Advanced Cognitive Processes
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Lecture - 37
Cognitive Development – II

Hello and welcome to the course Introduction to Advanced Cognitive Processes. I am Ark Verma from IIT Kanpur we are in the final week of the course and we have been in this week talking about cognitive development. So, in the last lecture I talked to you about you know different aspects of development different fundamental questions that have been asked about development the nature versus nurture debate.

I spend a lot of time talking about how the nature aspects of you know the whole equation really works out, what is genes heredity? How do things how do things transmit from one generation to the other? What are the kind of genetic disorders that might be there? What are the kinds of other prenatal influences like, the influences of drugs and alcohol on the developing child?

So, in today's lecture actually I will take this discussion a little bit further we have talked about the prenatal aspect of things in much detail, but let us now talk about how is the newborn, you know born with what are the abilities that a newborns is.

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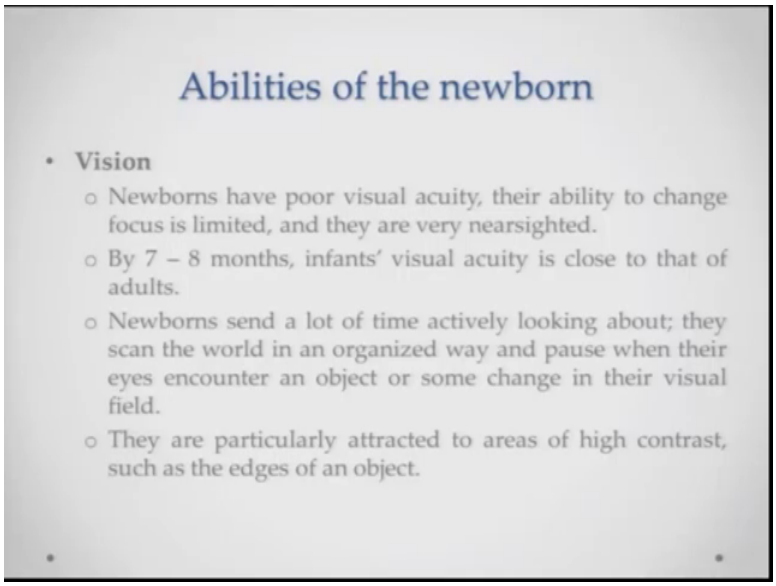

You know coming with and how do these abilities develop in the course of the life. Now, I am kind of going to talk about these different aspects. So, let us begin with the perceptual processes, let us begin with visual. Newborns have poor visual acuity their ability to change focus is very limited and they are very nearsighted. So, for example, children were just one, one and half months old they generally the fathers they can see is very close up to 10 15 20 centimeters.

So, also the other aspect is that they have very poor visual acuity you can actually look at this figure here this is basically you know a kind of mirroring, what kind of resolution as a newborn is really looking at on the you know.

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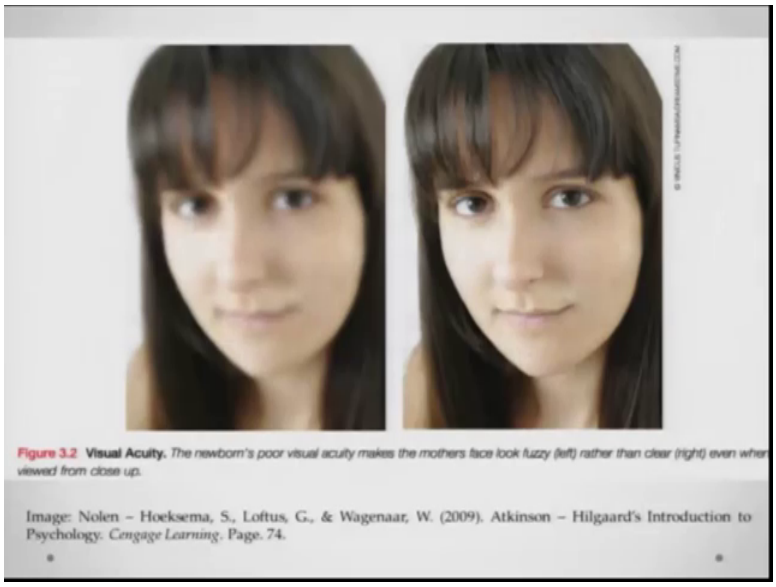

So, slightly blurred picture is what actually the newborn is really getting and the visual acuity the resolution you can actually think of visual acuity in terms of resolution the resolution that the child has you know with respect to whatever he seeing in the world is a slightly poorer. By 7 to 8 months infants visual acuity is close to that further so, it takes around 7 to 8 months for the child to actually go from a slightly hazy slightly blurry vision to more clear to you know to the proper vision that adults have.

Now, newborn is spend a lot of time actively looking and this is something. So, a lot of these things I am talking about you can actually observe them yourself you can actually observe them, when you are actually you can actually observe how children are behaving

and by being around them. So, newborns if you see they spend a lot of time actively looking around you know they are interacting with their environment.

So, they scan the world in a in a rather organizer. So, they are not really randomly just moving their heads and looking around the world they are actually scanning the world in a very organized manner and say for example, if there is something that catches their attention they would pause if they will try and analyze that. So, the when the eyes encounter an object or some change in the visual field will orient towards it and they will kind of try and understand what has really happened.

So, it is not like we are just here and they are just passively seem them I mean there actively interacting with the environment you know and this interaction becomes very interesting say for example, when the child is just a newborn a month, month, month and half old to when the child is got you know full visual acuity by 7 8 months and then when a what are the kind of sense that the child is making later.

Newborns are particularly attracted to areas of high contrast such as the edges of an object say for example, when the child is looking at particular objects is more intrigued by the edging part because say for example, you are looking at a surface and then there is a edge there is a vast contrast difference between these 2 parts.

So, the edges are regions of high contrast you can actually you know one a one the in the surface a different kind of structure is there and as the surface ends the different kind of structure is there. So, this is something which the child kind of gets attracted to a lot.

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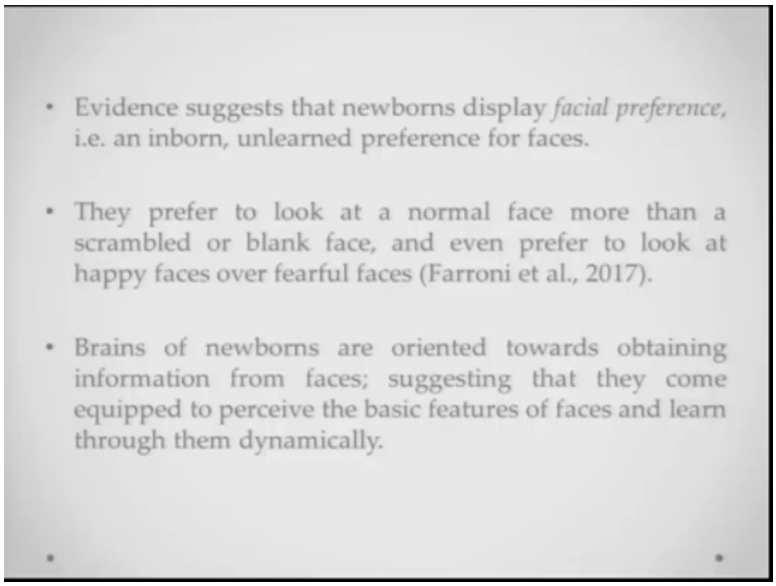

Now evidence is suggests that newborns display what is referred to as facial preference. So, they like to look at faces they have this inborn innate preference for faces as compared to other kinds of visual stimuli.

So, children you would see they will be more interested in looking at people's faces as compared to and when they are very young children as compared to you know other objection other visual stimuli that might be available, also they would prefer looking at a normal face much more than a scrambled or a blank face. So, if you try and show them scrambled face pictures or something like that they will not really you know grasp their attention, also one of the things is they would prefer looking at happy faces over fearful or you know angry faces.

So, that is also something you know that the child is born with so, is preference for happy faces is there you know when you are talking about the child. Now brains of newborns are oriented towards obtaining information from faces one of the things is that this is something which is evolutionary also useful.

So, brains of newborns are supposed to be oriented towards obtaining information from faces, suggesting that they come equipped to you know there is suggesting that they come equipped to perceive the basic features of faces you know the eyes, nose, mouth, also slight you know some emotional information that might be there in the faces.

And the child is always trying to you know learn through whatever he is looking at, learn through the face is dynamically understanding the persons you know expressions, reacting and learning also 2 things. So, for example, when the child is looking at the face the child is doing at least 2 things a is that the child is trying to understand the emotional information in the facial expression, also one of the things could be whether child is trying to you know learn to reciprocate those emotions as well.

Say for example, and I was probably talking about this in some other lecture is that one of the things that the child learns to do is you know smile for example, or being angry for that matter partly could be innate, but partly has also learned from looking at how people behave, when they have to you know how people turn their faces, when they are displaying particular kinds of emotions.

So, that is a very interesting thing that is one of the reasons why it might be a evolutionarily important for the child to look at the faces more carefully because that kind of you know could have survival value to it, also the child kind of it is learning it is first you know impressions of social communication it is first aspects of you know learning how to behave in the world by looking at faces they are certainly the most important visual stimuli this child is you know coming across.

Now, brains of newborns as ever same brains of newborns are oriented towards obtaining these various kinds of information from the faces suggesting that they are kind of equipped to perceive these basic faces features and also learn through them.

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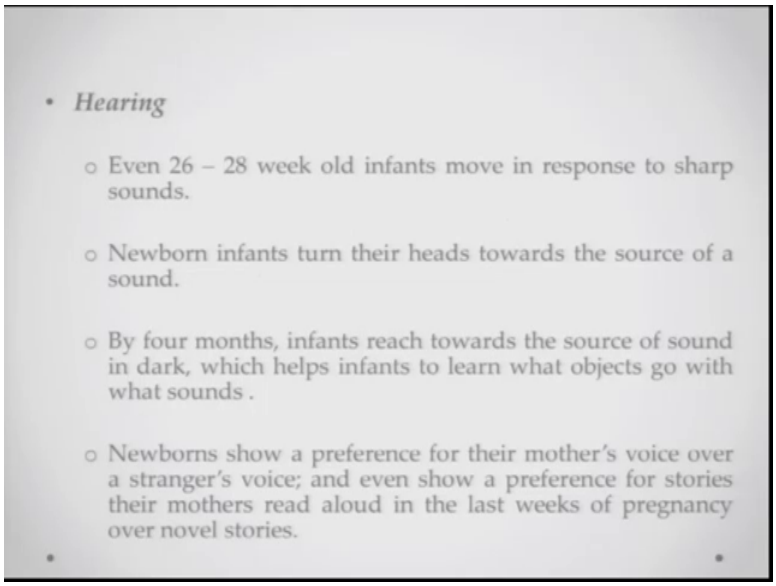

Now let us move to the hearing part auditory part, even 26 to 28 week old infants move in response to sharp sounds. So, if there is a sharp sound the infant would kind of get startled look around and maybe move in response to that sound.

Newborn infants turn their head towards the source of the sound. So, as soon as they develop the control of the neck, they can orient their heads towards the, you know where the sound is coming from. By around 4 months of age infants reach starts reaching towards the source of sound in their suppose for example, if there is somebody calling out the child even though it is dark and the child cannot really see the person, child would try you know move towards the source of the sound they move, they are trying to you know localize the sound by moving towards state.

This helps infant to learn what kind of objects go with what kind of sounds say for example, it might be very useful in recognizing you know the voices of people around the child, you know the first caregivers, the parents, the you know siblings maybe relatives and so on and so forth. Now, newborns they show preference for their mothers voice over a strangers voice and they even show a preference for you know stories that their mothers have told their stories their mothers have recited why during the last weeks of pregnancy.

Now this is also something which I am sure you might remember from the lectures on language acquisition when we are doing those in the, I think in the third week. Now, this

is something that the child is kind of an a hearing by the way is something very very important for the you know sense of for the ability of language for the cognitive function of language to develop so, hearing is very closely tied to that. Hearing you must remember we have talked about you know at these day things when you are talking about child language acquisition things like you know across cultures.

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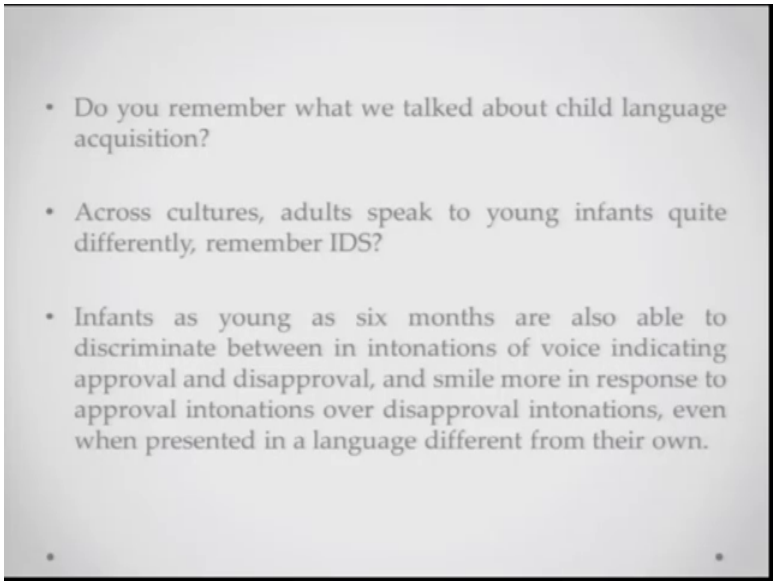

And that is also very important across cultures adults speak to young infants in very peculiar ways you remember I have been talking about infant directed speech or mother is now they will talk in a way that is highly exaggerated, they will talk in a way that the has too many loud noises, they will have too many very well defined spaces or pauses which will help the child to grasp aspects about you know human speech.

So, a good proper and a very receptive auditory function is a very much required for the child to be able to learn language that is one of the reasons by the way why a children who are congenitally duff might have it slightly difficult in learning you know speaking and language moving further. Infants as young as 6 months of age are also able to even you know they can they can distinguish or discriminate between intonations of voice indicating approval and disapproval.

So, for example, if you are kind of praising the child, you know a lot of times people talk to children in funny ways suppose they are kind of appreciating something that the child that over suppose they are kind of you know trying to you know in a play sort of way

scold the child that you know you should not do this. So, children as there is around 6 7 months of age they start understanding these intonations, they start understanding whether I have been praised or whether I am scolded at this moment.

And this is this is very fascinating again something that has to do with the child having a superior ability to process prosodic characteristics of speech. So, they will smile more in response to approval intonation and they will smile you know they will less and they will kind of try and avoid get unhappy start crying when the disapproval intonation is presented, even when this is presented in a language different from their own.

So, this is not really about them having learned language by this time they are not really learned language of words or anything, but they have just kind of started appreciating the intonations that are there. So, again I am not really talking about them having learned the language, but it is just that the prosodic characteristics are giving certain kinds of valuable information to the child which the child is processing and many and kind of you know manipulating it is own behavior in response to these auditory information.

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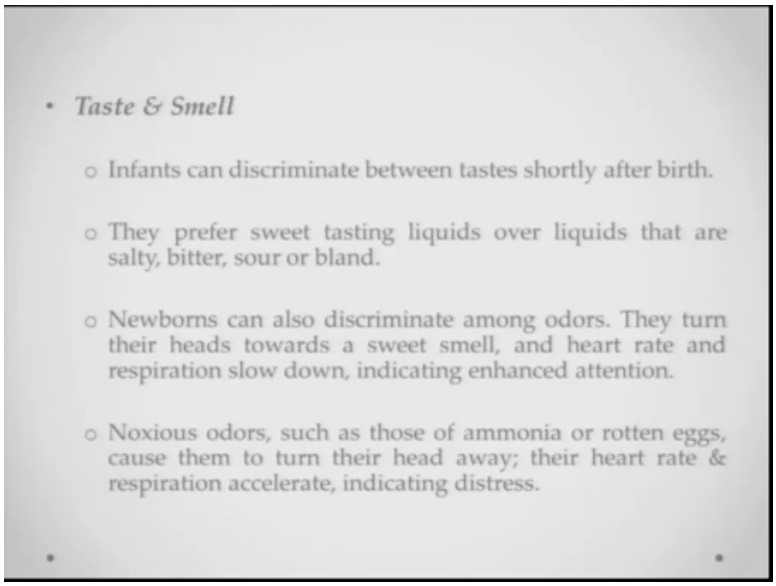

Let us move to something else let us talk about taste and smell, infants can discriminate tastes very shortly after birth they prefer sweet tasting liquids over liquids that are salty, bitter, sour or bland. Newborns can also distinguish between odors they turn their heads towards sweet smells and their heart rate and you know respiration slows down

indicating enhanced attention to you know and this happy and this a sweet odors that they are you know more tuned to get.

Noxious odors on the other hand suggest those of ammonia or rotten eggs so, those kind of things will caused the children to turn their heads away from their and their heart rate and their respiration rates generally accelerate indicating distress and indicating the fact that they want to avoid these smells. So, they already show by these physiological manifestations whether they are preferring a particular odor or they are not preferring that particular odor.

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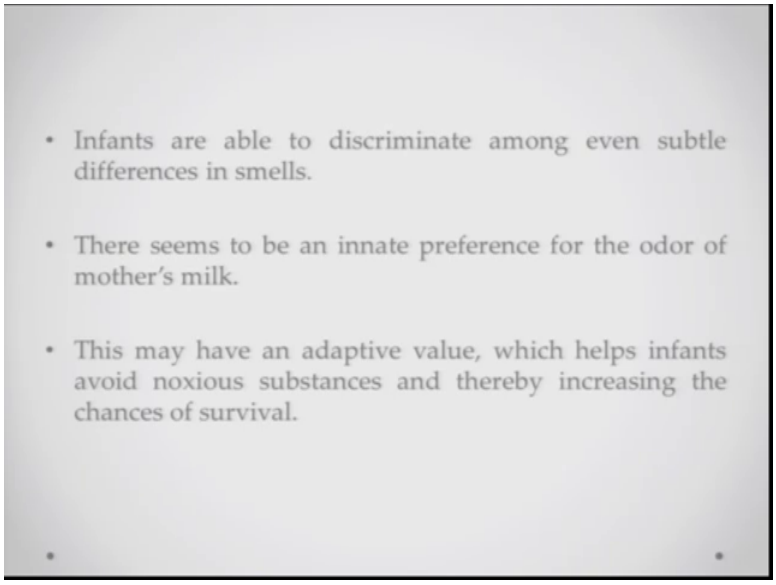

Also infants are able to discriminate a very well among subtle differences in smells they are seems to be an innate preference for the odor of mother's milk. So, one of the things that I was reading actually talks about the fact that children prefer the children start getting the sense of the mothers body, they start getting this scent of the mother's milk and this is something they would say for example, if you kind of dip you know a cloth in the mother's milk and if you kind of move it around the child you will see that the child kind of attains reacts to that odor very favorably and kind of try as to orient itself towards that odor.

That could be one of the evolutionary things that have been built up in the child you know because these are the things that are necessary for the child's survival for proper

feeding and you know these kind of things and I think this may have an adaptive and also about these odor things.

So, this mean these things may have an adaptive value which would help infants avoid noxious substances and thereby increasing the chances of survival typically noxious odors and you know bad taste is a kind of closely related to things like say for example, imagine the time when we were living in jungles you know the pre evolution era. It is very common that if you are in the jungle things that taste extremely bitter, might be poisonous things that kind of smell very bad, might be spoil food and you do not really want to eat it because if you ingest it you might you know die of food poisoning.

Now, this enhanced the sense of you know this extremely developed sense of both taste and smell is in that sense having a lot of evolutionarily a evolutionary value that it has a lot of adaptive or survival value.

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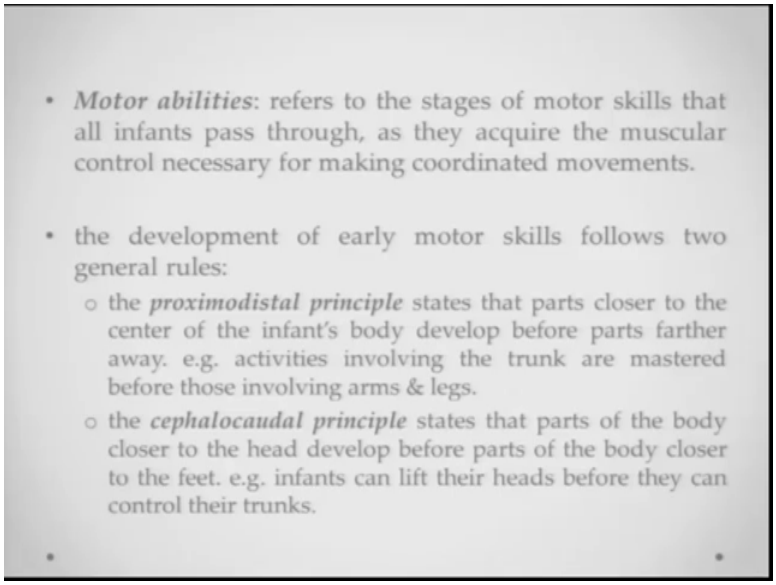

Now let us talk about a different kind of ability let us talk about motor abilities, now motor abilities basically refer to the stages in which children acquire these motor skills and this is their sequential stages which all the infants pass through as they acquire the muscular control necessary for making coordinated movements.

So, they basically need to get that kind of muscular control developed in order to start moving their hands or start moving there you know neck, the lower limbs, their torso for

that matter. Now the development of early motor skills you know once the child is born generally is supposed to follow 2 kinds of rules, I list refer to these rules briefly the proximodistal principle basically says that parts that are closer to the center of the infants body that is the torso will kind of you know the movement or the control of them become comes much earlier in parts away from the body.

So, activities involving the trunks are mastered first before they can actually you know start moving their arms and legs or they start getting a control over their arms and legs. The other principle that is important is the cephalocaudal principle, now the cephalocaudal principle says that parts of the body that are closer to the head develop better, develop before or develop better control, before the parts of the body that are further from the head. So, again the first thing that the child starts to move other than the trunk is the neck, again the limb, limbs part you know basically comes is slightly later. So, infants they can kind of lift their heads before they can start you know controlling their trunks.

So, it is kind of 2 things 2 principles that are governing the, at early development this is a chart basically borrowed from Atkinson Hilgaard's books, Susan Molen Hoeksema's book.

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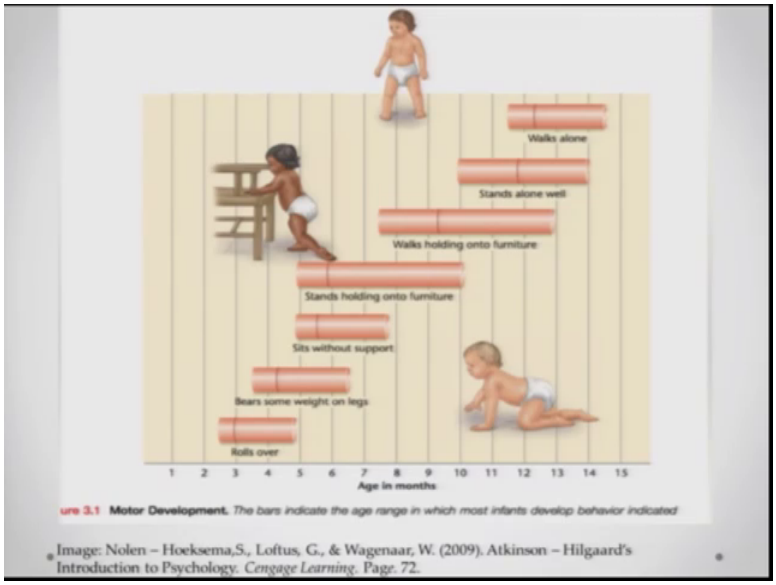

And this kind of shows the chronology or the pattern with which the child is acquiring the motor skills.

So, you can see that you know by the amount of 2 and half, 3 2 and half to 4, 4 and half months children develops you know children can roll over they have developed the control of the trunk months later the child can kind of you know it can bear some weight on legs and start you know if you hold the child it can kind of start putting the legs you know in a particular fashion or move a little bit more move to 5 and 8 months the child can start sitting without support move to close to you know starting from 5 to 9 to 10 months the child start can stand up holding to furniture and so on and so forth.

So, again you see that these milestones which I am referring to are not kind of situated at just one age point they are not situated in just one month they kind of span say for example, rolling over is can happen anywhere between 2 and a half to 5 months or say for example, sitting with our support can have a happen anywhere between 5 months to 10 months.

Now, this is basically the standard deviation with respect to which these abilities might be achieved by different children depending on other kinds of environmentally and physical nutritional and environmental features, but if the child is kind of missing this then there is that there can be a talk of you know whether the child has missed that developmental milestone.

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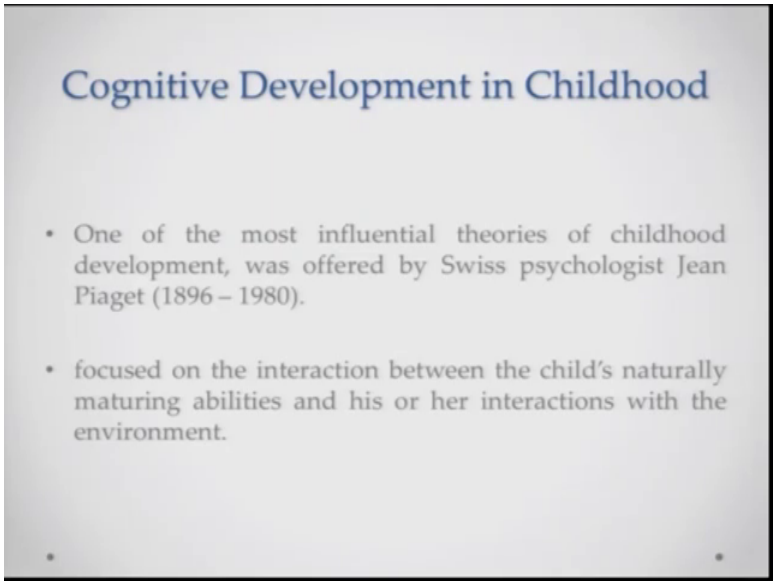

Now let us move slightly further let us start talking about some other aspects of development beginning with talking about cognitive development and one of the most

influential theorists who have talked about cognitive development was the Swiss a psychologist Jean Piaget and for those people who have done any course in psychology earlier if you even if you have done first year course in psychology or if you have just held a book of introduction to psychology in your hands you will find Jean Piaget name there.

And Jean Piaget is one of the persons who has you know extensively worked over you know he is kind of worked by observing children over long periods of time and he is kind of worked over different aspects of children's development I will talk to you about will Piaget work today. Now Jean Piaget basically he focused on the interaction between the child's naturally measuring abilities you know, the biological part that we have been talking about and also his or her interactions with the environment.

Say for example, when the child is growing up see for example, we are talking about the motor development part at different ages when the child is you know acquiring these different motor skills. The nature of the child's interaction with the environment also changes till the point that the child can only roll over the child can only reach out to particular places and you know the entire thing is just limited to that by the time that the child starts controlling limbs where the child can reach out to things hold things etcetera. By the time that the child you know has started to stand then our started to work then the entire the scope of activity is completely changes, also during these interactions the child is learning a lot about the world the child is kind of elaborate on that in a bit.

So, Piaget basically and the whole point of the example that I was giving was that Piaget basically sees the child he views the child as an active participant in his environment the child is an active participant in his environment and is also an active role player in the entire developmental process it is not that the child is just you know a passive recipient of whatever biological development is happening and whatever the external stimuli is are teaching external stimuli are teaching the child.

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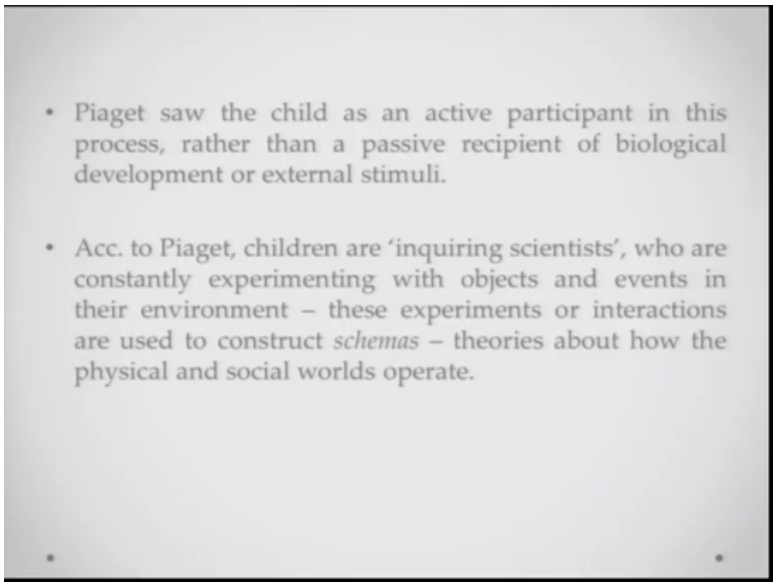

So, according to Piaget and that is a very interesting thought children are 'inquiring scientists' who are constantly experimenting with objects and events in their environment you will see when children are growing up they say for example, they will they will do a lot of hit and trial they will you know do something observe very keenly what is happening, how is the environment changing.

Suppose for example, you touch something you know if you touch something you like the texture you will touch it again and again you know furry objects soft objects that children you know develop a likeness to or if the child touches a texture that is you know slightly uncomfortable it is thorny picky or something like that which I will not try and touch it again the child learns this is a texture that I can prefer this is a texture that I would not prefer.

Now, Piaget says these experiments or interactions that the child is carrying out these are used to construct what are called schemas. Now schemas are small schemes there are small theories about the world you know about how this works, do not touch the cup it is hot, do not you know do touch the soft why because it is soft and you like it. So, these kind of schemas are developed and they are being developed constantly as the child is growing up they are basically coming from the interaction of the child with the environment.

So, it is not like somebody is coming and telling the child you know it is it is not coming from the god given thing that, you know this these things you are going to prefer these things you are not going to prefer it is basically coming out from the child's interaction it itself.

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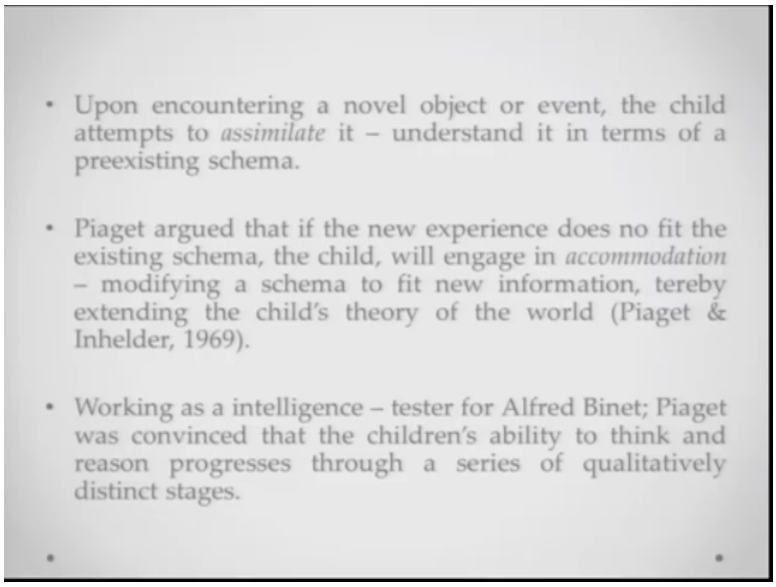

Now upon encountering a novel object or a novel event you know if something is done what will happen or a novel object how do I interact with this object, the child attempts to assimilate it that is understand it in terms of a pre existing schema.

So, for example, it could be a case of a child say for example, you know child has a pet at home and the child kind of pats is paired plays with this pet and you know gain some information about. So, dogs say for example, dog you know is a child as a pet dog child would know dogs are harmless creatures and it is fine to pet dogs hold their tail move around with the dog etcetera, but if the child kind of comes across a new object you know a different kind of a dog you know it goes to somebody at someplace else and kind of encounters a different dog.

Now, what would happen is then the child will try and [FL] this is a dog this probably is very similar to the dog I have at home. So, it is kind of trying to understand it in terms of a pre existing schema for the most part it could turn out in the same way the dog also responds by place and you kind of you know to start developing a theory about how to interact with dogs.

Now Piaget said that if the new experience does not fit the existing schema what the child will do is it will engage in what is called accommodation, accommodation basically is modifying a schema to fit new information thereby extending the child's theory of the world you know. This is what happens in the world and the child is constantly doing these experiments and you know gaining or grass or kind of garnering evidence in order to move ahead in life.

So, for example, the child knows that you know dogs are friendly creatures, they can be patted they can be moved around and their tail can be held etcetera, etcetera, but then the child goes outside and it is kind of you know trying to do the same to a stray dog or trying to do the same to a dog that you know that is probably not as friendly as the dog that child is known. Now what will happen is that the child will learn the fact that not all dogs are needed to be fed if the dog kind of bars on kind of you know growl. So, the child milling is get afraid, start crying get back and make a note mental note that this is not what supposed to be done.

So, you cannot pet all dogs you can actually very easily you know fit this example that I was trying to make assimilation and accommodation to things like say for example, the child is reaching out for a cup, the cup has hot milk and then the child learns you know accommodates at not or all cups need to be touched because you need to wait and check whether the liquid there is hot or not.

So, these are some of the things there are some examples which can demonstrate what Piaget was really thinking and how Piaget was viewing this process of development. Now Piaget was basically before he you know became his own person and became he is you know is started his own individual work he was working as a intelligence tester you might have heard of the name heard of the name of Alfred Binet who was designed a famous intelligence skills.

So, he was working as an intelligence tester for Alfred Binet and work he used to do was he used to you know get these children conduct these intelligence tests on them and in you know one of the things he wondered a lot was why are these children making errors, what kind of errors they are making, what kind of you know ways that they can be actually taught not to do these errors.

So, he was convinced during his experience being an intelligence tester is that children's ability to think and reason progresses through a series of qualitatively distinct stages. So, he thought that this cognitive development, this development of intelligence is basically going through you know a variety of qualitatively distinct stages you know in one say something else is happening in the other one something else is happening and so on.

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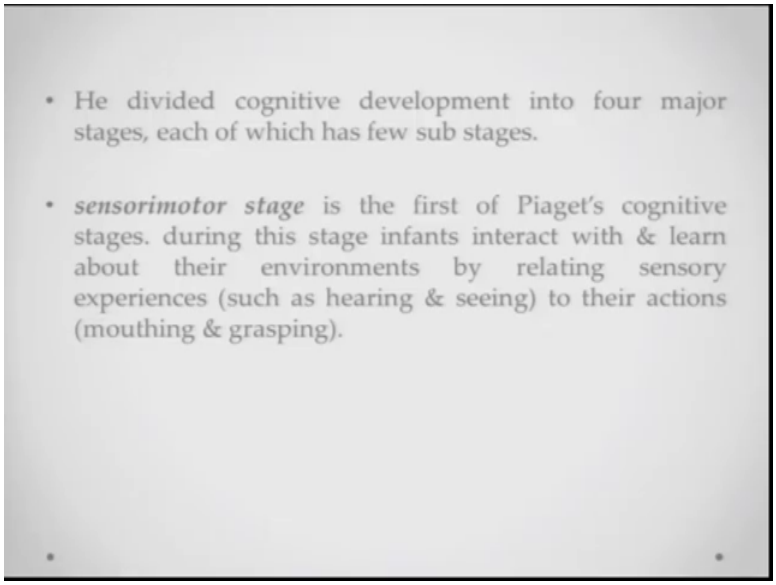

So, he divided this cognitive development of the child into 4 major stages, I will just talk to you briefly about what these stages are and you know there could be some stages sub stages as well the first stage that Piaget basically talks about again you know the first year of the child is the you know is the sensorimotor stage.

During this stage the infants interact with and learn about their environments you know be it about dogs or hot cups and stuff like that, the kind of you know are gaining more and more information about the environment by relating their sensory experiences to their actions I like to touch this I will touch this again and again till there is you know reason not to do it.

So, what they are doing is they are interacting with their environment using their limbs using their you know physical senses and the kind of the experience that they are getting is determining whether their actions will continue on it they will change. So, this is the sensorimotor stage movement and sensory interactions are involved, during this stage there are interesting things that the child cannot do things like object permanence.

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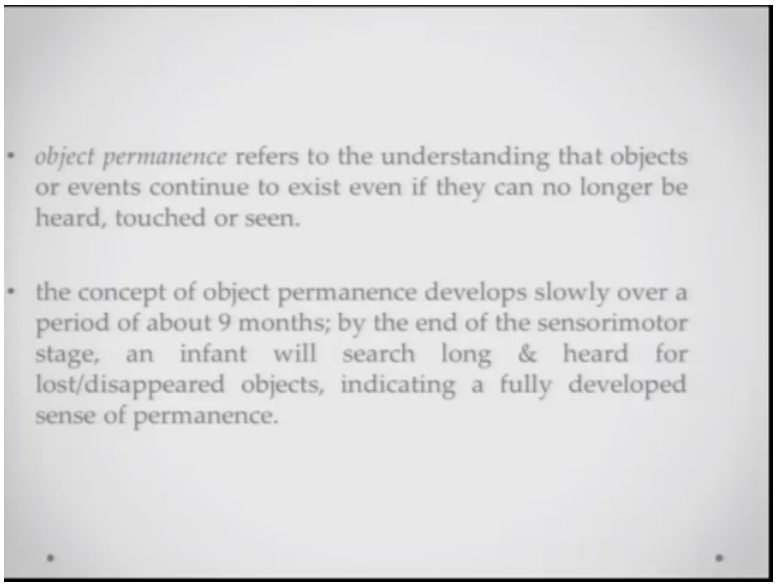

The object permanence basically refers to the understanding that objects or events continue to exist, even if they cannot no longer be interacted with suppose; now this is again something that a lot of people do which in you show them a toy and then you hide the toy behind your back. You will notice that very very young children stop searching for the toy as soon as you kind of you know take it away from them, one of the reasons that Piaget said is that children have not really developed this concept of object permanence.

Very young children in the first stage of development they do not really have this concept if they if the object is not perceptible, it is not there for them to see they would not have the sense of that object still exist because if they one they once they develop this sense that this object still exists they will try to look for and search for the object and will try to ask you to bring that object because they know that it is there somewhere and you see how this behavior changes when the child is growing up.

Now, so this concept of object permanence develops slowly over a period of about 9 months and by the end of the sensory motor stage an infant will now start searching for the object, you know they will start looking for the lost disappeared objects indicating that this sense of object permanence is now fully developed.

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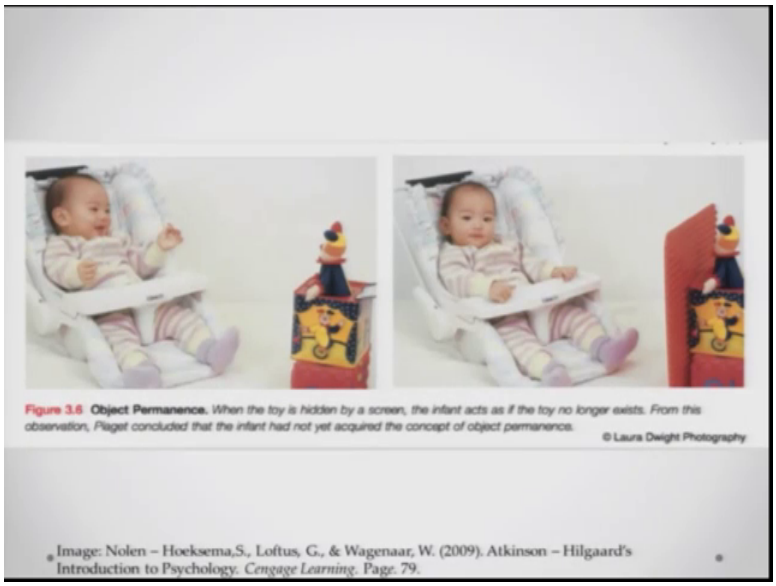

You can see this example here again from Nolen Hoeksema's book that you know if you hide the toy using a particular kind of screen the child is not really looking for the toy anymore because there is no sense that this object actually you know exists more than there.

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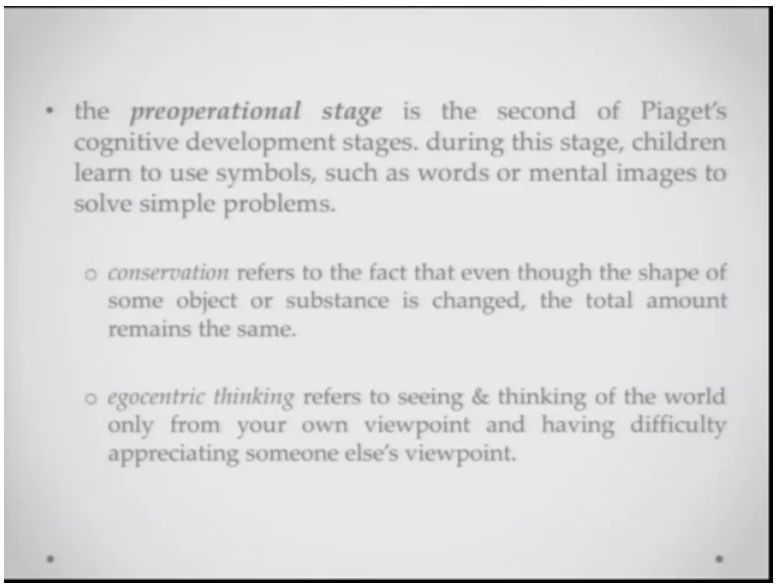

The next stage is the preoperational stage; the preoperational stage is the second of Piaget's developmental stages, during this stage, children learn start learning to use using symbols such as words or mental images to solve problems. So, there are 2 kinds of

interesting problems that you know Piaget gave the children to solve and kind of thought how they are going to develop this first is this problem of conservation.

Now, conservation basically refers to the fact that even though the shape of some object or substance is changed the total amount remains the same suppose for example, I am kind of lined up if I think I will show you the example now.

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If the concept of conservation suppose here you look there are 3 glasses you can see that the amount of the liquid is the same when you look at the shorter glasses, but if you kind of put liquid from one of the glasses into this taller, but more slender glass the level will rise up. Then when you ask this 4 year old child that which of these things which of these glasses hold more liquid the child is just going to look at the level and tell you that the taller and slender glass has more liquid even though already you seen that this is the same amount of liquid across there.

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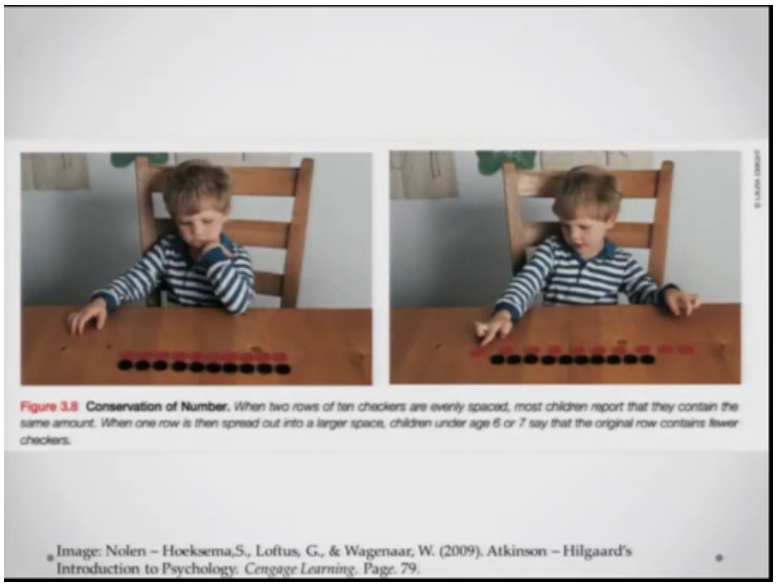

So, this concept of conservation is not there another example again borrowed from Nolen Hoeksema's book you see here that you can see for example, the you know when 2 lines of these kind of plastic coins there and you are kind of asking the children that you know which of the 2 lines has more coins and the first instance the child is kind of confused because it is; obviously, the same number of coins and they are no structural differences.

But if you look at the next picture you just put the coins the red coins in a more spaced manner then that is basically what is you know and when you ask the child the same question again then the child says you know there are more red coins than the black coins.

So, again this is something that conservation of number is it is really not their children under age 6 or 7 would say you know that the original thing now contains the black one now contains fewer coins.

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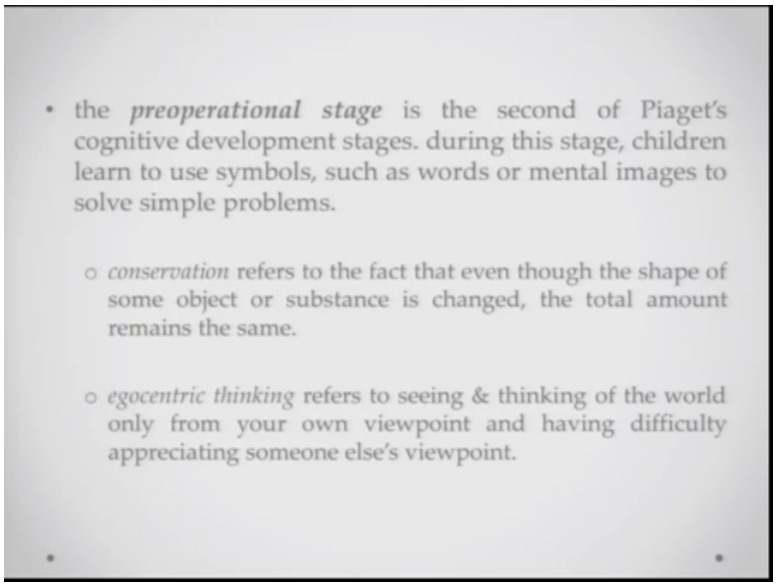

One of the other important aspects of the preoperational stage is this aspect of egocentric thinking. Now egocentric thinking basically refers to the fact you know it refers to seeing and thinking of the world only from your own viewpoint and having difficulty appreciating you know from someone else's point of view. So, the idea is children you know young children basically have this aspect that the kind of cannot understand the other persons point of view.

Say for example, if you ask the child that you know if and there is a very neat experiment that Piaget or you will find that in demonstrations you know there are 2 mountains you draw to the child and you place the child towards the a smaller mountain and you are towards the lower mountain. If you ask the child then you know which one of the 2 is bigger and say suppose for example, the that one is kind of seeming bigger to the like the child will continue saying and that one is bigger.

If you ask the child that you know what is bigger for me the child not be able to correctly answer this question because at this stage children have not really acquired the ability. So, to think about what others might be seeing and looking the world as I will talk about this very this is a very interesting aspect of cognitive development will talk about that very shortly in more detail.

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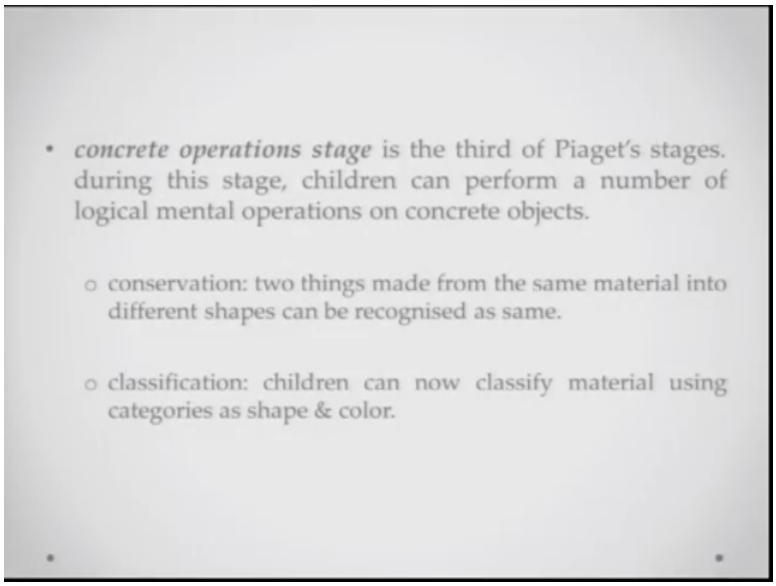

The third stage of cognitive development as per Piaget was a concrete operational stage, now the concrete operational stage is a third stage and during this stage, children can you know they can start performing a number of logical mental operations and dealing with concrete objects. Now this is the time that a child kind of crossed this concept of classification. So, 2 things made from the same material into different shapes can be kind of you know recognized as same, they will start they will have this understanding there.

Classification children can now classify material using categories such as shape and color. Suppose you give children different kinds of shapes in a basket and ask them to put all triangles together and all circles together they will start you know doing these kinds of things at this stage.

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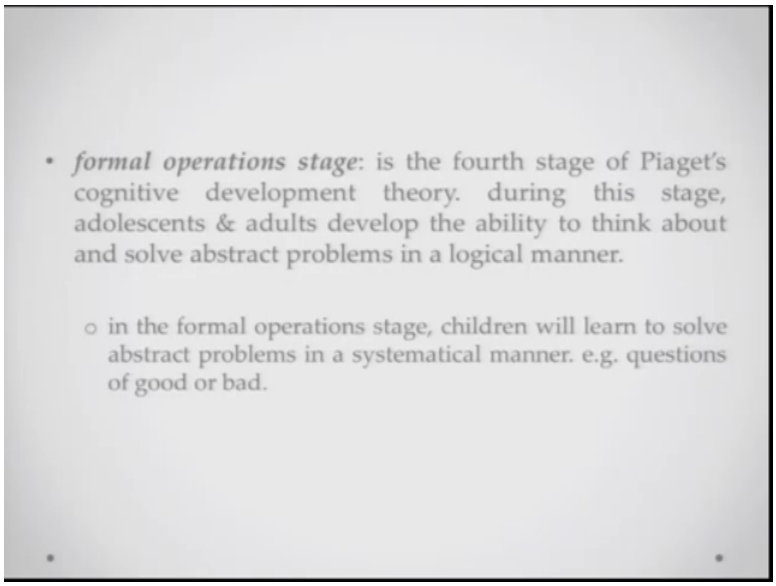

Now the forth in the final stage of Piaget's cognitive development theory is the formal operation stage, this is from young you know from around very young age to a young adulthood. During this stage adolescence and I am talking about adolescence here. So, during this stage adolescents and adults develop the ability to think about and solve abstract problems in a more logical manner. In this formal operation say the children will learn to solve abstract problems in a systematical manner they can be asked questions about good, bad, right, wrong those kinds of things.

So, all of these basic biological and other conceptual developments have happened now the child can start appreciating abstract things you know happiness, sadness, earlier it is just about you know if you if there is a desired outcome the child is happy there is a undesired outcome the child is sad, but at this stage formal operational stage the child is starting to grasp more abstract concepts things you know that things can be right or wrong, good or those kind of things those appreciation is appreciation of those concepts are there.

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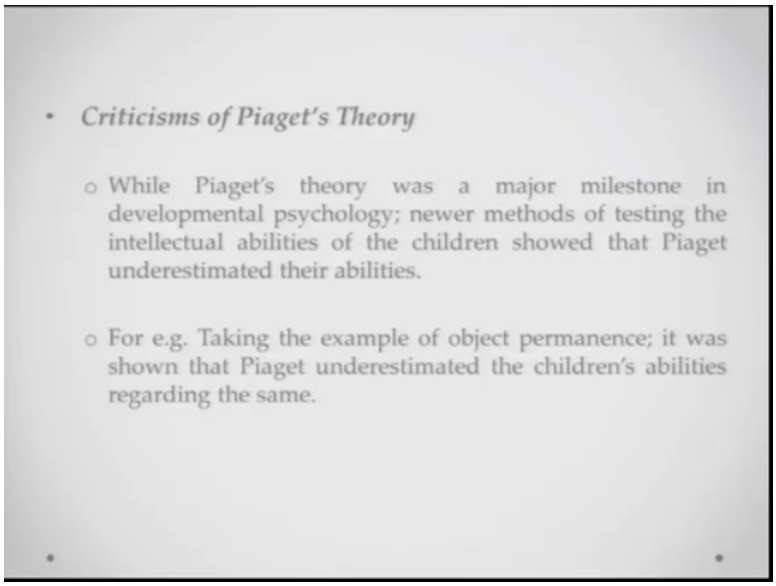

Now, let us talk a little bit about you know criticisms of Piaget's theory. So, there are some of the major criticisms of Piaget's theory say for example, while Piaget's theory was a major milestone in developmental psychology the newer methods that followed him, newer methods that kind of brought to them new ways of testing in the intellectual abilities of the child they showed that Piaget probably underestimated children's ability.

Say for example, you know this case of object permanence it was shown, but Piaget underestimated the children's abilities regarding the same. So, he said that you know object permanence is not developed until the end of the sensorimotor stage by around 8 to a 9 months, but newer methods newer testing methods have shown that you know these kind of things or hints of object permanence ability start happening much earlier than what Piaget estimated.

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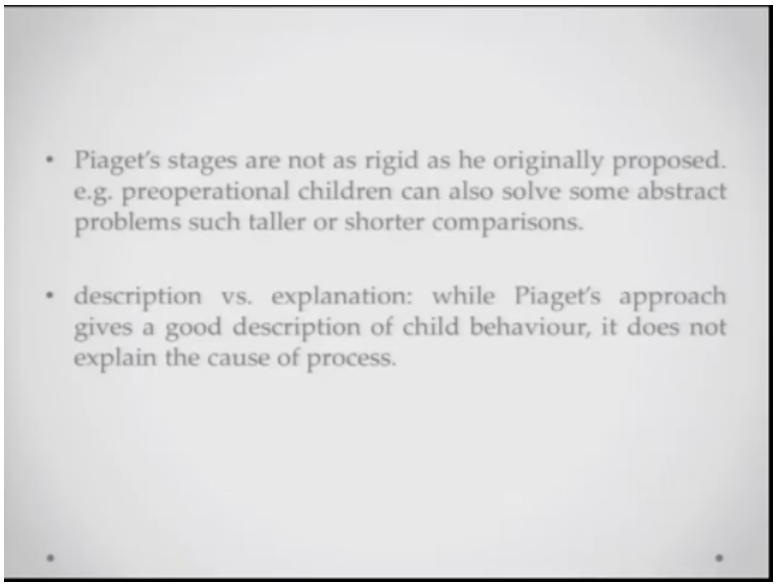

So, that is one also if you look at Piaget's you know developmental stages and as he is kind of said these are not really you know development does not really happened in such a rigid ways you know. So, these stages are not really found to be as rigid as he had originally proposed them for example, preoperational children can also start solving some abstract problems such as taller or shorter comparisons as you know because caches suppose that this will happen slightly later.

But you know even I mean he would say that these things would happen only in the concrete operational stage, but it has been shown with newer a testing methods and with different ways of looking at how children perform that some of these operations that again as object permanence I was saying. So, these things might be happening slightly earlier than what Piaget would have estimated another and this is the major aspect why I think that you know this theories and Piaget's theory falls short is that this is a theory that talks more about description than explanation.

So, if you look at how Piaget kind of draws the, you know this typology of development draws this whole sequence thing these stages are more descriptive in nature. They will tell you what the child will be able to do in this stage what the child will be able to do in this stage and what the child will be able to do in the third stage, but the idea is that Piaget does not really talk at length about how and why these things are happening at these stages, he is not really attempting to answer the causality question.

He is not attempting answer how these processes are happening, when they are happening and you know in what manner that is again these 3 of the points that I pointed out 4 of the points could be you know valid criticisms of Piaget, but again certainly this is one of the most influential theories of cognitive development, development of children that we have and it is one of the earliest you know such broad theories of development and in that sense it kind of you know deserves adequate credit and adequate you know place.

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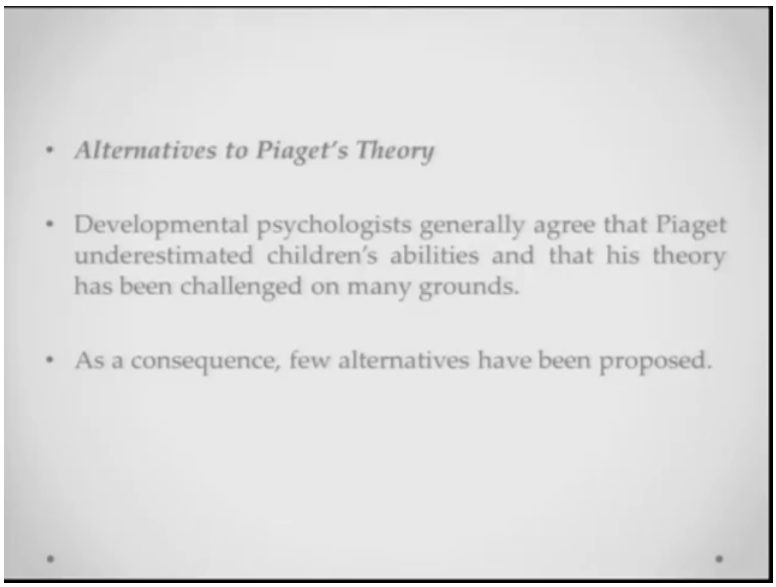

Now, ever since that time a lot of alternatives to Piaget's theory of development have been offered things like developmental psychologists you know generally agree that Piaget must you know must have underestimated children's ability and that his theory has been and you know can be challenged on. So, many different grounds, but we have kind of come with different alternatives and not all of them have really worked out so well.

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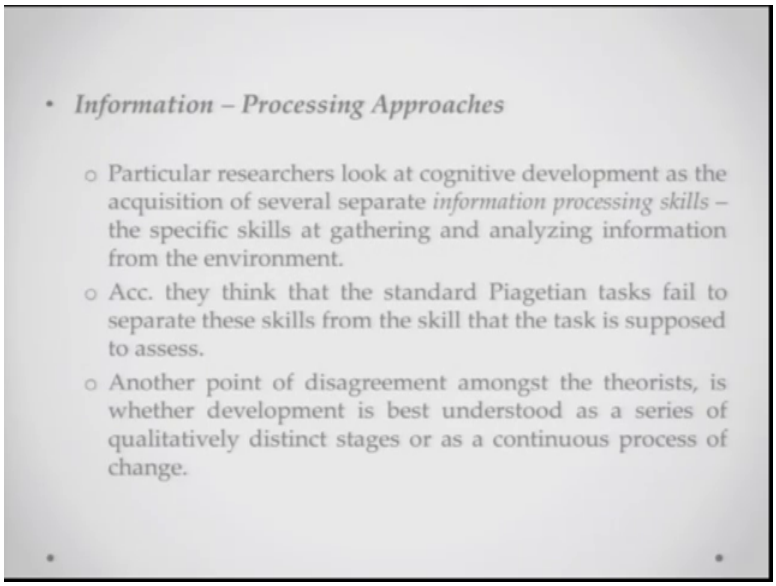

So, first kind of alternative that comes up in response to Piaget's theory of development is coming from the information processing approaches. Now, information processing approaches basically believe that you know children are good at gathering specifically specific skills and they are basically you know learning to analyze specific information coming from the environment and react accordingly. So, they think that the standard Piagetian task and one of the things, they you know emphasize is that the standard Piagetian task you know conservation of number object permanence those kind of things.

They fail to separate the skills from the skill that the task is supposed to assess they were saying that a lot of things that that Piaget was asking these children to do could be done by so many different skills. So, the explanation could be you know could be varied and in that sense it does not really tease apart the skill that you are actually focusing at. So, this is one of the things that they point out and so, they are saying is that you should look at development as the process of gathering and analyzing information.

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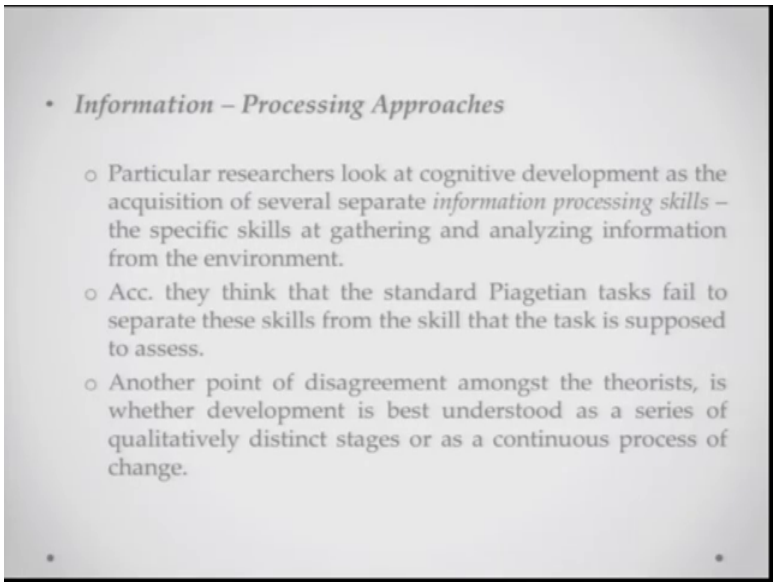

So, children's development is more about them collecting information from the environment and analyzing that information and reacting you know accordingly, another point of disagreement and there is this disagreement between the information theorists information processing theories is that whether development should be understood as a series of consequential and series of a consecutive qualitatively distinct stages or you could look at you know development as a continuous a process as a continuous process of change.

So, because Piaget is kind of putting these rigid boundaries you know all of this happens in this stage, all of this happen is in the second, all of this happens in the third, and the fourth stages. Now the information processing approach is basically say that all of this is a cumulative process say for example, if the child develops a particular skill that development of that skill might be a cumulative you know outcome of whatever information processing things that the child has learned over the years.

A good example for that is you know this development of language when the child has said it is first word it is not that you know suddenly at a particular age the child kind of you know starts speaking. You have seen in the you know language acquisition chapter that there are so many abilities you know starting from 3 months before the child is actually born there are so many things that the child is acquiring prosodic appreciation

the disagreement between you know a speech and non speech sounds the non native contrast the you know the preference for a native language.

So, many things that the child is learning and then at a particular age you know one and half 2 years that child speaks the first word. So, this is one of the, it is kindly a more tenable approach when you are talking about development. The other kinds of approaches that have come across are referred to as the knowledge acquisition approaches.

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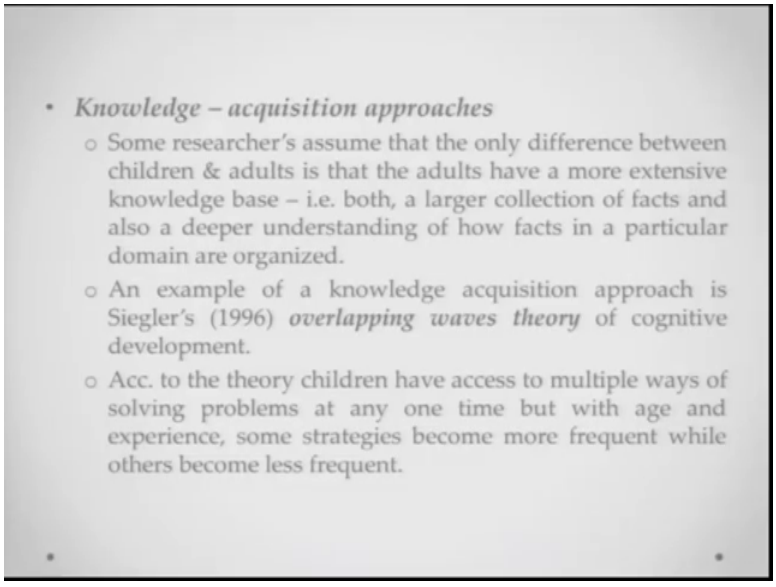

Knowledge acquisition approach ability so, some researchers assume that the only difference between children and adults is that adults have a more extensive knowledge base they have a larger collection of facts they know a lot more about the world, but they also have a deeper understanding about how facts in a particular domain are organized you know.

So, the adults know that how things function, but why they are functioning like that it is also what the adults have and children basically have to kind of gain both these pieces of information. An example of a knowledge acquisition approach is a Siegler's overlapping waves theory of cognitive development. So, according to a Siegler's theory children have access to multiple ways of solving problems at any one time you know with, but with age and experience some strategies become more frequent while others become less frequent.

Now, this is something you can observe in children that you know their behavior and their way of interacting with the environment changes with age. So, they might say for example, you know to get food from the mother the earlier thing was that you just cry and their food is notice and you your demand is notice and you are given later, you can just ask for it and stuff like and you know later you can get develop more nuanced ways to ask for the same thing.

So, these strategies basically tell I mean these change over time and these effect how children are acquiring an acquiring this knowledge and interacting how thing with the environment you know they get this better and more specified theories about how things work in this world.

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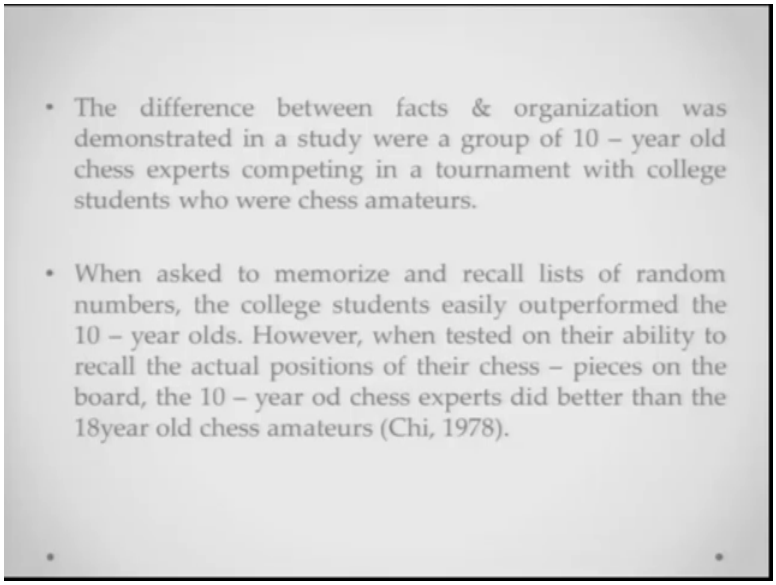

Now the difference between facts and organization was demonstrated in a study where there were 10 year old chess expert. So, children who were very good at playing chess and they kind of were competing with college students who are amateurs at chess, but; obviously, the college students they have more mental ability and you will expect them to do better.

Now, when they were asked to memorize and recall lists of random numbers the college students obviously, outperform the 10 year olds, but when they were tested on their ability to recall the actual positions of the chess pieces the 10 year olds did it much better as compared to the 18 year olds. So, as far as just the fact part just the ability your ability

part was concerned; obviously, the 18 year olds could do it better, but when organization of this material is there then the you know these people the 10 year old children who have had more practice with chess they; obviously, outperform the 19, 18 year old chess amateurs.

So, this kind of demonstrates this distinction between, you know an approach which is basically is resting of facts, but not only on facts, but organization of these factual knowledge is well.

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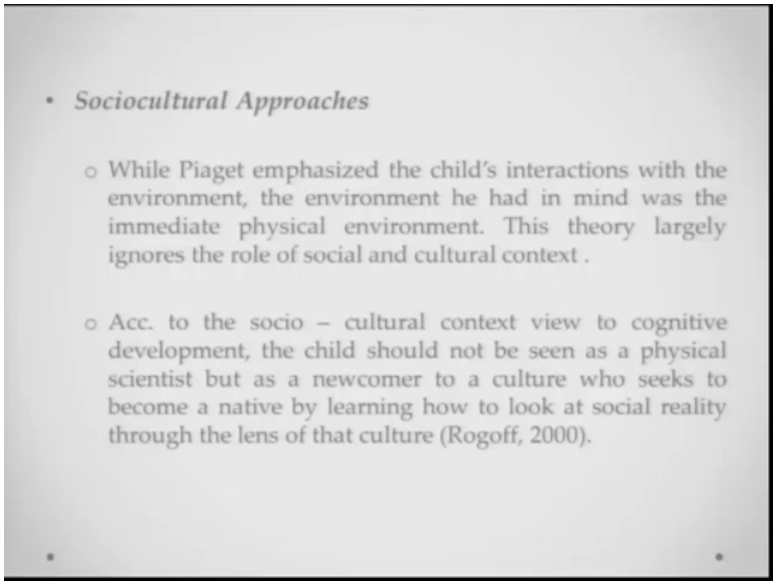

Now, we can move to socio cultural approaches, you know children's intelligence does not really develop or flower in isolation, it always is happening in response and in context of a particular situation. So, while Piaget was emphasizing children's interaction with the environment the environment he was talking about was the physical environment this one is kind of ignoring the cultural context largely, but other approaches the socio cultural context view of you know cognitive development.

It says that the child should not really be seen a only as a physical scientist, but also as a newcomer to a culture you know say for example, you were born in a African family or you are born in American family or born in Indian family within India there are so many different cultures that are there whether you born to a Punjabi family or you know or Tamil family or a Kashmiri family you know things like that.

So, the child has to also be seen as a newcomer to a particular culture and other than what cognitive intellectual development the child will be doing he will also be learning how the culture operates and as a very important aspect and you know the culture interacts with the kind of intelligence that the child is developing. So, this is something so, children are also seeking to become a native by learning how to look at social reality through the lens of that culture you know in my culture this is happening and you will see children kind of pick up these aspects of their culture almost automatically.

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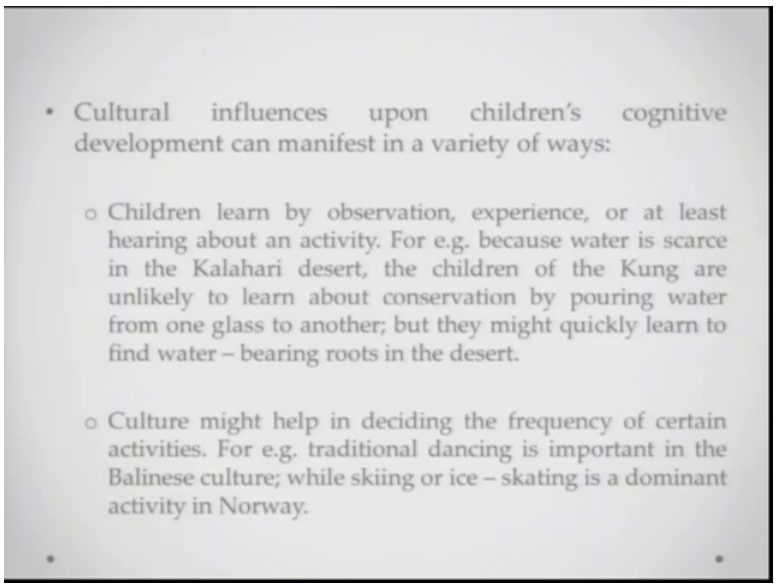

So, cultural influences about you know upon children's cognitive development can manifest in a variety of ways children learn by observation, experience or at least sometimes by hearing about an activity. A good example could be say for example; if you talk about people living in the Kalahari Desert water is very scarce. So, if you try and teach them this the concept of conservation by this you know the glass experiment example that I was showing you recently they might not really be able to learn that, but does that mean that these children are intellectually underdeveloped or they are challenge or something maybe not.

They have their own special set of skills for example, they can at even that particular age can succeed in finding and looking for water bearing roots because water is cursed you have to find any source of water that might be there. So, that is also the kind of

intelligence that is more culturally entrenched that is more situated within the context that the child is living in and that also needs to be emphasized adequately.

Now culture it might help in deciding or you know the frequency of certain activities for example, traditional dancing is very common in the Balinese culture. So, children in the born you know born and brought up in Bali might be very good at you know traditional dancing and those kind of things they pick up very quickly, but say for example, in Norway the culture involves a lot of skiing there is a lot of ice it involves a lot of skiing and skating.

So, same issue and here might develop skiing and skating a lot more than traditional dancing you will see you cannot really say that you know this one is more cognitively complex this one is more cognitively simpler both are physical activities both are basically within the cultural context that the child is born into Angeline kind of grasp them accordingly.

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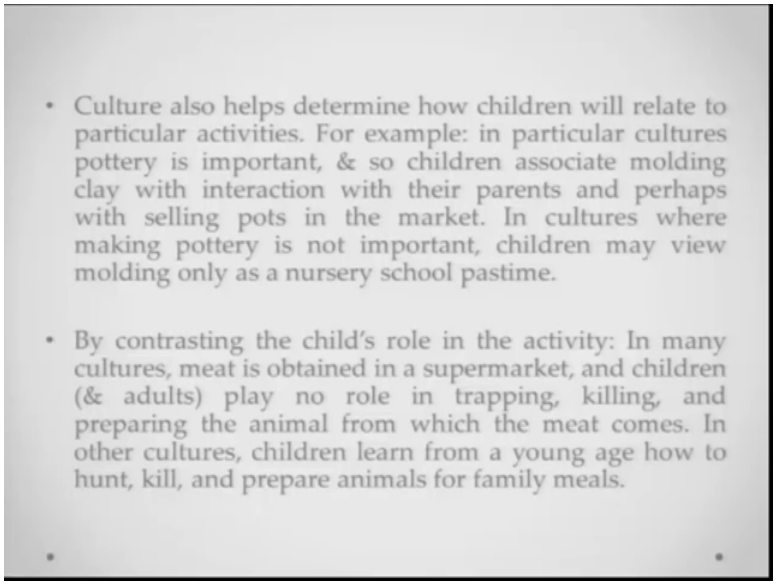

Culture also determines how children will relate to particular activities for example, children born in particular cultures where pottery is concerned considered important they will actually associate learning poetry a learning pottery as a very important function you know they will interact with their parents they will contribute to making pots and they will basically you know end up maybe selling pots in the market. That is there is a very

important social economic activity that the child is mastering at you know a very very early age.

In cultures say for example, you know or in privileged cultures for that matter were making pottery is just a hobby course children will not really attach that much importance to pottery. So, these people the formal people for whom making pots is part of their earning their livelihood, it is part of their social interaction they will learn pottery making in much more nuanced ways as compared to these people for whom pottery is just a hobby that you kind of learn to do and you know it pass it off pass it off as just a socially you know useful productive work kind of thing or you know just a nursery school pastime.

So, you can see how these you know how the culture is playing a role in just differentiating these different aspects of skill acquisition. By contrasting the child's role in the activity also cultures tells us a lot about how children will pick up something for example, in particular cultures meat is obtained in the supermarket and children and adults really have no part in you know getting the meat to the table they just go to the supermarket pick up the frozen meat pay the money and they are fine with it.

But in some other cultures say for example, tribal cultures etcetera that the meat basically has to be hunted you know it has to be basically you have to trap the animal kill the animals and prepare the animal that is the entire you know aspect of eating meat has all of these 3 or 4 steps. So, for them getting meat on the table is much richer activity as compared to our culture where just you have to go to the supermarket you know buy the meat from the freezer and pay and come back.

So, different activities how much the child is involved in a particular activity will also kind of determine how much you know what kind of intelligence, what kind of skill set, what kind of understanding of those activities, that the child will kind of grasp. So, this is again something where I am talking about this the role of culture.

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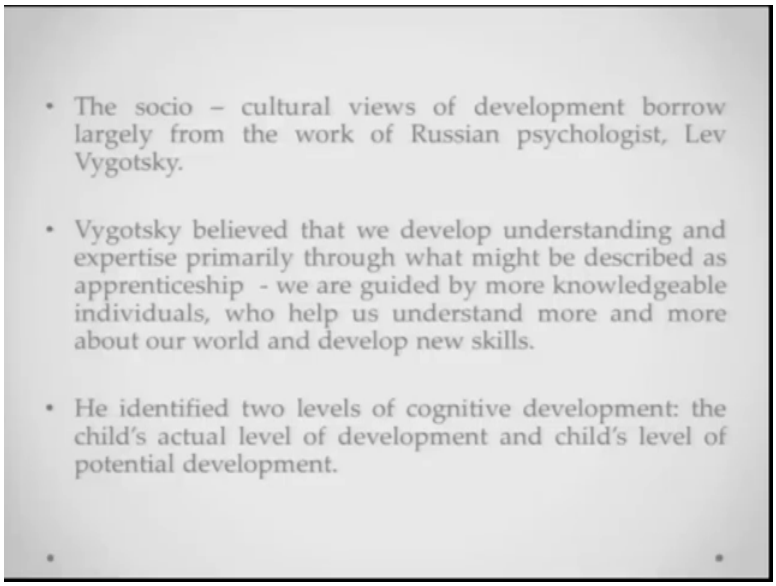

Now this socio - cultural views of development of cognitive development basically they borrow largely from the work of this Russian psychologist Lev Vygotsky. Vygotsky believed that we develop understanding you know and expertise, but I merrily through what is described as apprenticeship you know we are just we are just observing, we are just looking at you know being guided by the situation that we are in you know we are guided by more knowledgeable individuals and these individuals help us in understanding you know more and more about our world and you know they help us, in grasping more and more skills for children for that matter parents are these you know highly skilled individuals.

So, children are really getting most of their information from parents how do they behave, how do they eat, how do they sleep, how do they walk, how do they talk, all of those kind of things children are basically learning as being apprentices in the same things you know if the child eventually does all of the things that the father or the mother is going to do. All of the you know things that the child was skills are that the child will acquire, but the child is observing through these more knowledgeable more skilled people all of these aspects.

Finally, he you know Vygotsky kind of defined 2 levels of cognitive development the first is the child's actual level of development what the child can do at a given point in

time and the child's level of potential development say for example, what the child can do when taught and trained to do something.

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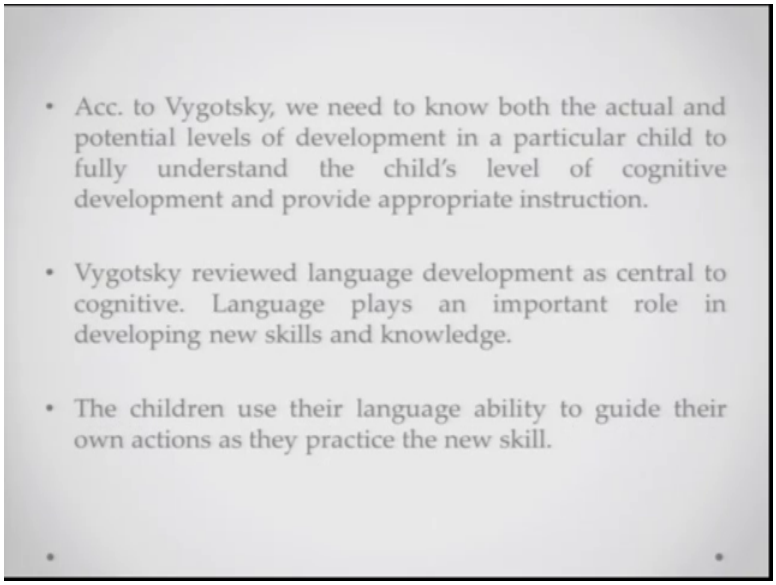

So, Vygotsky basically says you know that if you really want to measure you know the how the child is developing you basically need to take into account both the actual development, whatever the actual things as a child can do and also potential development you give the child some task see how you can help him do it and see how quickly is picking up that task.

So, to talk about a particular child you have to take into account both of these things and that will be you know giving a more better they will be giving a better measure of the cognitive development and you know it will help you provide appropriate instruction to the child. Vygotsky reviewed language as central to cognitive development he says that you know language plays a very important role in developing the new skills and knowledge.

Language is actually one of the things that as we have talked about in this entire course that it plays a role in understanding thoughts it plays a role in communicating expressing all those kind of things and so according to Vygotsky language is one of the central tenets of how cognitive development really goes through.

He says that children use their language ability language ability to guide their own actions and to practice the new skill I mean that is one of the things that children are constantly using and that is something that contributes to their overall development.

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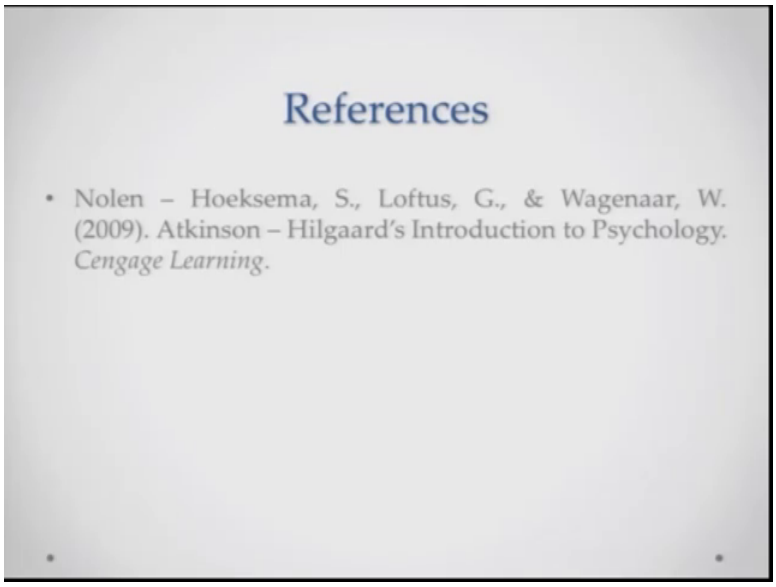

So, that is all from my site about cognitive development and we talked a little bit about how they are you know initial perceptual abilities of the child are and will continue talking about various aspects of development in the next lecture.

Thank you.