it refers largely inherit abilities and to think and reason in a sense the hardware of a brain that determines the limits of a information processing. So, basically fluid intelligence is that which is in it is largely inherited ability of thinking and reasoning and this is this kind of ability is hardware to our brain and it is also dependent on certain abilities.

So, how quickly can you read will depend upon how your eye sight is or how nicely can you find things is depended on your ability to see, also how quickly can you hear something will depend upon your the ability of hearing and so that kind of a thing. So, small children will not be able to process large complex problem and so that is also dependent on the brain ability.

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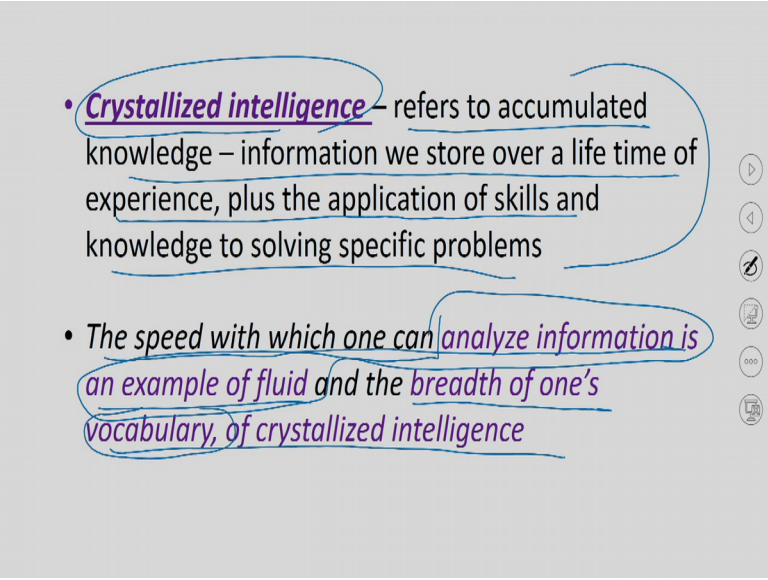

Now, in opposition to that there is something called crystallized intelligence which refers to the accumulated knowledge – information we stored over a life time of experience, plus the application of skills and knowledge. So, this is that intelligence or those factors those kind of a abilities that we actually learn through our experience. Now, the

examples of it the speed with which one can analyze information is an example of fluid intelligence and the breadth of one's vocabulary, is crystallized intelligence.

As you know analysis of a information is dependent on how developed your brain is, how basic areas of a brain has developed and vocabulary which is something that you learn when you start learning language is what is called the crystallized intelligence.

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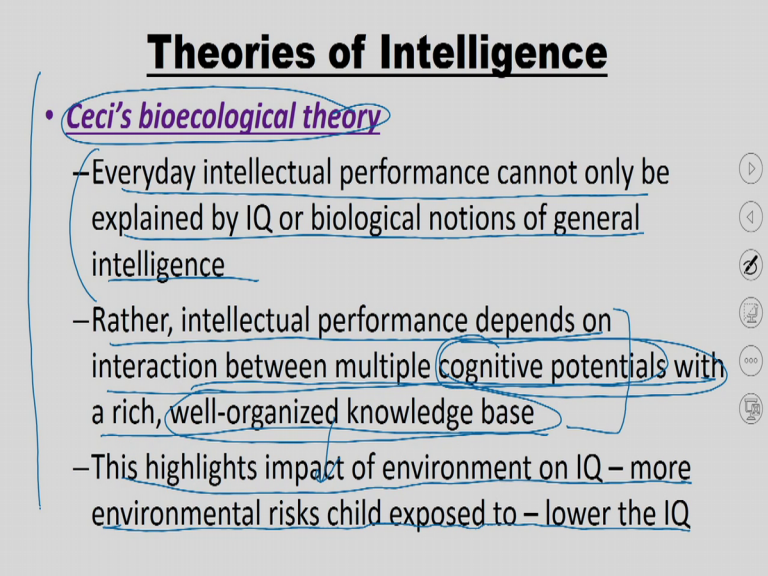

And. So, the last theory in this section is called the Ceci's biological theory. So, it is a very basic theory. And what it says is that everyday intellectual performance cannot only be explained by IQs or biological notions of general intelligence. So, what he says is that, Ceci says that intelligence is not only just general intelligence or biological factors, inherited factors looking at intelligence, but the environment has a lot of role to play.

So, rather than intellectual performance depends on interaction between multiple cognitive potentials with a rich, well-organized knowledge base. So, intelligence performance depends on interactions between cognitive potentials with, well-organized knowledge based. So, how good knowledge you have, how much good knowledge you have and how much good potentials or abilities that you have, good processing ability visual processing ability with good knowledge based can actually be what is intelligence.

And this highlights the impact of environment on IQ more the environmental risks child exposed to lower the IQ. And so this theory says that environment has a lot of role to

play. So, not only a cognitive abilities, but the rich based that you have that will combine together to form your intelligence. And this rich based actually come from well-organized knowledge based actually comes from environments. So, if you are in a very promising environment, you were actually turn out to be very good. And if you are in a very deprived environment, you will actually turn out to be stupid person or may be not so intelligence person.

So, I will I will stop my lecture here today, and will try and do a review of what we did in this today's lecture. So, what we did in today's lecture is we looked at another interesting factor which is called intelligence or cognitive factor which is called intelligence and that decides our behaviours to external stimuli or external world. Now, we looked at what is a definition of intelligence and how intelligence is basically looked at as a unitary system as a multiple faceted system, how they combine together, so that is what we did. Other than that we looked at certain theories of intelligence, so starting with a idea of Gardner's theory, to the idea of the Anderson's theory and Sternberg's theory, and the idea of Ceci's theory and Cattell's theory.

So, we looked at five different intelligence theories, and what they think of intelligence, and what comprises of it and how it moves and that kind of a thing. So, how is intelligence important, what are the parts of intelligence factors effecting intelligence and that is what we did in today's lecture. So, when we meet next we will be continuing with looking at how intelligence tests are defined or designed and what is the neural and the cognitive basis of a intelligence, further on we will look at some intelligence tests and give you a view point of what intelligence test actually measured. And then we will take a model system which is emotional intelligence and see whether that model system fits with the idea of intelligence. So, up till we meet the next time it is bye from the studios of MOOC's. Bye.