Advanced Cognitive Processes
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Lecture – 39
Cognition Development –IV

Hello everyone, hello and welcome to the penultimate lecture of the course introduction to advanced cognitive processes I am Ark Verma from IIT Kanpur and in this week we have been talking about various aspects of cognitive development. Now, I have talked about in this week already about biological factors that are responsible for human development, emotional development, motor development, we have talked at length about cognitive development.

We have also talked in some sense about you know slightly complicated processes like theory of mind and development of moral judgment etcetera. Now in this penultimate lecture of the week I actually wanted to take one of the aspects of cognitive development separately and talk about it in terms of how it develops across the lifetime of an individual.

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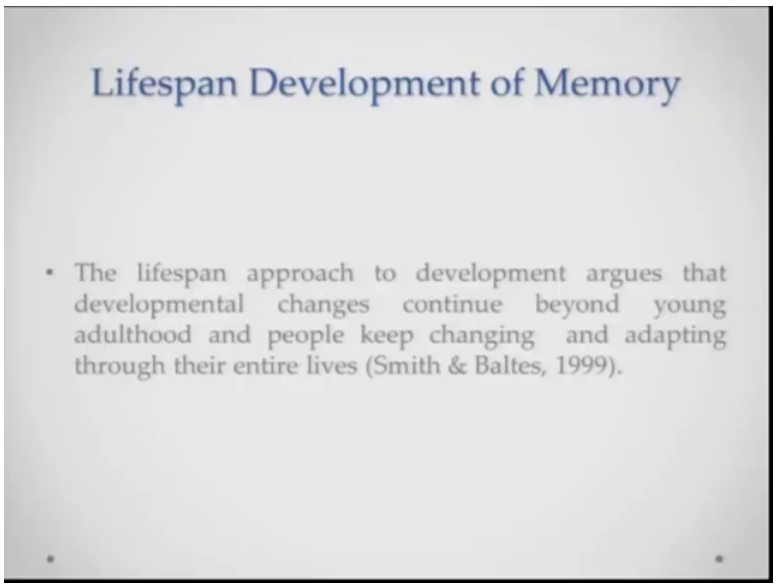

The approach that I will be using to talk today is a referred to as the lifespan development of memory. So, I am I will be talking about this lifespan approach to

development which argues that developmental change is continue beyond the young adulthood and people keep changing and adapting through their entire lives.

Now the lifespan approach to development can be contrasted with you know typical notions about development where it is believed that the entire physical and cognitive maturation of the individual kind of you know culminates and you know reaches it is peak around the young adulthood time and they are not majors or significant changes that are going to come after that age onwards.

In contrast the lifespan approach to development of any aspect of human development and we are talking about memory today is the fact that you track the changes that happen with respect to that particular ability that you are trying to you know work with and see how it changes across the lifetime of an individual.

For example, we will talk today about how memory you know develops how the skills about memory develop from very young children from 3 days to few months old children to you know senile population to elderly people 60, 70, 75 year old individuals and we will see what changes come in this component of memory? How do people adjust to the coming changes? What are the strategies they used to remember stuff? And how do they organize information? What are the other skills that might help people to really you know kind of keep track of their memory abilities?

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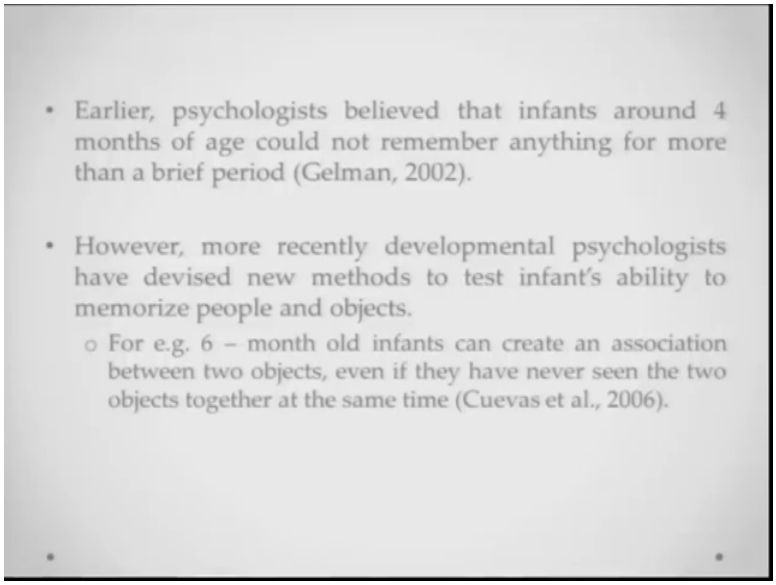

Let us move slightly further. So, earlier it was believed in psychologists believed that, infants around 4 months of age could not remember much could not remember anything for more than a very brief period of time. Now this finding could also be a result of the kind of testing methods that were available then because more recently developmental psychologists have come up with new ways to test the infants ability to memorize people and object and they have basically opine for the fact that around 6 month old infants can actually create association between objects even though they have not really seen those objects presented before together at the same time.

So, there are cases being made the research is suggesting that cognitive psychologists might have underestimated the, you know the level of skill that children would have with respect to memory you know at the given age. So, let us kind of move slightly further from there when you talk about memory when you talk about say for example, what are the things that the child would you know need how would the child attend to learning and acquiring a new information.

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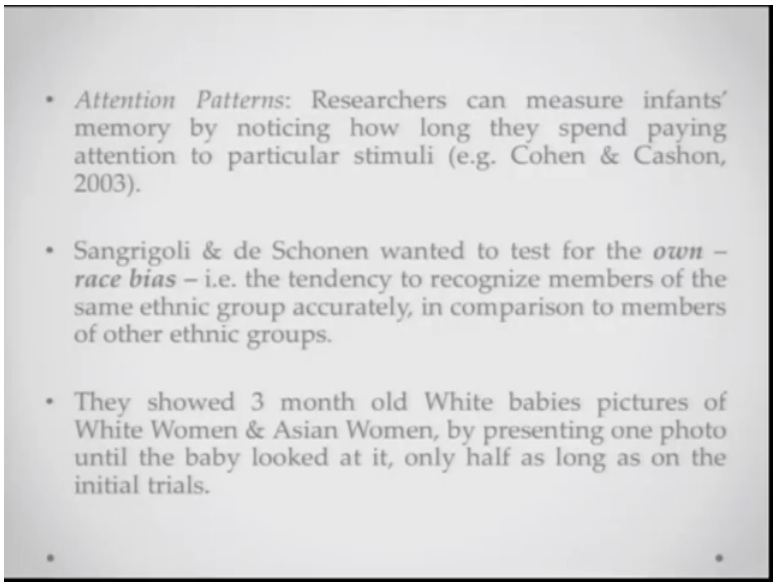

So, attention patterns basically is a very important components, the thing that the child pays attention to if you remember I was talking to you about this a little bit when I when we were discussing about language acquisition. The child has to pay you know a lot of attention to whatever speech stimuli are going around the child whatever in donations are being used with what kind of emotional expression somebody's speaking whatever

sentence and where the child is doing is the child is paying attention to all of these signals even though it is not really understanding it in one sense of the word , but the fact is that the child is a very attentive listener and the child is processing all of this information.

Similarly, this attention that the child is applying to his or her environment to whatever is being said or done around the child is very important for the child to basically acquire or learn new material and it is in that sense a very important aspect a very important ability that could contribute to say for example, children's memory researchers have nowadays can measure infants memory by noticing how long this spend paying attention to particular stimuli that is can be one of the ways if you remember we were talking about habituation and dishabituation when we are talking about language acquisition.

So, if the child is you know is getting familiar if the child recognizes his particular things then the child will not need to pay a lot of attention to that same thing again and again. So, this is one of the ways that researchers who work with very young children infants for that matter use to infer whether the child has acquired or remembered something or not.

A very good demonstration of this one could be actually seen in Sangrigoli and de Schonens study where they wanted to test children for the own - race bias. Now own - race bias in memory is basically it refers to the tendency of people to recognize members of the same ethnic group more accurately in comparison to members of other ethnic groups.

So, Caucasian children are given tasks to remember Caucasian faces to memorize Caucasian faces versus to memorize say for example, African American faces then you would see that generally these children would probably you know recognize faces white children Caucasian children would recognize faces of Caucasian people slightly better then they would recognize the features of the African American people.

Now, it is just an example the study in question here basically compared 3 month old white babies Caucasian babies and they showed them pictures of white women and Asian women and the idea was they would present these pictures to the child repeatedly again and again till the amount of time that the child looked at the picture for reduces to almost half. This logic basically says that because now the child has memorized and the child

knows that you know this is a familiar face. The child really does not want to spend much time on that, children are in some sense slightly miserly about how they you know going to use their resources.

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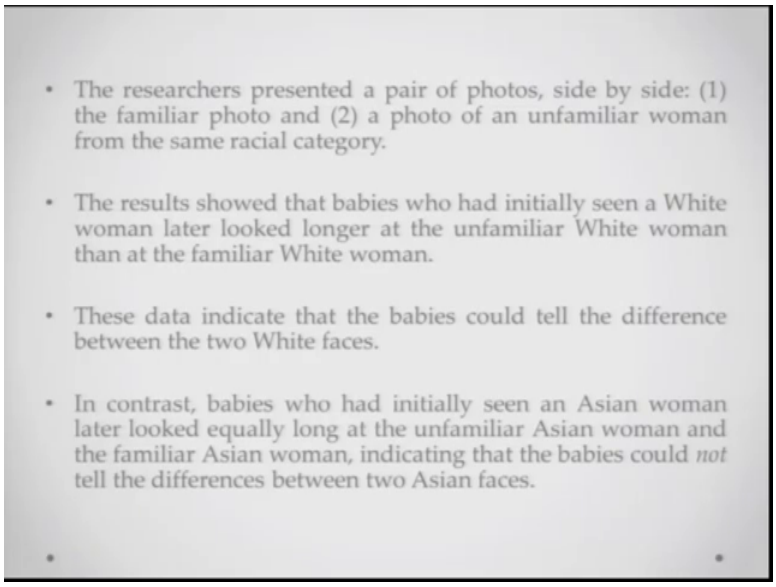

Now, in this study researchers presented a pair of photos side by side there was one familiar photo and a photo of an unfamiliar women from the same racial category. So, some testing was done they were made familiarize with some photos and then a familiar photo and an unfamiliar photo from either the same racial category or a different racial category could be presented.

The results showed that babies who had initially seen a white woman and had gotten familiarize later looked longer at the unfamiliar white woman than at the familiar white woman. So, the idea is because they had been familiarize with this thing they are not really going to is take you know spend a lot of time looking at these pictures they are going to look slightly longer at the unfamiliar white women these data indicate that the babies could certainly tell the difference between familiar and unfamiliar white faces.

Further babies were initially seen an Asian women remember we are talking about white babies, babies would seen and initially an Asian woman later looked equally at the familiar Asian women and the unfamiliar Asian woman, why is this happening because they are probably not being able to memorize the features of the Asian face as well as they were able to memorize the features of the white American face.

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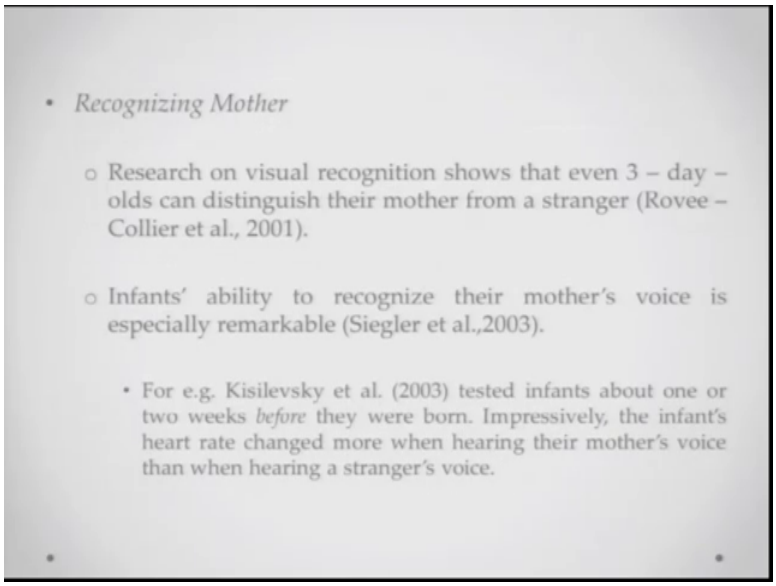

So, that is basically the demonstration of that the fact that own race bias exists, but it actually is more of you know more of a demonstration about that babies you know even at around 3 months of age and start remembering faces.

Let us talk about a different kind of memory again when we are we talking about infants. So, recognizing mother research on visual recognition shows that even 3 day old infants can distinguish their mothers face from a strangers face that is something slightly remarkable also infants ability to recognize their mothers voice especially remarkable.

Kisilevsky and colleagues in 2003 they tested infants about 1 or 2 weeks even before they were born. So, in the last couple of weeks of the pregnancy and they observed that the infants heart rate changed more when hearing the mothers voice than when hearing an unfamiliar strangers voice. So, already you can see even before the child is born the child has acquired a degree of familiarity with the mothers voice as compared to the voice of somebody else.

Now, there is this a very interesting technique that people have used to kind of check whether children have memorized something or not. So, this one is referred to as the Conjugate Reinforcement technique.

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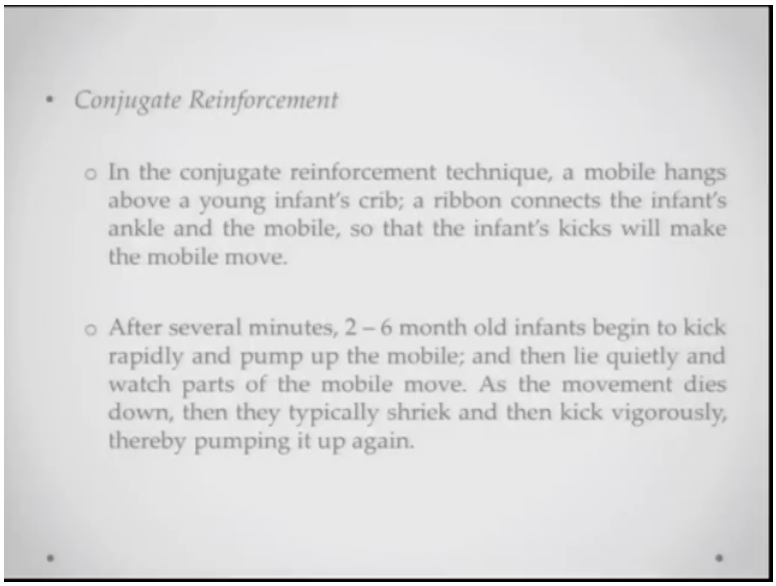

Now, in the conjugate reinforcement technique what happens is that it is a mobile that hangs over our infants crib and there is a ribbon that connects the infant's ankle and the mobile stand. So, the idea is whenever the infant is going to move for his or her feet the mobile is basically going to move you know there is going to be motion.

Now after several minutes after this training is done after several minutes 2 to 6 month old infants they start to kick rapidly and pump up the movement of the mobile and then lie quietly and watch parts of the mobile move now I am not really referring to a mobile phone here I am referring to something that kind of moves over the cribs over the infants crib.

Now so, after several minutes 2 to 6 months old infants can begin to learn the fact they can begin to appreciate the fact that as soon as they kick the mobile starts to rotate. So, they will kick for a time once the movement is initiated they will kind of lay back and watch it is movement and that is there is a very interesting play idea as well.

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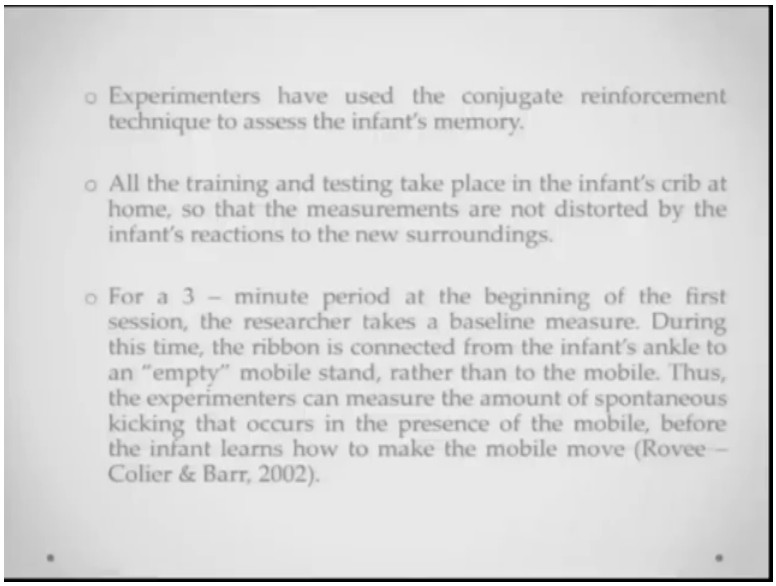

Now, they use this technique of conjugate reinforcement to assess the infants memory now what they do is they do all of the initial training in testing at the babies home in the babies own crib. So, that none of the reactions that the baby is going to make are basically because they are unfamiliar with the surroundings.

Initially what they do is, they give a 3 minute period at the beginning of the first session the researcher kind of already takes a baseline measure how much that you know, how many movements or how many kicks the child is making anyways, during this time the ribbon is connected from the infants angle to an empty mobile stand. So, there is just the stand there is nothing that is going to move and attract the child's attention thus the experiment can now measure the amount of spontaneous kicks how much ever the child is kicking and the and they just note it down as a comparison to be made later.

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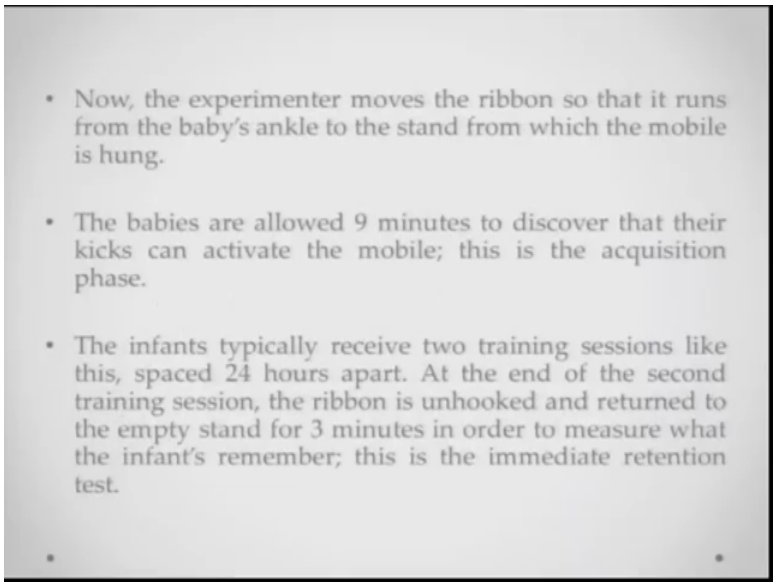

Now, the experiment moves the ribbons and the next thing the that this one does is that they can kind of measure the amount of spontaneous kick and then they be basically before the infant starts to move the mobile later what they do is and the moved the ribbon so that it turn runs from the babies angle to the stand in which now the mobile is hung.

So, they kind of connect these two things the babies are allowed around 9 minutes to discover that when they kick it activates the movement of the mobile and this is basically refer to as the acquisition phase.

So, now, the baby is learnt the fact and when I will kick the ribbon will actually let the mobile move, the infants basically receive these two training sessions typically around 24 hours apart from each other at the end of the second session the ribbon is unhooked and returned to the empty stand for 3 minutes. Now again it is written and the mobile is moved and ribbon is tie to the empty stand in order to measure whether the infants remember that they have to make this movement make this kicking movement to start the revolution.

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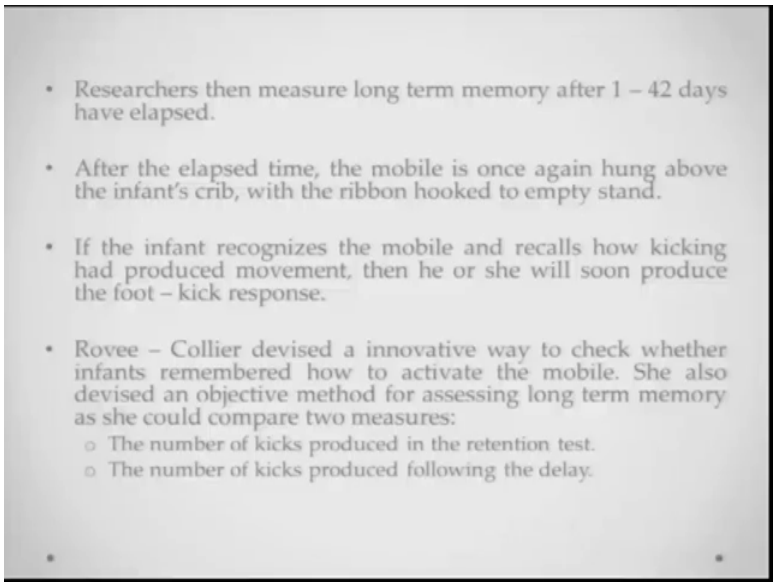

Researchers then measure long term memory after 1 to 42 days have elapsed, after the elapse time the mobile is hung again above the infants crib with the ribbon hooked to the empty set. So, that is done if the infant recognizes the mobile and calls how kicking had produced movement then he or she would soon produce that foot kick response to make the mobile turn.

Rovee - Collier who actually was doing this research devise an innovative way to check whether infants actually remembered how to activate the mobile, she also devised an objective method for assessing the long term memory as she would now compare two measures they were taking two measurements first was the number of kicks produced in the retention test without the time being elapsed and the number of kicks after particular time has elapsed. So, they have two tests available.

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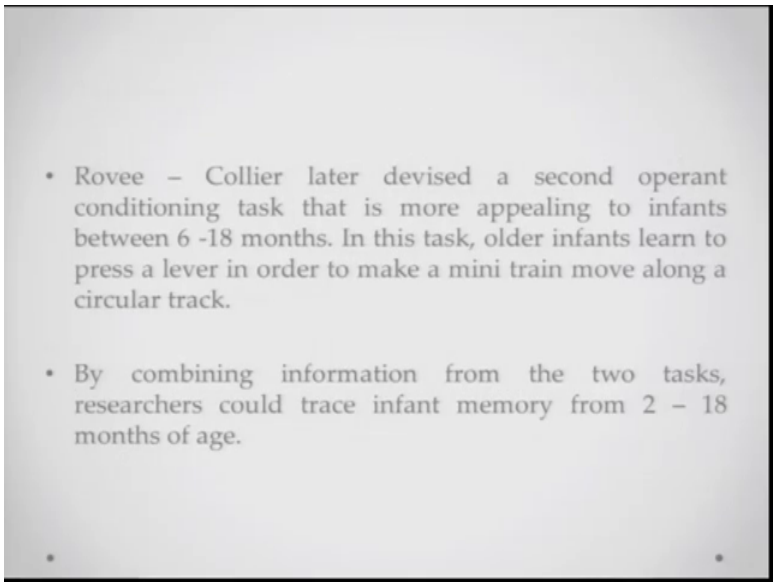

The later also devised a second operand conditioning task which is more appealing to infants slightly older 6 to 18 months old infants and in this task what was happening was the infants had to learn to press a particular level. So, that a trained you know a toy train could move around a circular track.

Now, they had these two tasks and they would compare the findings from these 2 tasks to trace infant memory from as early as 2 months to as late as 18 months of age.

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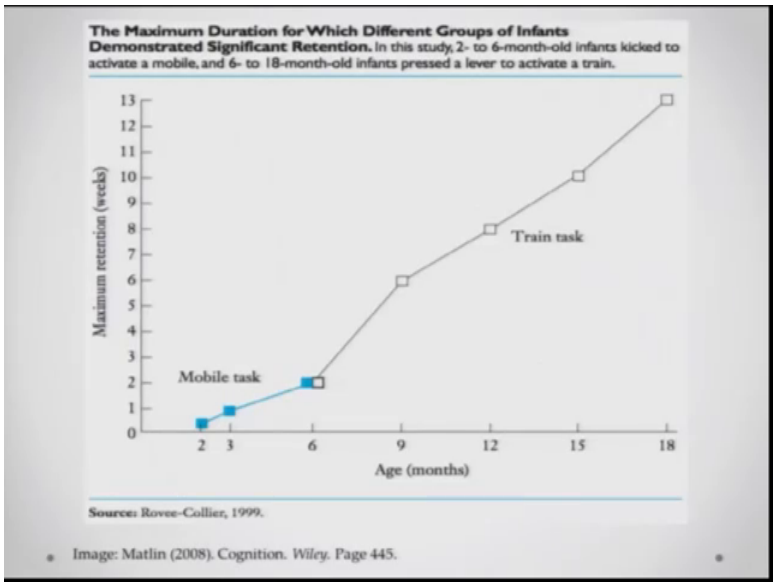

You can see here if you compare that mobile task and the train task you can see that 2 to 6 month old infants already kick to act activate a mobile and 6 to 18 month old infants they press a lever to activate it you can see that the amount of retention that is around the age of 6 months they would already retain this idea of kicking to produce a mobile movement for around up to 2 weeks.

Then you see that as the age in months increases the amount of retention goes from you know starting from 2 weeks to up to 13 weeks in the train tasks. So, this basically says the memory or the memory of the child in doing particular things is increasing and the amount of retention is increasing over time and it is almost a steady and linear improve during the first 18 months of life.

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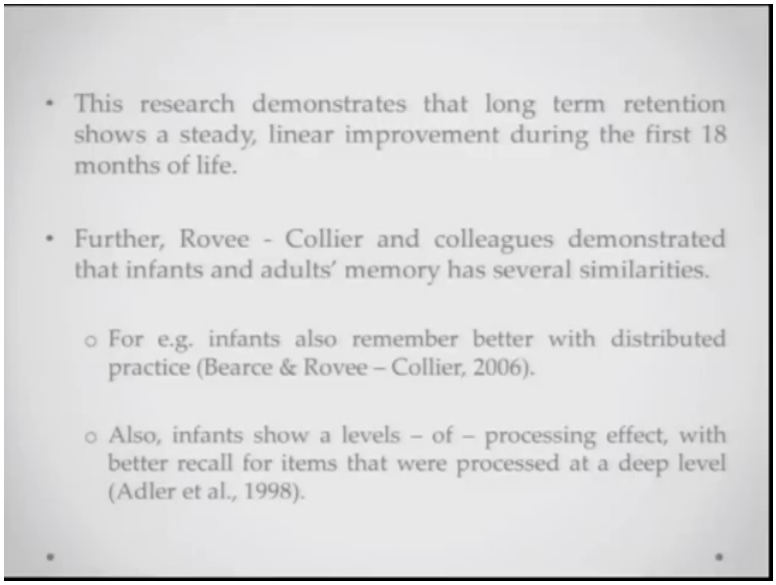

Further Rovee - Collier and colleagues demonstrated that infants and adults memories has a very you know has quite a number of similarities, for example, infants also remembered better with distributed practice you give a a person you know an adult 18 years 20 or 25 year old person you give them a list to remember and ask them that you know you memorize this directly all of this much in just this much lit this little time and come back and I will take a test.

You will see that they perform rather poorly , but if you give them some material and you ask them to you know study it in separate batches you study this for 1 hour take rest, then study this another material for 1 hour take rest and study another material for 1 hour and

take rest then if you take the you know test of recall you will find that they have done better. Infants are also basically work like that they also remember better with distributed practice it is not really a great idea to make them learn everything at one go, infants show as well as adults the levels of processing effect.

If you remember creek and (Refer Time: 15:17) I have talked about this in the course on mem, in the last course basic cognitive processes when we have talked about memory in much detail that in infants also there is better recall for items that a process at a deeper level, just to remind you shallower level is basically when you are just looking at the physical structure say for example, the sound and you know the number etcetera.

The deeper level is when the infant or when the child is started appreciating the meaning, started appreciating how to use that information that is a deeper level. So, if they process something to a deeper level they learn to use something they learn a skill for example, the kicking or the pressing lever thing they will remember it much better as compared to if it is just a you know information about how sound is like and those kind of things.

Now, let us talk about memory in children we have kind of moved slightly away from infants let us talk about slightly older children and you know memory is basically at least 2 major components working memory different components therein and long term memory.

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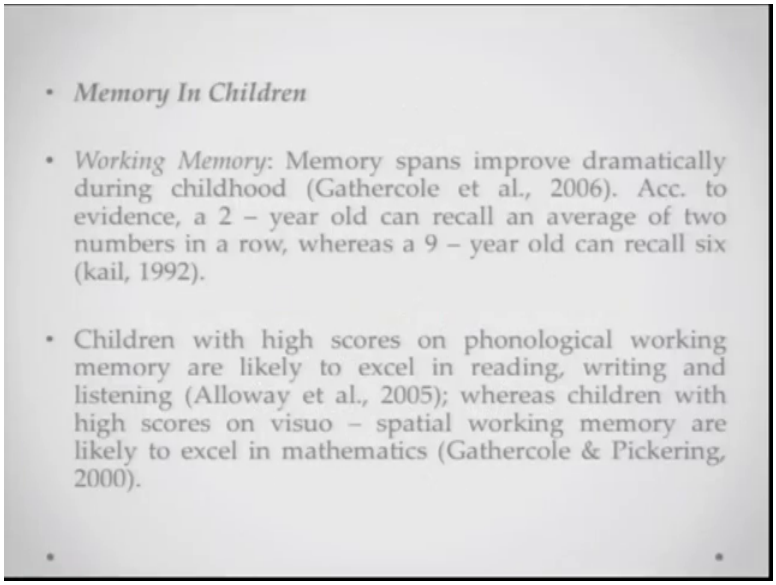

Now, let us talk about talks a little about working memory, memory spans basically improved dramatically during childhood according to a research evidence a 2 year old can recall about an average of 2 numbers in a row whereas, 9 year olds can already recall around 6 numbers in a row. So, the yours think you think that the span of memory is increasing with age, children with high scores and phonological working memory a component of working memory are likely to excess in likely to excel in reading, writing and listening language related tasks.

Whereas, children who have a higher score on visual spatial working memory the manipulation of information shapes and figures etcetera they are much likelier to excel in mathematics. So, you can see the relative contribution of the kinds of skills that the children will be good at and might lead to them being good in particular aspects of the studies.

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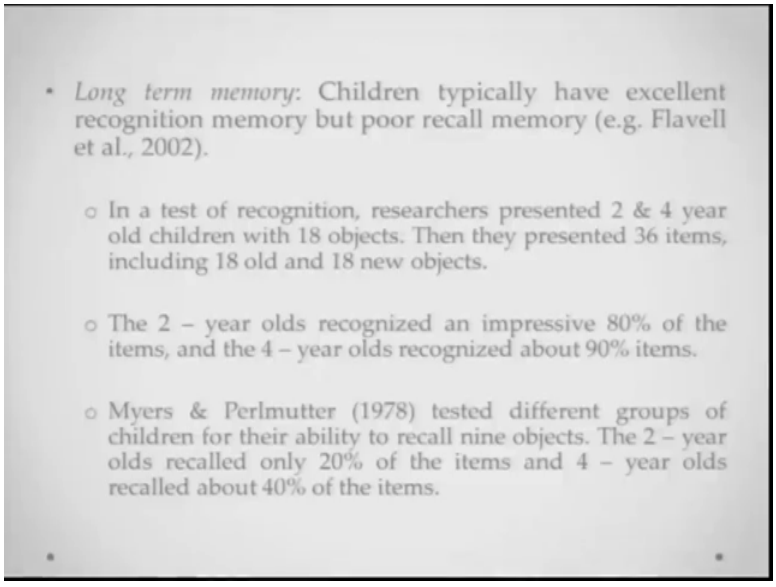

When you talk about long term memory children typically have excellent recognition memory, but they have a rather poor recall memory. In a test of recognition researchers presented 2 and 4 year children with around 18 objects and they later presented a mix of 18 older objects that they had already presented and 18 newer objects what they find is that 2 year olds recognition impressive 80 percent of the items whereas, 4 year olds recognized about 90 percent of the item. So, you see again there is this increase in recall with age.

In another study Myers and Perlmutter they tested different groups of children for their ability to recall a set of 9 objects, the 2 year olds recalled only about 20 percent of the items of the 20 percent of the 9 objects whereas, the 4 years recalled around 40 percent of the 9 objects it is you will see it is almost linear with age.

Now a very important aspect of memory performance or even our memory performance or children's memory performance in general is, what are the strategies you are using to learn particular material that is a very very important aspect. So, memory strategies in that sense are very crucial to somebody's memory performance eventually.

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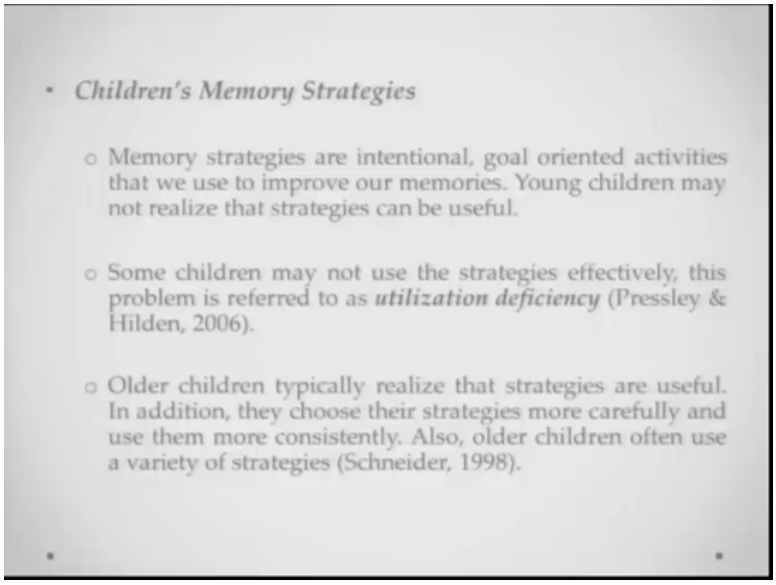

Memory strategies just to define it for you are intentional goal oriented activities that we use to improve our memory suppose for example, children and even adults for that matter they learn information with the goal of using it somewhere for children it is performance in school tests, classes, etcetera for adults it might be to use somewhere to use it as an argument to use it to do something.

Now young children do not always realize that strategies can be useful we do not appreciate the use and the kinds of strategies that might be available to them to you know learn a particular material better. Some children may not use these strategies effectively and this is a big problem this is referred to as the problem of utilization deficiency, they are not really bad at their memory the memory is not really bad, but you are not either

aware of the strategies that can we use also they are not really using those strategies effectively and consistently.

Older children; however, a typically realize that strategies are very useful in addition they choose their strategies more carefully and use them consistently you can kind of link it with the school performance, the school is getting tougher expectations to learn information is there, there is this pressure to retain as much as possible children already start figuring out ways of remembering and retaining information and in that process they start using strategy start you know hit in trial use this strategy use that strategy and then plan carefully that this one works best for me or this one works best for me.

Older children also often use a variety of strategies so, they can kind of as I was saying the kind of choose between the number of strategies available to them.

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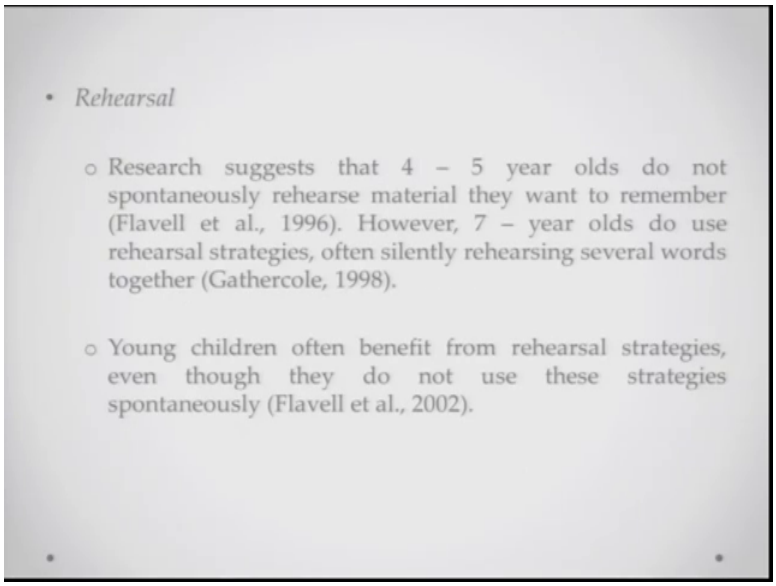

Now, the amount of information that you will remember also depends upon the kind of rehearsal that you are going to engage in. So, researchers suggest that 4 to 5 year olds do not really spontaneously rehearse material they want to remember. So, they do not really have this you know this idea of strategy.

However, 7 year olds you know use they do use rehearsal strategies by the time they are 5 6 7 years old these do use strategies and they often silently rehearse several words you know, by 7 year old you might at least be required to start remembering you know

nursery rhymes and those kind of things and this is where you will see that children are kind of you know repeating things mumbling them in their mouth so, that they can recall this kind of information.

Young children often benefit with the rehearsal strategies even though they do not use the strategy spontaneously they have to be instructed they have to be helped to start using these strategies, but once they use start using these strategies they do benefit from you know these strategies.

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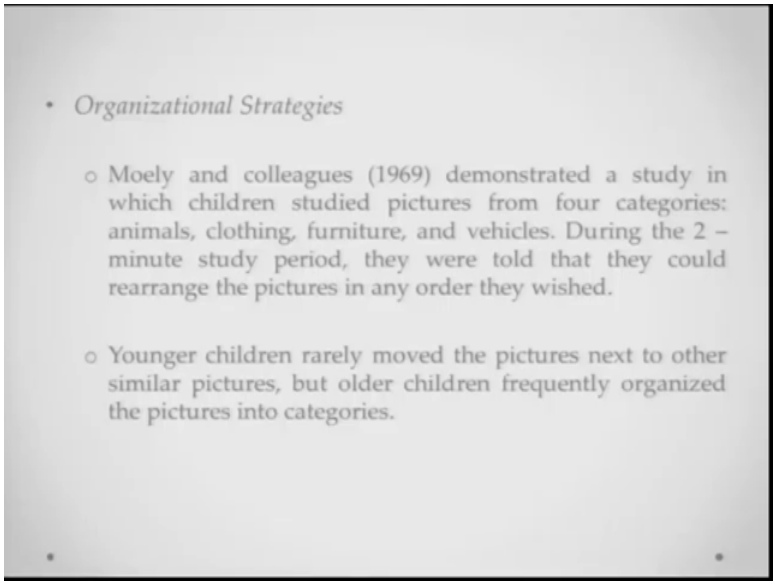

There could be organizational strategies as well that might help the memory performance of individuals. Moely and colleagues in 1969 they demonstrated in a study in which children studied you know they looked at pictures from 4 categories, animals, clothing items, furniture and vehicles. During the 2 minutes study period, they were told that they could organize and rearrange these pictures in whichever way they wanted this arrangement could actually help them recall stuff better.

If you remember in the memory chapter we talked about that if you start classifying things in categories you might be able to retain them better. But young children could really move the pictures next to each other you know they could not bring similar pictures together older children; however, appreciated the rule and they frequently organized the pictures into these different categories.

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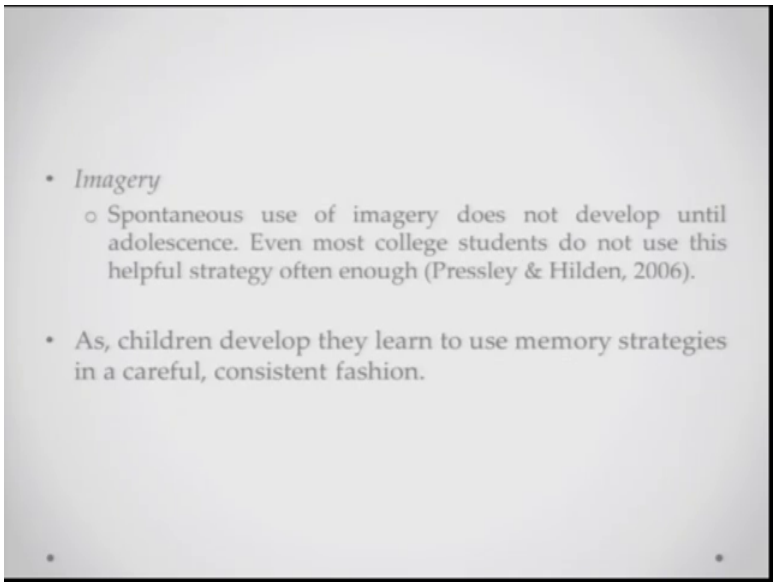

Talking about imagery sometimes imagery is a good way to retain information if you remember how people would memorize cognitive maps or general you know and how people would recognize you know paths or routes or you know layouts of places use of imagery is very helpful for retaining information in memory; however, it is seen that it is not really research evidences or suggest that people use it so liberally.

Spontaneous use of imagery does not even develop till until adolescence even though even most college students they do not really use imagery as a strategy of10 enough to remember information. So, all in all as children develop they learn to use a variety of memory strategies in a more careful and consistent fashion and that already reflects in their memory performance.

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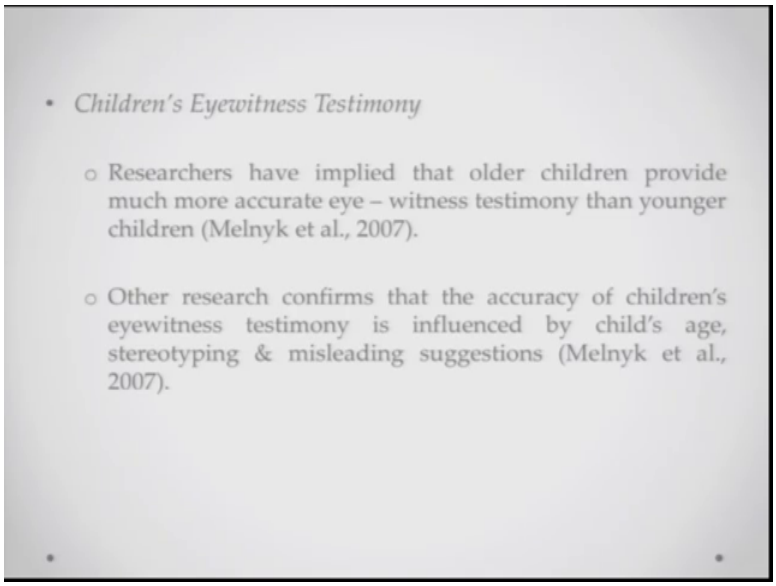

Now I will be talk to you a little bit about some applied aspects of children's memory. So, eyewitness testimony researchers have employed have implied that older children provide much more accurate eyewitness testimony than younger children, also research confirms that the accuracy of younger children's eyewitness testimony is often influenced by the choice age stereotyping and misleading suggestions.

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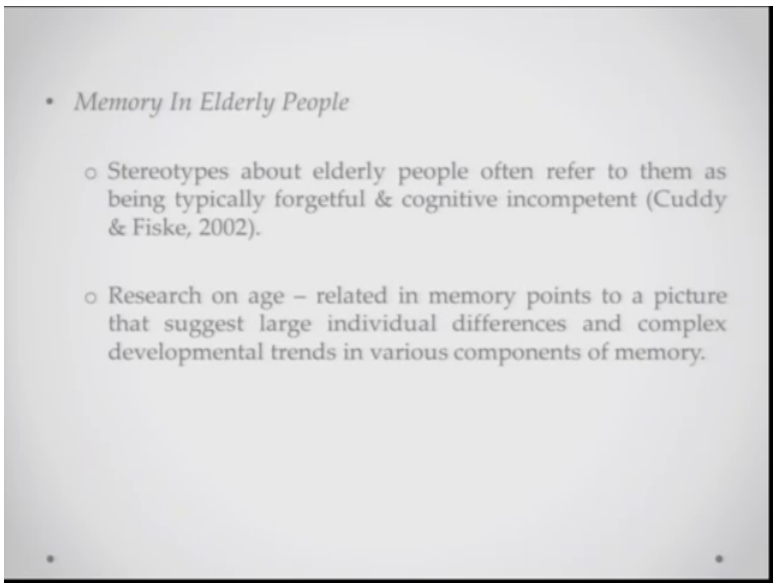

Now, we have talked a little bit about children's memory aspects of children's memory, now let us move to the memory aspect of elderly people you know this is the lifespan

development approach that we are following. So, I have kind of already given you a brief survey of what kind of memory abilities are there in children let us now survey briefly what are the memory abilities of elderly people.

Stereotypes about elderly people often refer to them as being typically forgetful and all way and also cognitively incompetent at times, research on age related changes in memory point through a picture that suggests larger individual differences and complex developmental trends in various components of memory.

So, the picture is not really clear you cannot really definitively say that there is a significant decline in adults memory in elderly peoples memory unless you know they are suffering from a disease like Alzheimer's or dementia or those kind of things. People who are developing normally and you know they have no diseases and they have a significant degree of education it research has shown that it does not really impact their memory so much.

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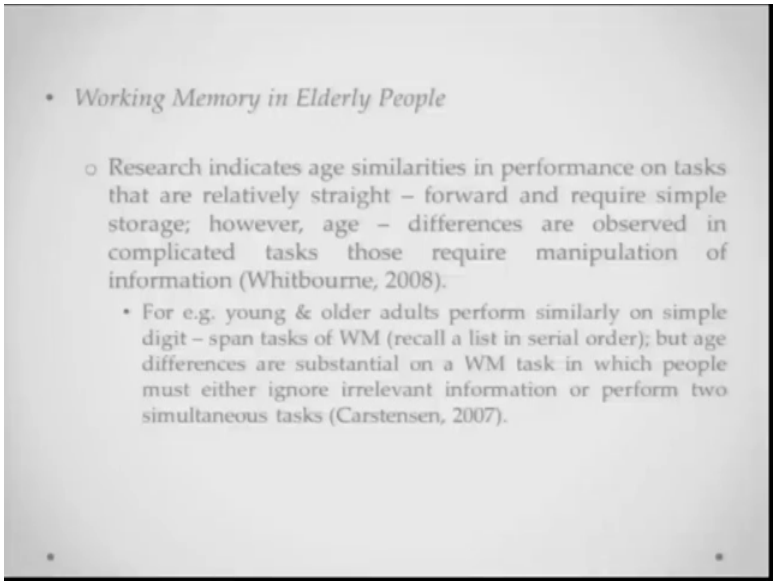

Let us talk about working memory research indicates that there are 8 similarities in performance and tasks that are relatively straightforward and require simple storage; however, age differences are observed in complicated tasks that require manipulation of information if you are you know if you are doing a working memory task say for example, the n back task you have to remember something that came on 2 trials back or 4 trials back or 6 trials back.

Young and older adults performs similar similarly on you know simpler tasks like digits pan asks that you know you just have to recall the numbers in serial order, but age difference are substantial on a working memory task where they have to keep some distracters away or perform 2 tasks simultaneously task switching kind of scenarios.

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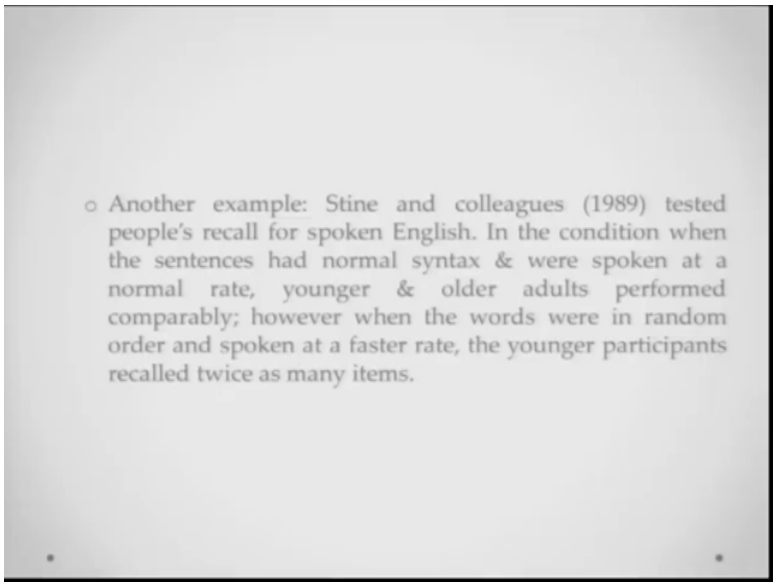

Another example sign in colleague tested peoples recall for spoken English and the two condition, in one condition the sentences were spoken in and the correct orders normal syntax and at normal rate of speech here the performance of adults and elderly people and young adults was the same, but when the there was you know when the syntax was jumbled in the words were in jumbled order and they were being spoken at a faster rate the young adults performed much better than the elderly individuals.

So, you can see that if the as the task gets more complex there in and there is where you can start seeing you know the difficulties in memory, talking about long term memory in elderly people. So, long term memory basically includes a few things it includes a semantic memory how they are going to use memory etcetera.

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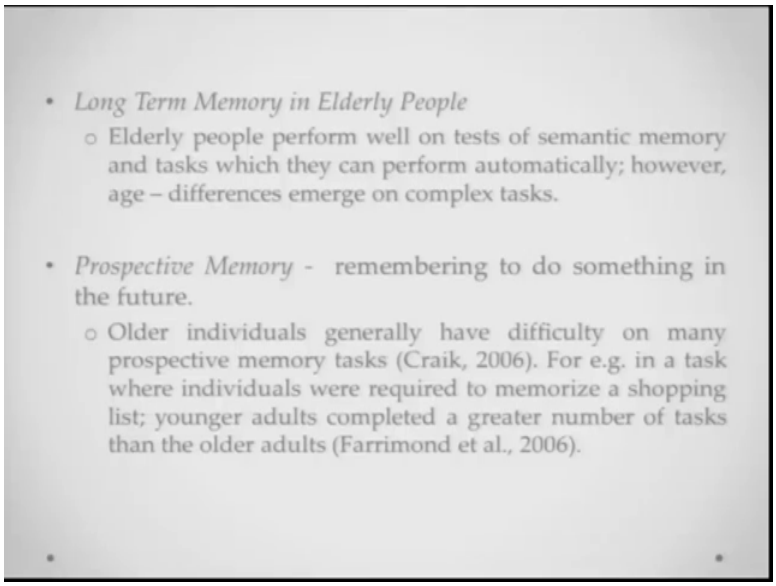

One of the aspects of long term memory is prospective memory that is remembering to do something in the future lists, to do lists, you know go and do this and come back in these kind of things.

Older individuals generally have difficulty on many prospective memory tasks for example, in a task where individuals who are asked you know required to memorize a shopping list something that they would have to buy from you know marketplace later young in younger adults completed a greater number of tasks than the older adults.

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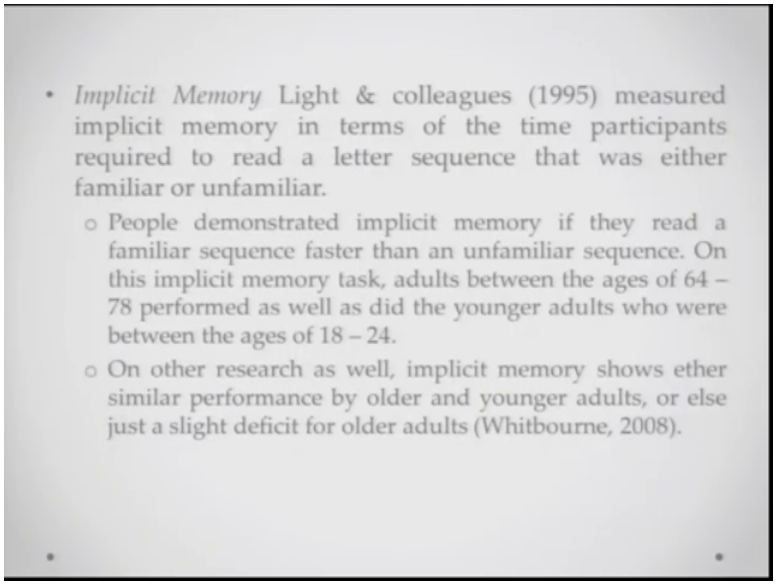

Implicit memory, implicit memory basically involves where there is no explicit recall in required.

But you have to do a task that involves memory often the previously learned information. Now, Light and colleagues measured implicit memory in terms of the time that the participants required to read a letter sequence that was either familiar or unfamiliar, if they could read the letter sequence first it did kind of indicated memory. So, basically when they did this task adults between the ages of 64 to 78 they performed relatively well as well as the younger adults who were between the ages of 18 to 24.

On other research as well implicit memory shows either similar performances by adults and elder adults and younger adults or else just a slight deficit for the older adults. So, in tasks of implicit memory you see that there is almost no difference between how elderly people perform and how young people perform.

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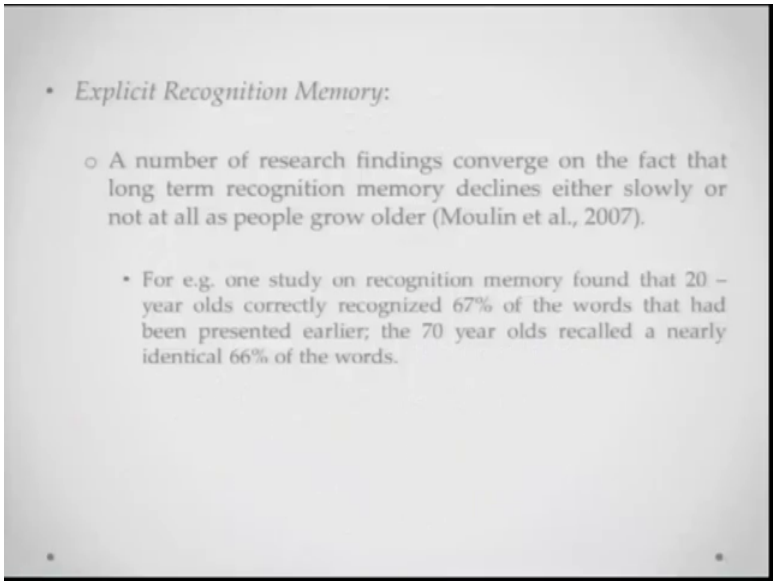

Explicit recognition memory a number of research findings have converged on the fact that long term recognition memory their explicit recognition is required either declines slowly or not at all as people are doing older. So, 2 kinds of things are possible in one of the studies they did recognition memory task they found the 20 year olds correctly recognized around 67 percent of the words that had been presented earlier and, but that 70 year olds recalled around 66 percent of the words so, there is almost no decline here.

But if you talk about this one was about explicit recognition memory this one is about explicit recall memory now explicit recall memory basically shows a lot of age differences the they are very marked age differences.

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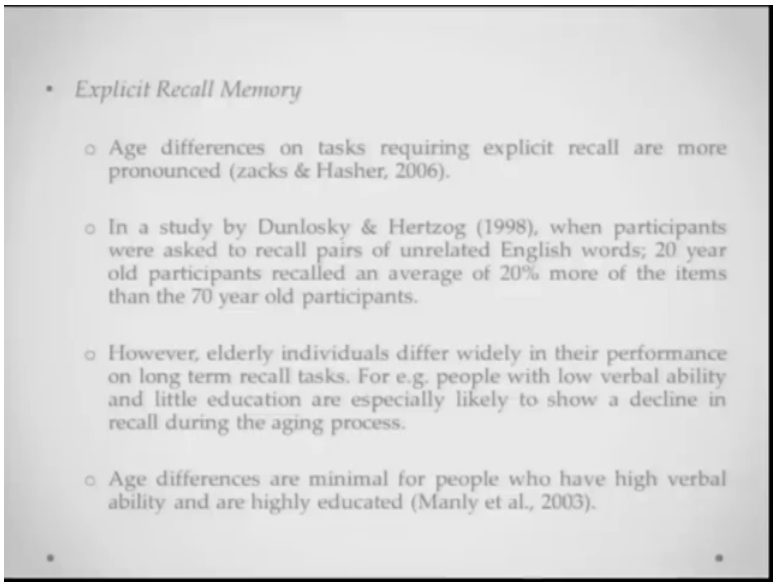

In a study by Dunlosky and Hertzog when participants were asked to recall pairs of unrelated English words, 20 year old participants recall an average of 20 percent more than the 70 year old participants.

However, elderly individuals also differed widely in their performance on long term recall tasks for example, people who would have low verbal ability and little education especially likely to show a decline, but people who have decent education and they are you know having good for availability they can basically show minimal age differences they kind of perform at par with a younger adult individuals that was something I was saying in the beginning of the class.

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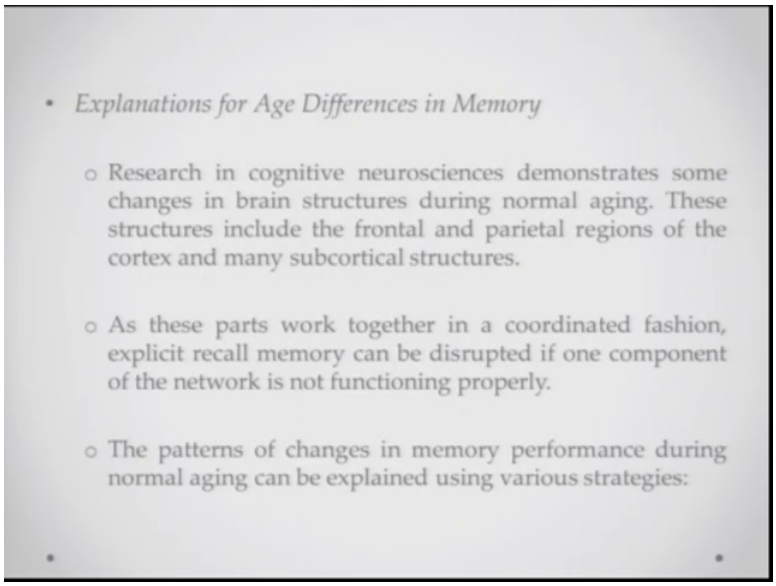

Explanations you know why are these age differences being observed let us talk a little bit about what could be the cause of these age differences between you know young adults and older people. Research in cognitive neuroscience demonstrates that you know there are changes in brain structure happening during normal aging. This change in the brain structure and these includes areas in the frontal and parietal region of the cortex and very many subcortical structures.

As these parts work together in a coordinated fashion and say for example, if one of the part is getting slightly tired or damaged let us say explicit recall memory can severely disrupted even if one of these components is not really functioning properly. The pattern of changes in memory performance during normal aging can therefore, being explained using a few strategies.

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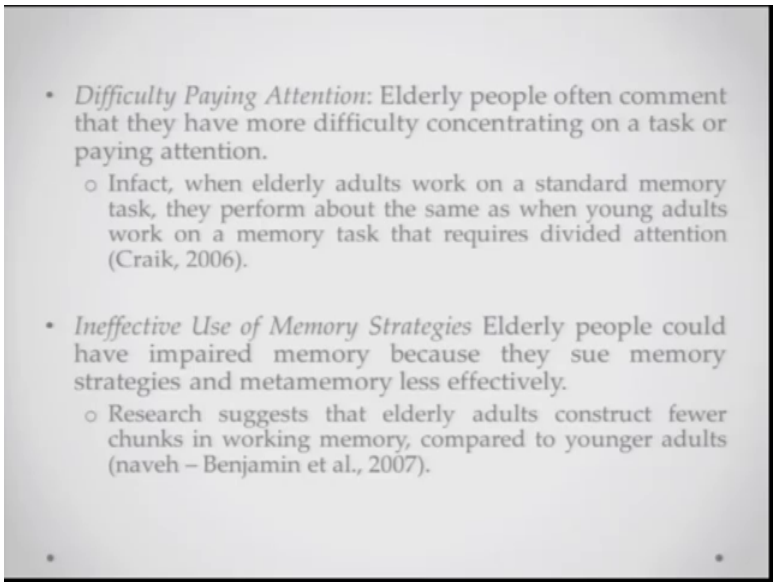

Let us see what are the strategies, first is that elderly people report starting to having trouble you know paying attention elderly people often comment that they have more difficulty concentrating on a task nowadays or paying attention. In fact, when elderly adults work on a standard memory tasks they perform about the same as when young adults work on a task which requires divided attention. So, it kind of tells you that in the elder peoples attentional resources are almost half of the attentional resources of the younger adults.

Ineffective use of memory strategies, I was referring to using memory strategies to m you know to boost your memory performance earlier, now elderly people could basically have a impaired memory because they kind of you know use memory, they kind of you know use memory strategies and metamemory less effectively, I will kind of talk about metamemory in more detail in just a bit.

Research suggest that elderly adults they construct fewer chunks in working memory as compared to older adults this could be just one corroborating evidence of the fact that they are not really using memory strategies properly.

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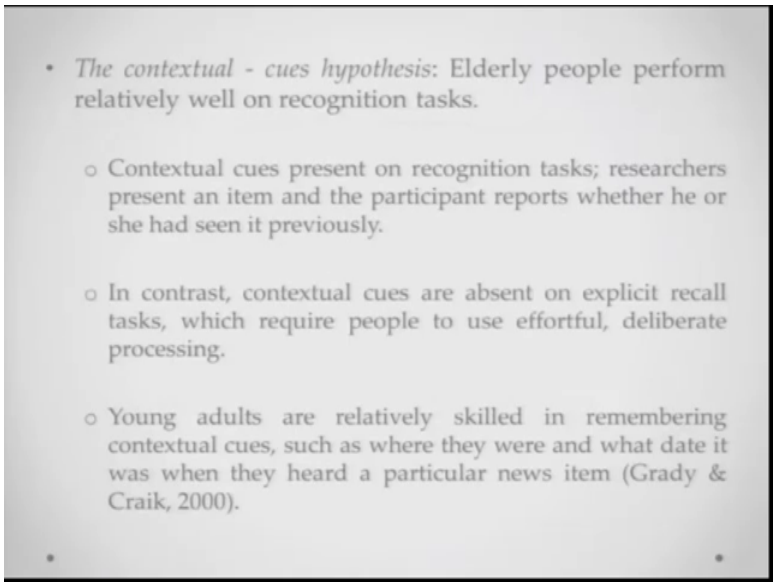

There is another hypothesis the contextual cues hypothesis, elderly people perform relatively well on recognition task because contextual cues are present on the recognition tasks itself. In contrast, contextual cues are absent on explicit recall tasks which require people to use effortful and deliberate processing.

Younger adults are relatively skilled in remembering contextual cues, such as where they were and way what date it was what were they doing when they heard a particular news item, but older people elder individuals might have a might have a problem with invoking these contextual cues and hence they would end up you know performing slightly poorly on these kinds of memory tasks.

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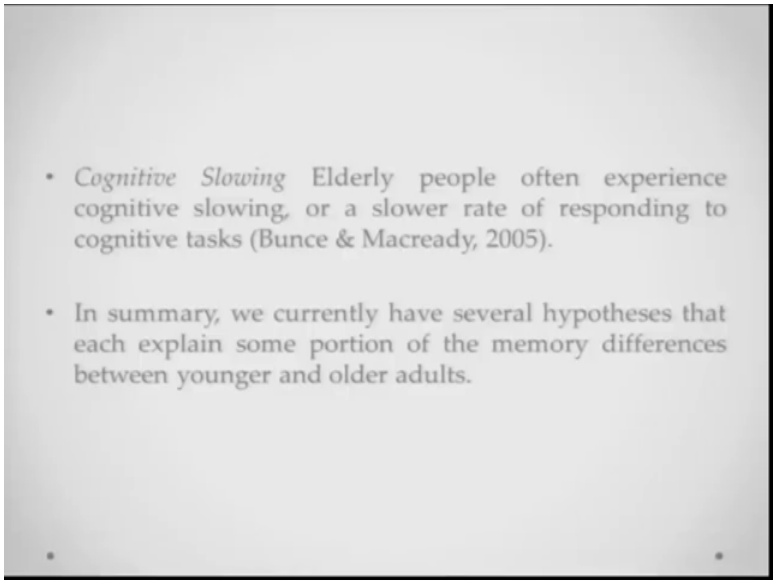

Finally, you could refer to cognitive slowing; elderly people often experience cognitive slowing or a slow rate of responding to cognitive tasks. So, this could just be a response thing which is basically reflecting in their performance on these kind of tasks. Now in summary we do have several hypotheses that explain some portion of the memory and differences that happen between younger and older adults.

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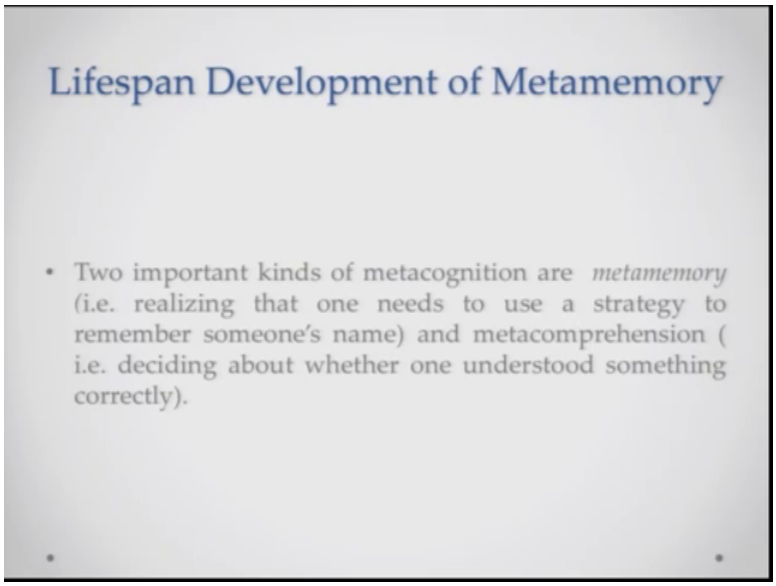

Now, we if I was referring to something like metamemory a bit low this is the time to start talking a little bit in more detail about this. Now there are two aspects of metacognition metamemory and metacomprehension, metamemory is basically realizing

that you need to organize this information in a particular way. So, that you remember it later you need to use a particular strategy so, that you remember this information better.

Meta comprehension is having that sense of whether I have understood this well or I have not understood this well these are two abilities I will limit discussion in today's class up to about to only metamemory.

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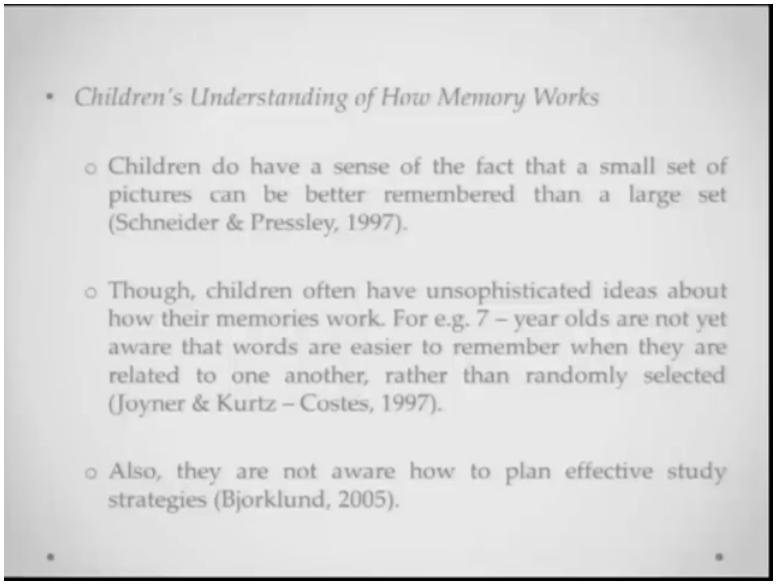

Now, let us talk a little bit about children's metamemory, metamemory would include how they understand that how memory works. So, children do have a sense of the fact that a small set of material or small set of pictures objects can be remembered better than a larger set though children often also have unsophisticated ideas about how their memories might be working.

For example 7 year olds are not yet aware that words are easily remembered if they are associated to each other as compared to you know whether they are randomly selected or not. Also younger children are not really aware of how to plan an effective study strategy so that they could remember information better.

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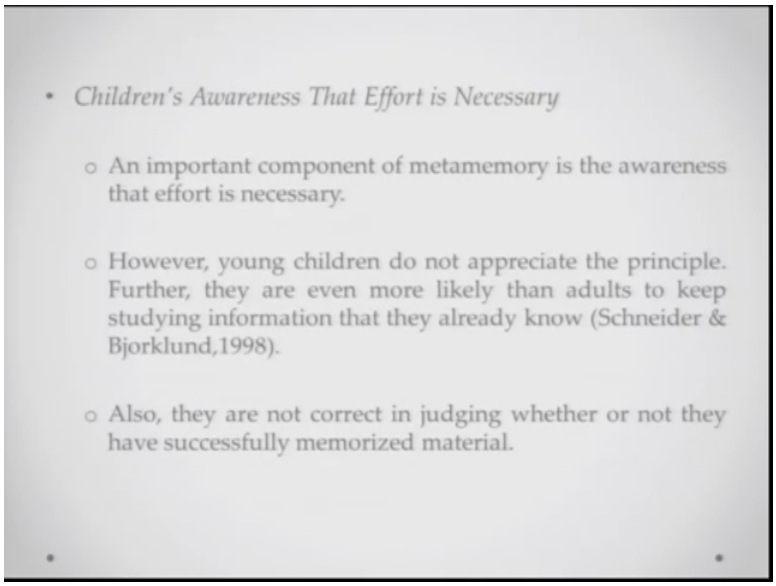

Another metamemory aspect is the awareness of the fact that effect and that effort is necessary it is a very important component because unless you realize that I should put some effort to remember this information later you are not going to put that effort and you are not going to retain that information for later.

However, young children do not appreciate the principle they are much more likely than adults to keep studying information that they already know and do not you know put time properly input proper strategy basically to remember something that they have not yet learned.

They are also not correct in judging whether or not they have successfully memorized material unless you give them a test and you kind of explicitly tell them that you have scored 20 percent out of 100 percent on the stars they will not really appreciate that I have not learned this material. Another interesting aspect about metamemory is the judgment about, their own memory performance.

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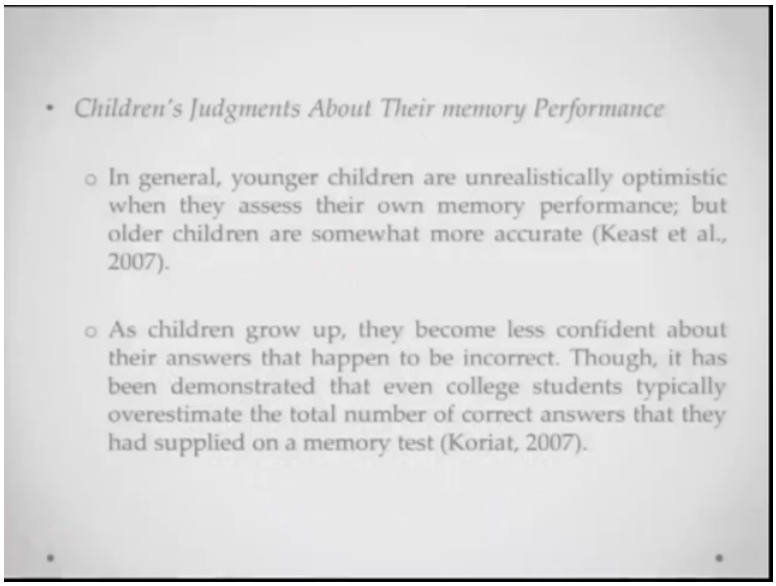

In general younger children are often unrealistically optimistic you ask them, how was the test? They would say very good, you ask them how much do you remember? They would say everything and then you give them questions they will not really be able to answer everything.

When they assess their own memory so, younger children are there you know unrealistically optimistic when they assess their own memory performance, but then older children are slightly more accurate they are getting better in making these estimations. As children grow up, they become less confident about the answers that might be incorrect, though it has been demonstrated that even college students are also typically always overestimating the total number of correct answers that they had supplied on a memory test.

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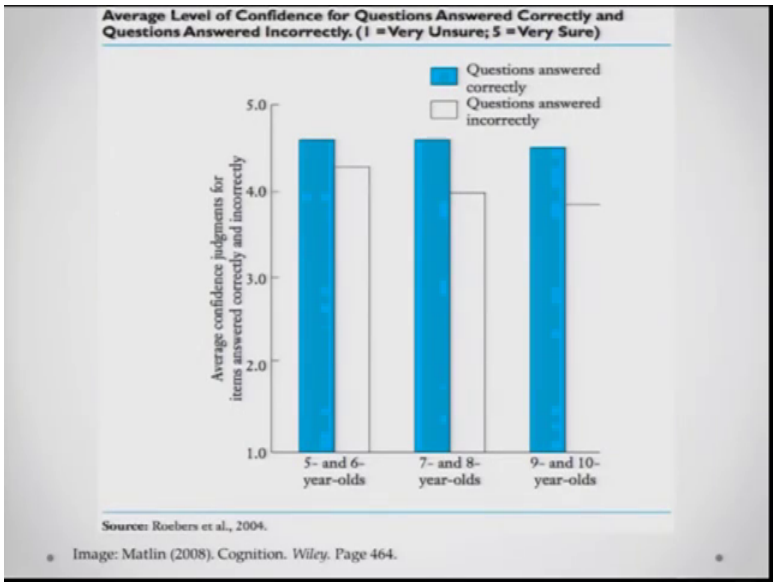

This is just a graph from a Roebers and colleagues study from 2004 borrowed from Matlins book and you can see that 5 years in 5 to 6 year old and 9 to 10 years old the amount of confidence that they report on questions that they had answered incorrectly is kind of decreasing gradually. So, it kind of discord, but it is what I was saying.

Now is the relationship between metamemory and memory performance.

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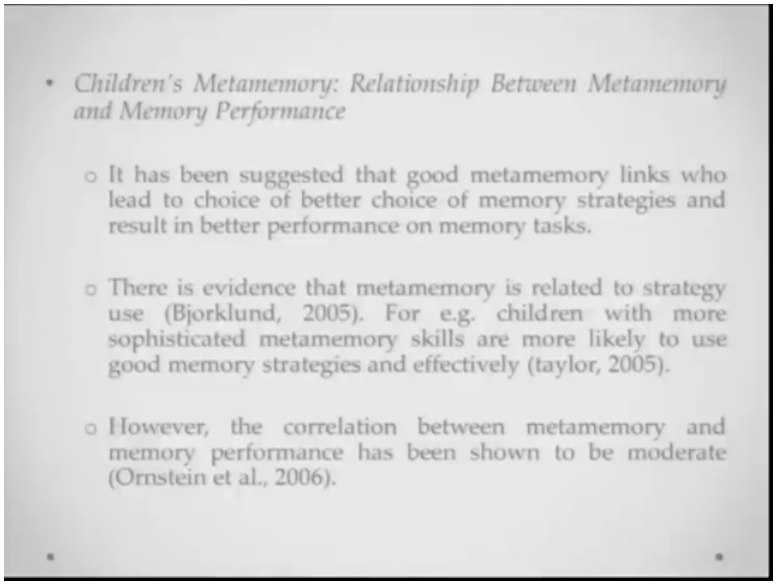

It has been suggested that good metamemory links lead basically good metamemory and knowledge of good metamemory skills leads to choice of better memory strategies and

might result in better performance on memory tasks, there is evidence that metamemory is related to proper strategy use.

For example children with more sophisticated metamemory skills are more likely to use good memory strategies and to use them effectively; however, the correlation between metamemory and final memory performances has been shown to be moderate. So, it is does not really good having good metamemory skills that is not always translate to good performance on the task you have to do a lot of practice and effort as well.

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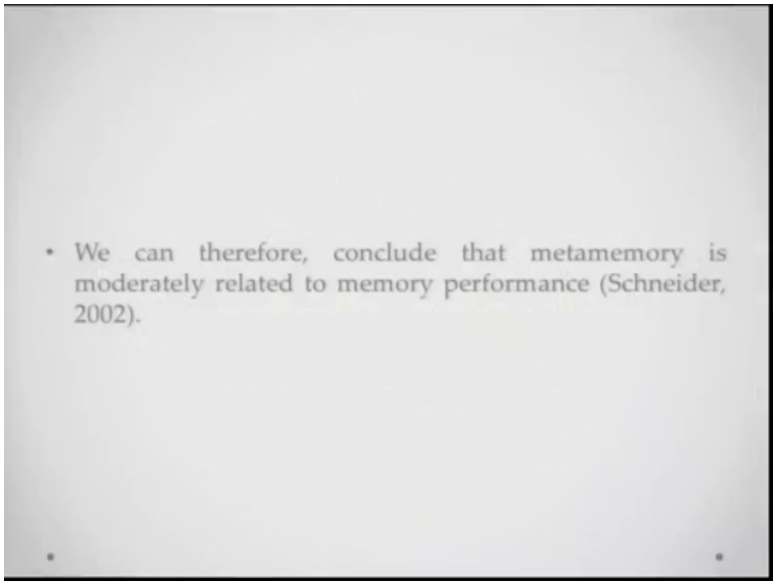

So, you can therefore, conclude that metamemory is moderately related to memory performance there is not really a very strong one to one link here.

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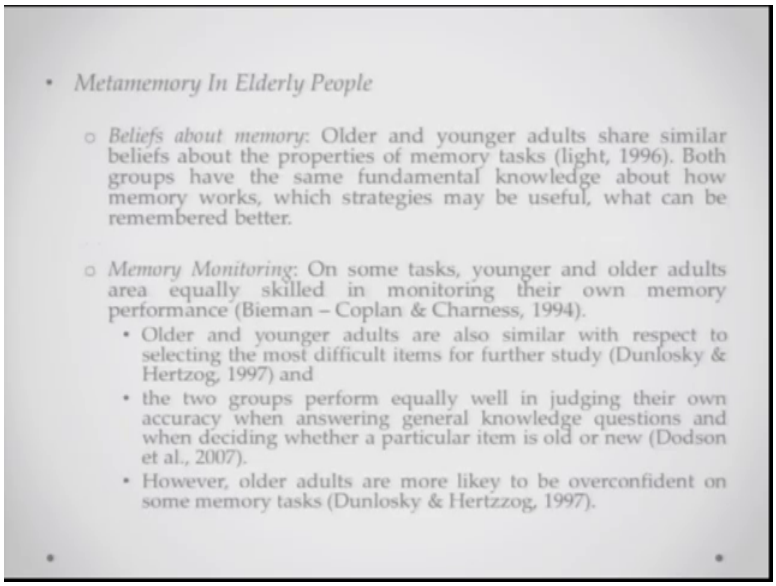

Let us talk a little bit about adults metamemory, elder peoples metamemory, they have some kind of beliefs about memory you know older and younger adults in some sense there is not a difference because they share very similar beliefs about the properties of memory tasks, what is being tested, how do you learn it the same fundamental knowledge and about how memory works, which strategies may be useful for recognize you know remembering this material and what is the material that I can remember better. So, there is no real difference between the metamemory skill of belief about memory when you compare younger adults and older adults.

Another aspect monitoring of memory on some task younger and older adults are equally skilled in monitoring their own memory performance, older and young adults are also similar with selecting the most difficult items to remember for further study. So, if you have given a material to read to young people and the same material to read for older people they both will figure out that this part is the most difficult which I have to rehearse more spend more effort in remembering for later.

The two groups also perform equally well in judging their own performance and judging their own accuracy when kind of you know answering general knowledge kind of questions and when deciding whether a particular information or particular item is old or new. So, they kind of they have the almost equal sense of how well they are doing on a task. However, the elder people the older individuals are slightly more likely to be

overconfident on some memory tasks than others. So, that is the difference between monitoring capability.

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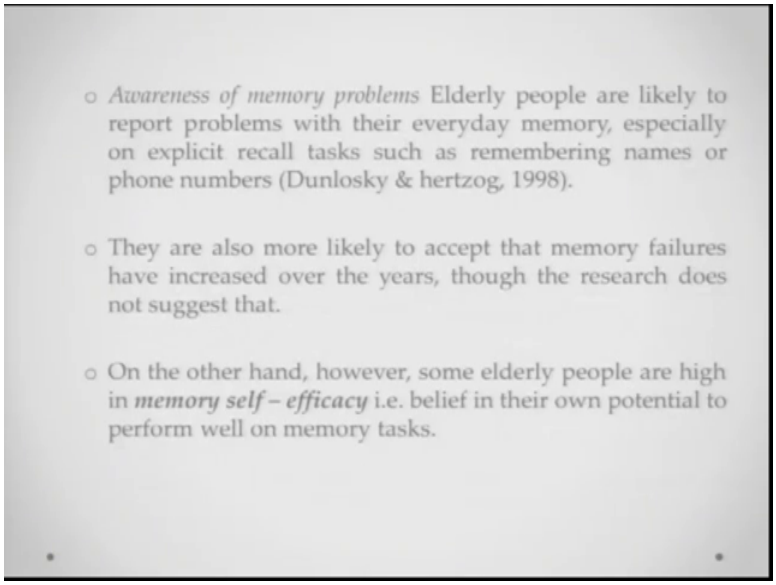

Another very important aspect is a awareness of memory problems, you know elderly people you will see that you know people always keep telling them that you know you do getting old your memory is going to get old you are not going to you know this is eventually has to decline. So, they also start believing these things, they are more likely to report problems with everyday memory especially on explicit recall tasks such as remembering names, phone numbers soon and so forth.

They are also more likely to accept that memory failures have increased over the years it is it is kind of you know it is kind of self fulfilling prophecy they start believing that their memory is gone down even though research evidence does not really suggest the same thing.

On the other hand, some elderly people; however, are they have this high memory self efficacy they are confident they have that kind of beef in their own potential to perform well on memory tasks. So, if you ask them do you remember that they will say yes if you ask them could you use this information to do that particular task they would say yes I have, I have used that our I am going to use that. So, there is this aspect of you know memory self efficacy this confidence on their own potential that they have done well or that they can do well on a given memory task.

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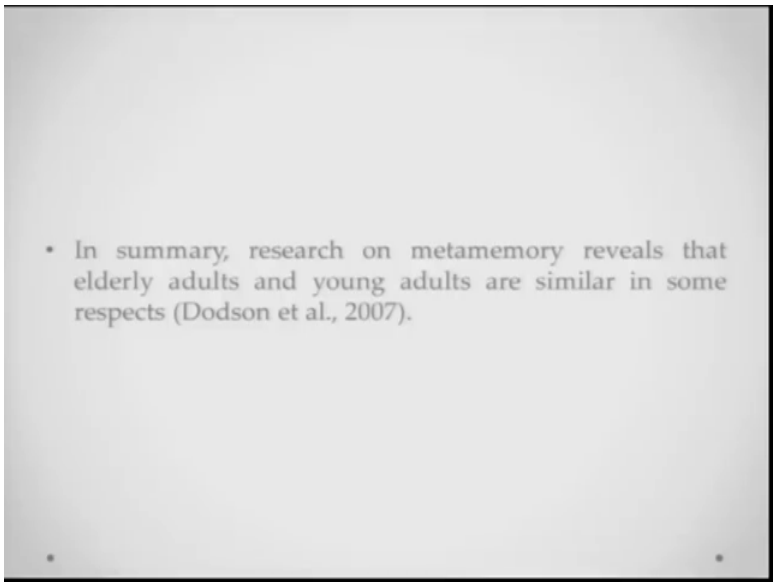

Now in summary if you yes again try and summarize the research on metamemory research on metamemory reveals that elder you know elderly adults and young adults are very similar in some respects when you know metamemory is concerned.

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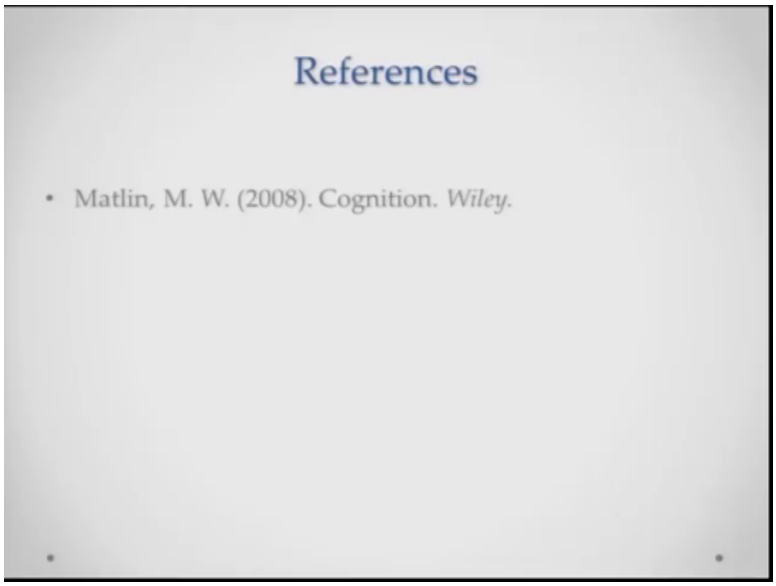

So, this is all from me about the lifespan developmental approach to memory we talked about memory and differences of memory between young adults and old adults, infants as well and then we also talked about metacognition capability as metamemory thank

you, I think this is the end of the course we will talk about something more important in the next lecture.

Thank you.