Indian Institute of Technology Kanpur
National Programme on Technology Enhanced Learning (NPTEL)
Course Title
A Brief Introduction to Psychology

Lecture – 6
Perception

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Till now we have been talking more with respect to the external environment okay. We have not yet you know gone to the cultural aspect. So now let us talk about the role of culture in perception okay.

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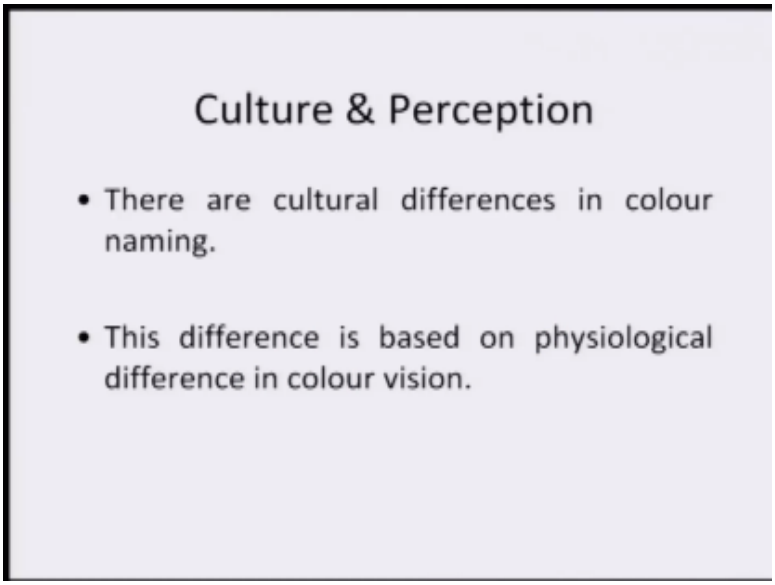

So we would be now factoring in the cultural factors, very interestingly would realize that there are cultural differences even in terms of giving name to certain colors. And this difference is based on the physiological difference in terms of color vision. Now look at the visual spectrum.

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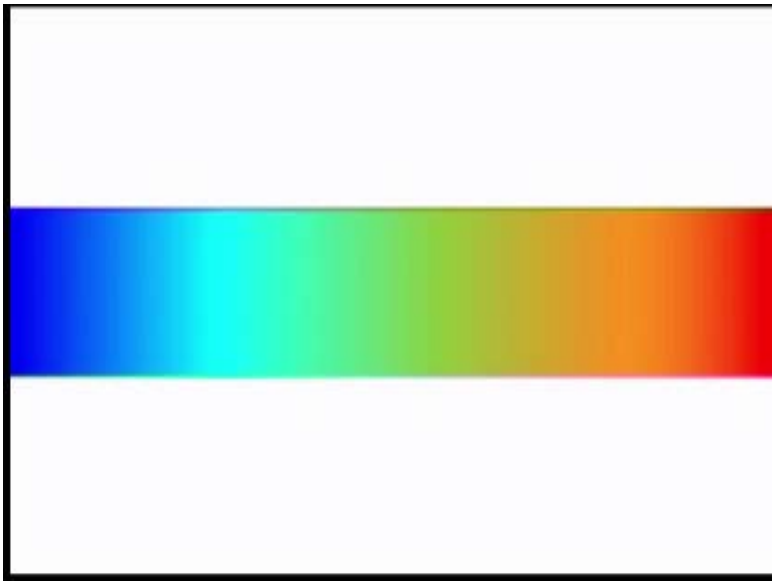

You are looking at the visual spectrum, you can clearly see the blue and the red ends of the spectrum but this is not true for every culture.

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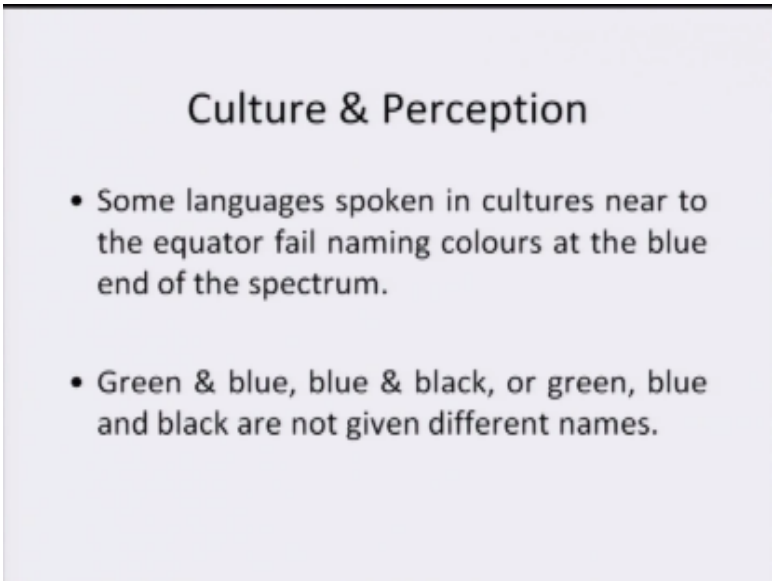

You will be surprised to know that some languages which are spoken in culture near to the equator they feel naming colors at the blue end of the spectrum. The green and blue, blue and black or green, blue and black, usually they are not given different names in culture near to the equator okay. And this is an interesting dimension no, so depending on where exactly you are now placed on the globe and the cultural context to which you belong to okay, the perception changes.

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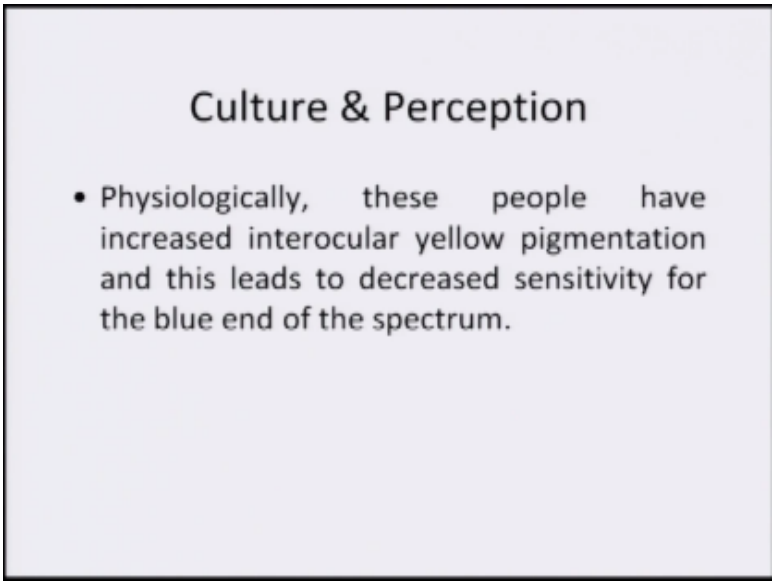

Now physiologically these people, they have increased interocular yellow pigmentation and this leads to decreased sensitivity for the blue end of the spectrum. The reason is physiological here okay.

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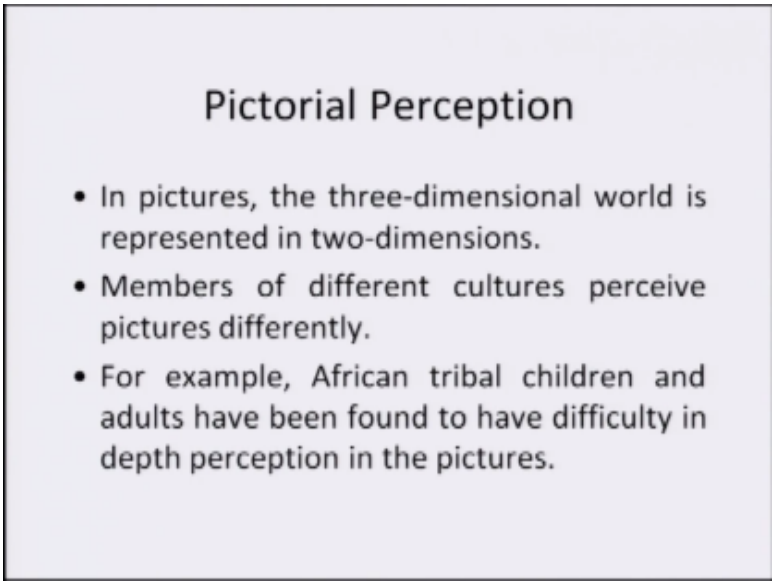

Now in pictures the three-dimensional world is represented in two-dimensions okay. Now members of different culture they perceive pictures differently. For instance, African tribal children and adults have been found to have difficulty in depth perception in pictures okay.

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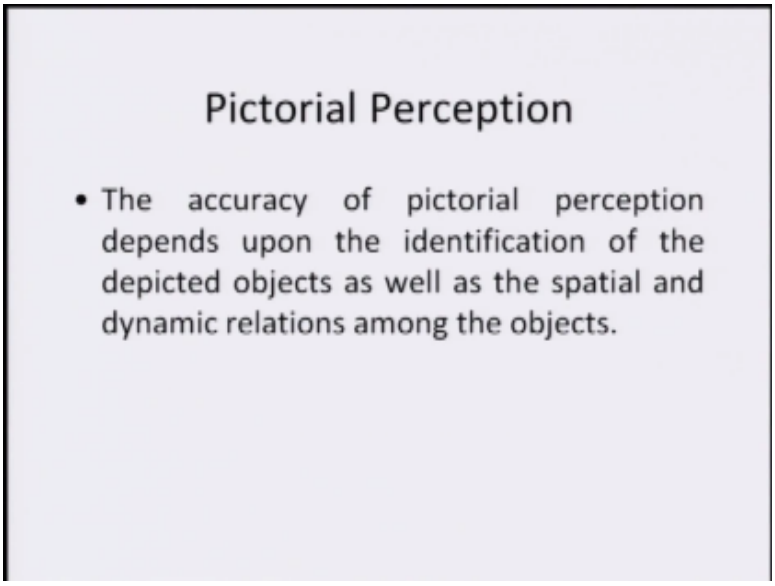

The accuracy of pictorial perception depends on the identification of the depicted object as well as the spatial and dynamic relation among the objects.

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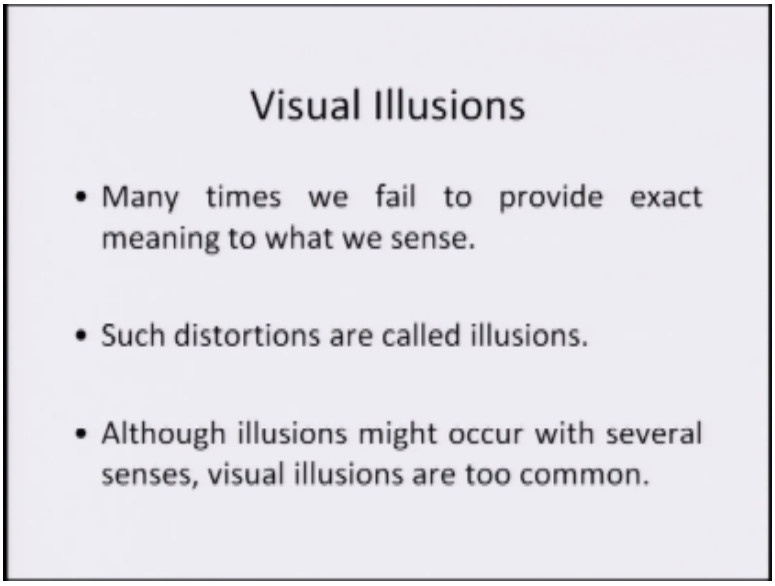

Many a times we fail to provide exact meaning to what we sense okay. And such distortions are called illusions okay. In case of perception sensation is complete, we assign appropriate meaning and then we say that because the meaning is appropriate therefore it is perception. If we commit error in that sense, then that is called illusion.

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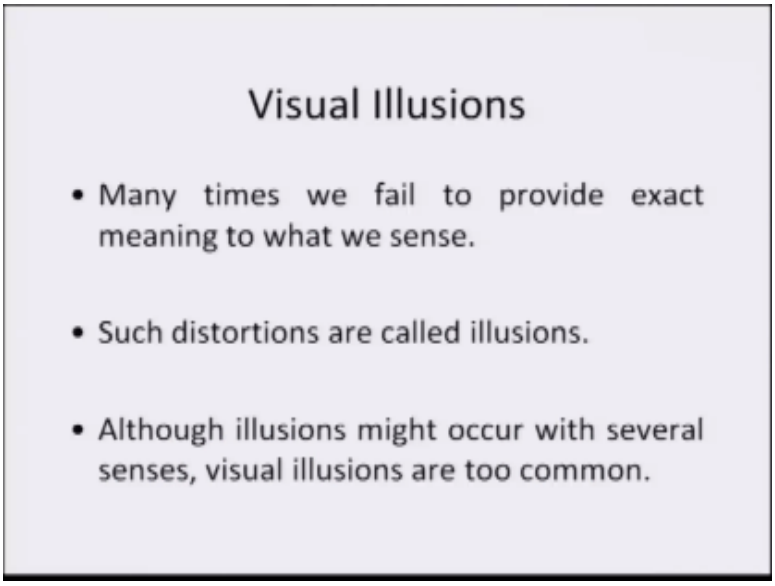

Now although illusions might occur with several senses visual illusions are most common.

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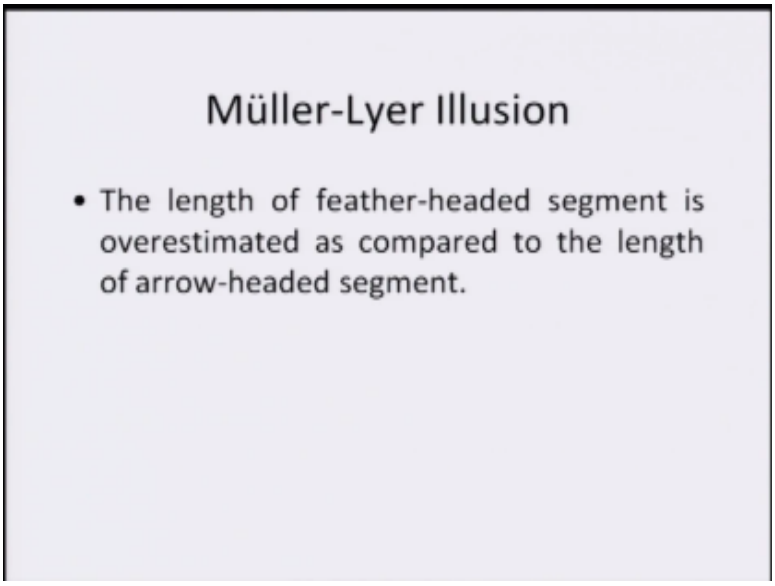

And the most common of the illusion is what is called as Müller-Lyer illusion. Here the length of the feather-headed segment is over estimated as compared to the length of the arrow-headed segment.

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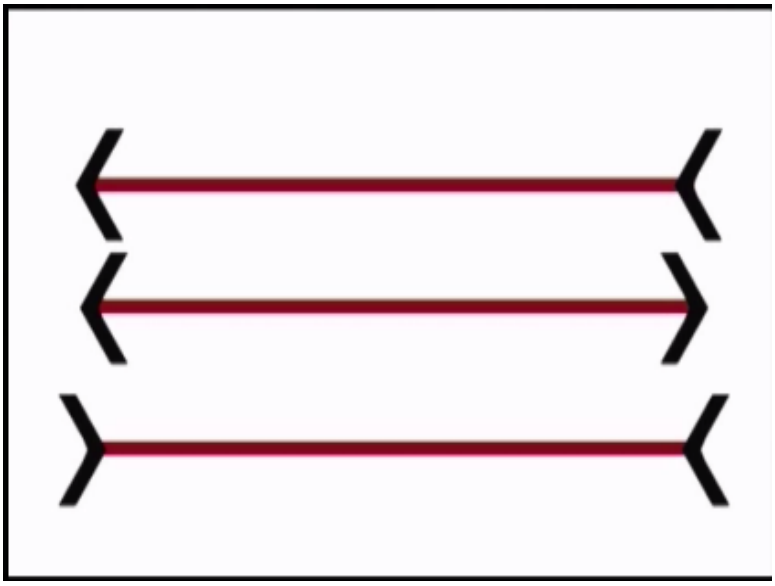

Look at this straight line, the left side of the line has now become arrow-headed whereas the right side has become feather-headed, are they equal? Let us look at it little differently, this is an arrow-headed line, another line drops down from it and becomes a double arrow-headed line. Now a third line drops down and become a feather-headed line, are they equal? You know that the answer is yes.

But when you look at them the third line which is feather-headed line seems bigger. The arrow-headed line on the top looks smaller compared to this feather-headed line. And this is called Müller-Lyer illusion.

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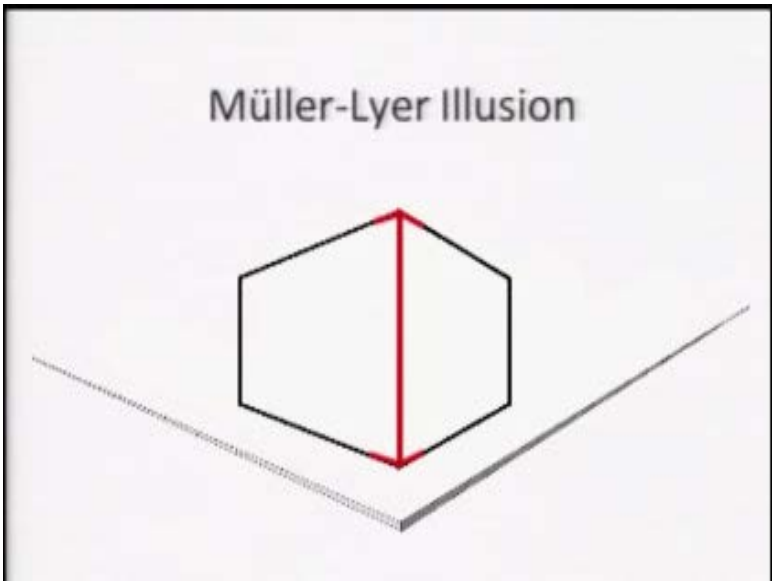

Now where do we actually have Müller-Lyer illusion in our real life, imagine now you are walking on the pavement, you are crossing a street no, you take a turn, the building that you see on the corner okay, you see a building on the corner here okay. Now you can very easily see this Müller-Lyer illusion okay. So some parts of the building looks to you know as if it has an arrow-headed line.

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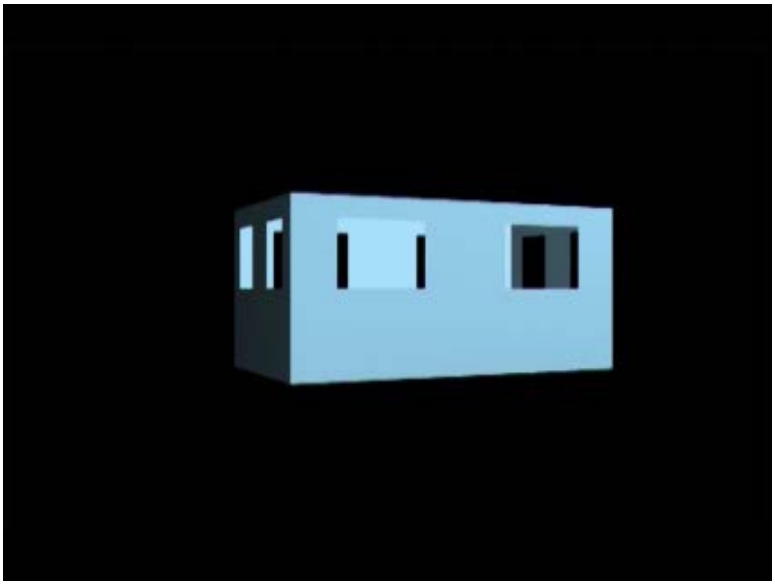

Have a look at this.

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You now see the arrow-headed line okay. Now if you know just try to move in what will happen, let us have a look at it.

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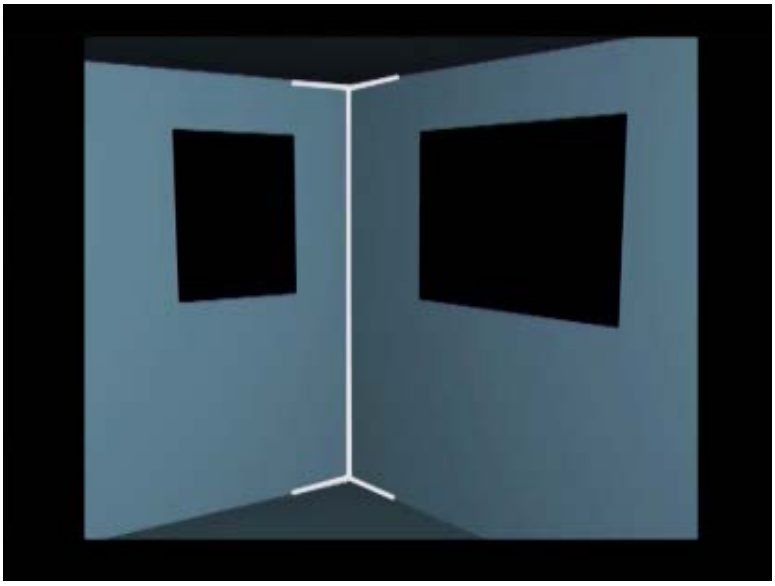

Now you are inside the room okay, and what you were actually looking at as an arrow-headed line now seems as a feather-headed line to you okay. And this is you know Müller-Lyer illusion okay. We all know that the size of the two walls are the same, but then depending on from which side you are looking at you know that edge is, okay once you have the – you feel that this is taller and the other case you consider that this is smaller. And in all the cases you know always have this Müller-Lyer illusion.

Now that we have understood no, that the length of the arrow-headed line and the length of the feather-headed line they are not perceived equal. What has been realized is that the magnitude of Müller-Lyer illusion it decreases with age, studies show data comparison among Eastern, Western and Southern African, Philippines and United States, when people from were taken from these areas the study shows that Müller-Lyer illusion was greater for children and it was not greater for adults.

Now cultural difference with respect to susceptibility of illusion is very interesting, one of the studies show that the magnitude of Müller-Lyer illusion in the residents of Papua and Great

Britain, and what they found as that although both groups had illusion the magnitude of Müller-Lyer illusion was higher among the British subject okay.

So people who are now exposed to the urban modern lifestyle they had more of this Müller-Lyer illusion. The earlier comparison among Eastern, Western, and Southern African, Philippines, and United States that we had seen right now, show that the Müller-Lyer illusion was higher in American and South African Europeans as compared to the non-western participants in this various study, this was the study by Segal and his collaborators.

Another type of illusion is Ponzo illusion, Ponzo illusion is a case where the length of the upper horizontal line is over estimated as compared to the lower horizontal line okay. We saw the example of railway track no that was with respect to perspective okay. Right now we are trying to understand it in terms of Ponzo illusion.

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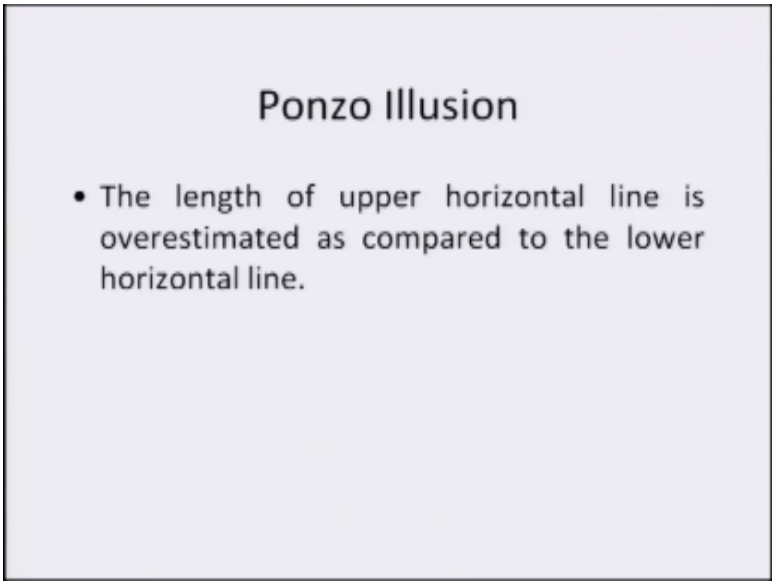

Let us look take example of Ponzo illusion. Now in case of Ponzo illusion the length of the upper horizontal line is over estimated when one compares it with the lower horizontal line.

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We have taken the example of the railway track in the past okay. So when you look at the slippers that connect the two tracks okay, you realize that the slippers which are nearer to you okay and the slippers that are at a distance they are not considered as having the same length.

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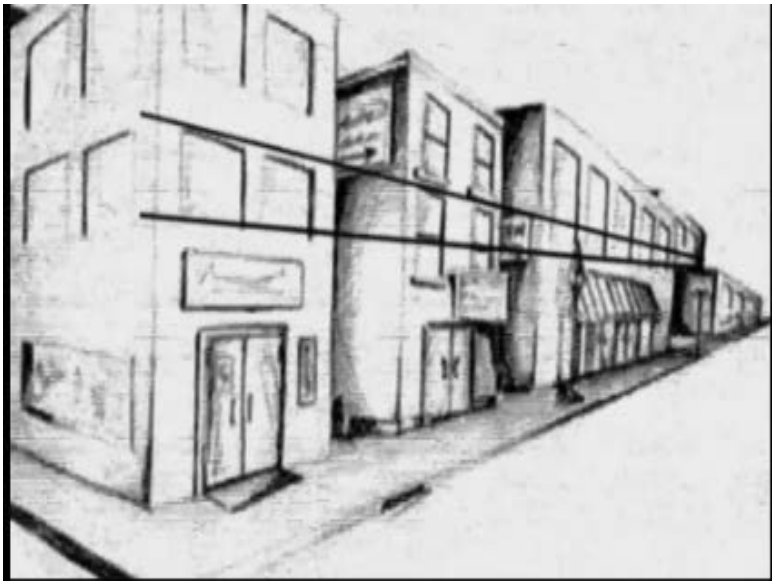

When you look at the parallel line stretching across the buildings here it seems that it is wider in the beginning and gradually it becomes narrow.

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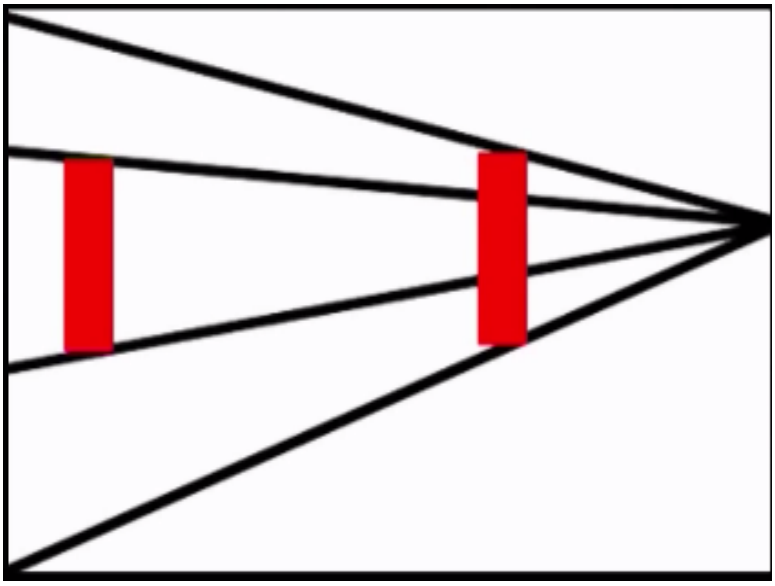

Let us take another example, you see a bold red line here, another line of same size comes out of it. But when you look at them after the black lines have been drawn, the red line on the right seems bigger than the one on the left.

If you consider yourself standing at the point where all the black lines originates, then the red bar nearer to you will look bigger as compared to the one which is at a distance.

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Look at now another example here, if you replace the lines with human beings you will still perceive the same. Here you see that the two human figures are actually replica and hence are of the same size, but the moment context is added one becomes bigger compared to the other one.

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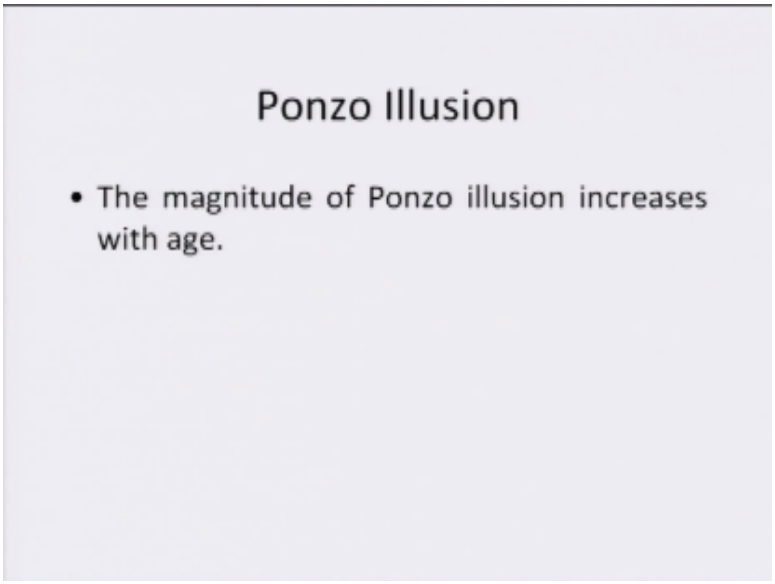

Now with respect to the magnitude of Ponzo illusion it has been realized that with increase in age the magnitude of Ponzo illusion also increases okay.

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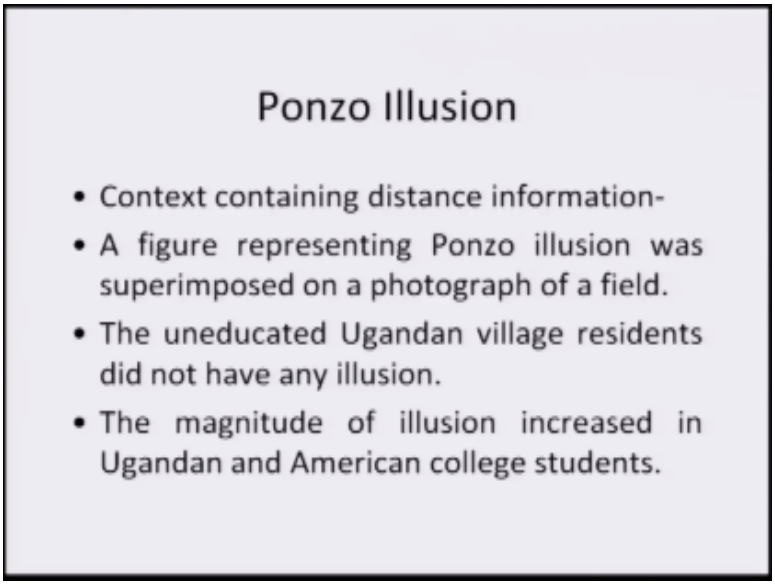

Now context that contains the distance information is of importance. A figure representing Ponzo illusion was superimposed by one of the researcher on a photograph of a field. Now the uneducated Ugandan village residents they did not have any illusion, that horizontal-vertical illusion. Whereas the magnitude of the illusion increased in the Ugandan in the American College going students okay.

Now this basically means that the cultural context in which you have been living, that affects the degree of illusion that one would experience.

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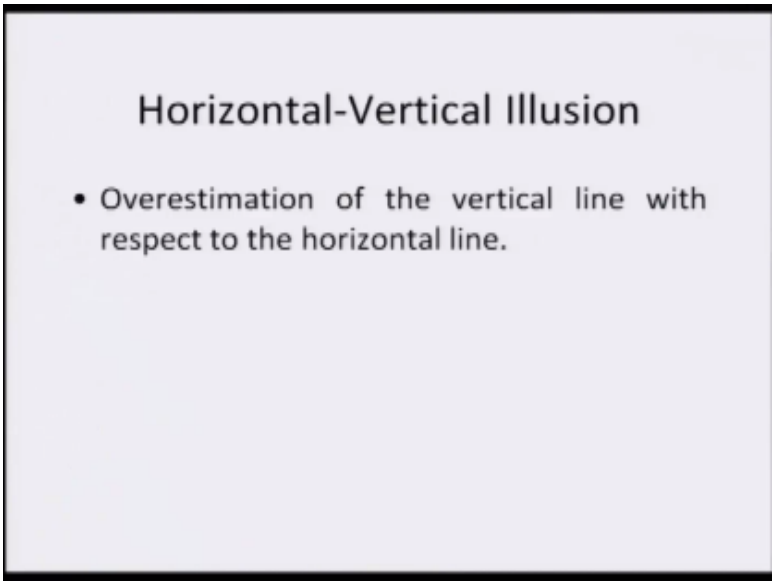

Now horizontal-vertical illusion if you look at no, there is always the overestimation of the vertical line with respect to the horizontal line. In horizontal-vertical illusion the vertical line is perceived extending away from the viewer rather than rectangular shapes the open vistas in the environment is pertinent for this illusion, the horizontal-vertical illusion.

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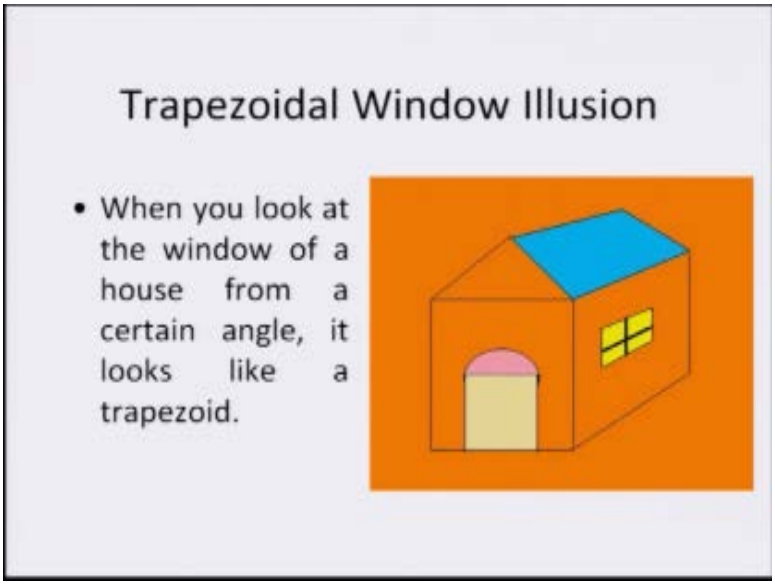

Now take this very example of our trapezoidal window okay. When you look at the window of a house from a certain angle it basically looks like a trapezoid. Now our rotating trapezoid window is perceived as if it is oscillating okay.

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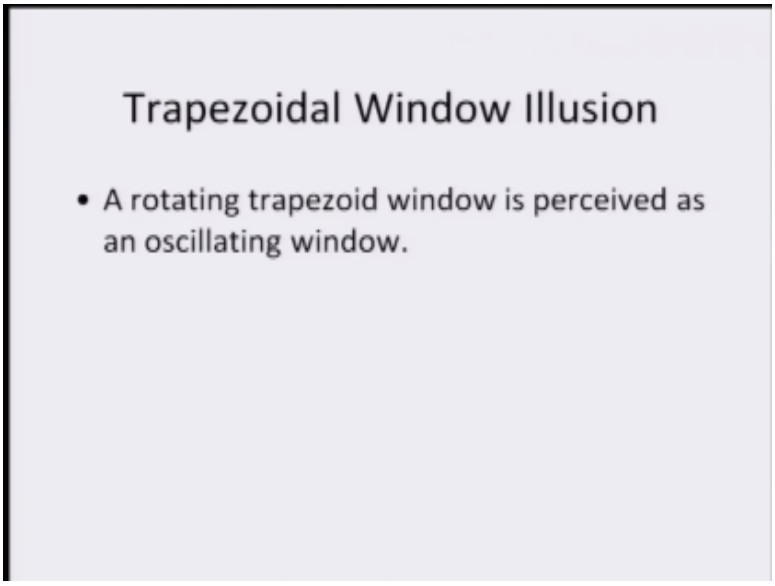

So the window looks like oscillating window.

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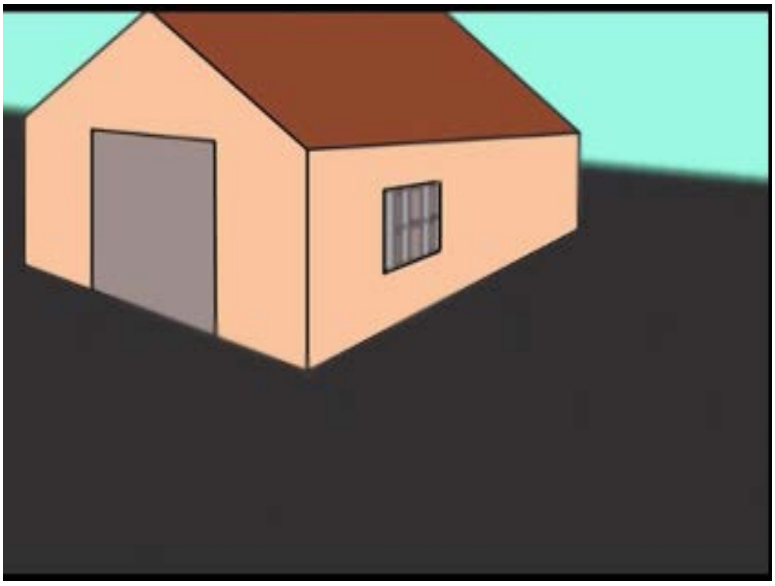

Right now you saw a house and then you had just rectangular window there to give you a sense that fine you know from particular orientation when you look at the house, look at the walls of it, the window that it has which is actually rectangular, you perceive that it is trapezoid. Now look at you know this video animation.

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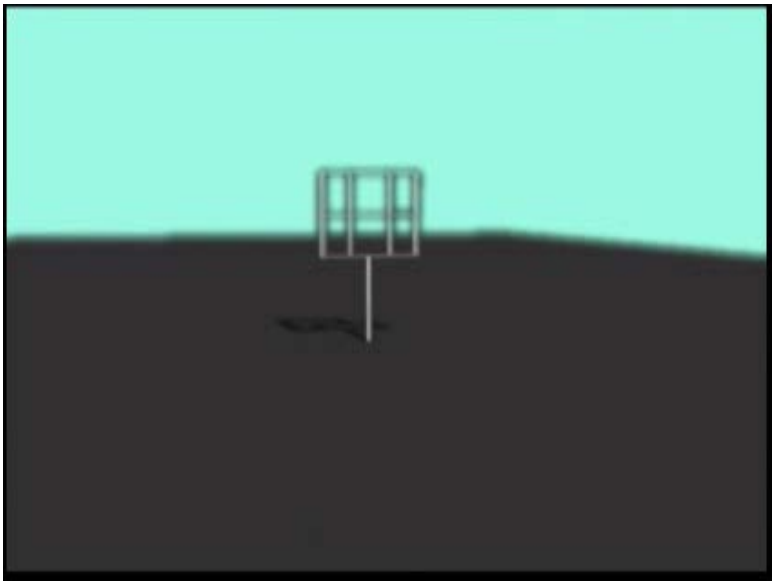

Now instead of a rotating window.

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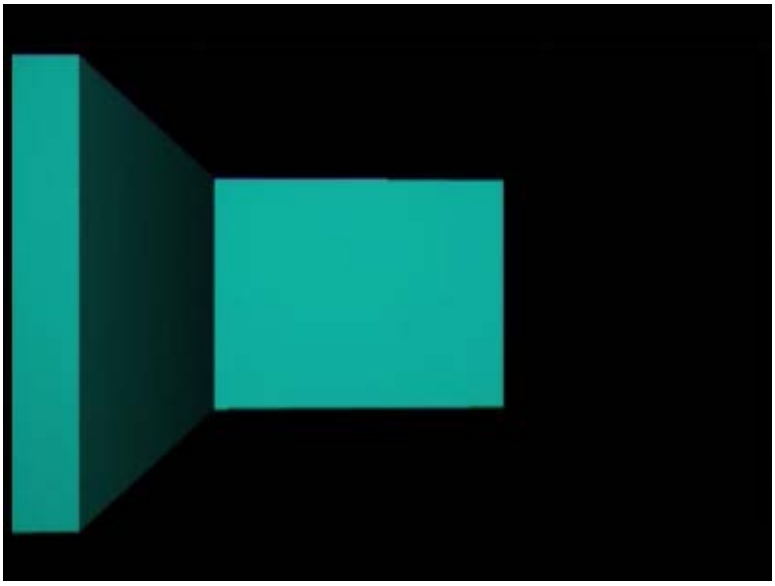

That you saw in the previous animation, see the animation here okay.

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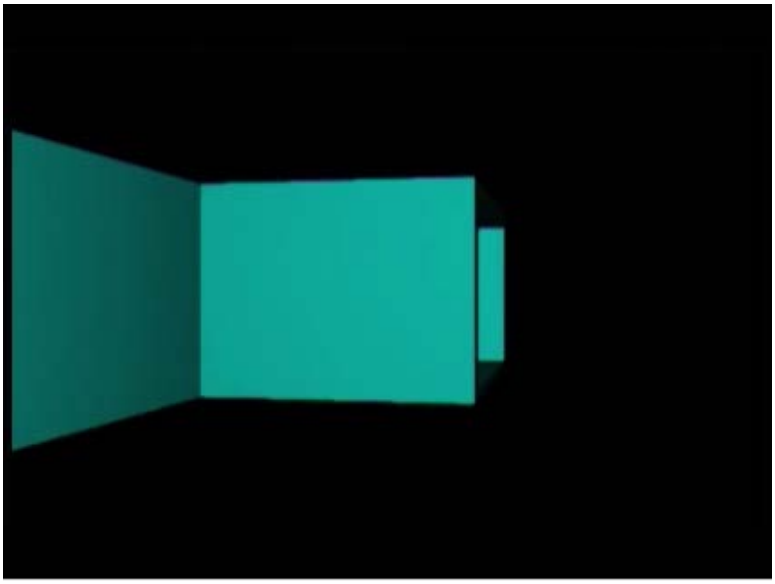

It is of course the full window only that gets projected here okay. And then you have a rotating window, the interesting part in trapezoidal window illusion is that the moment you know you start focusing on this rotating trapezoid it actually starts you know giving a feel that it is oscillating. This is now called a trapezoidal window illusion.

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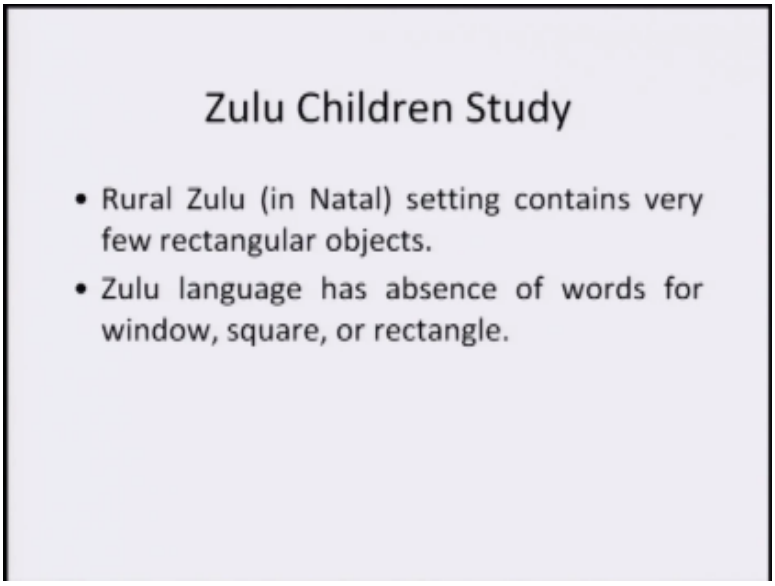

It is very interesting to know perhaps that the rural Zulu setup they contain very few rectangular objects. So their environment does not have too many rectangular objects and therefore if you look no at the Zulu language also it has absence of words for windows, squares or rectangles, these words are not there.

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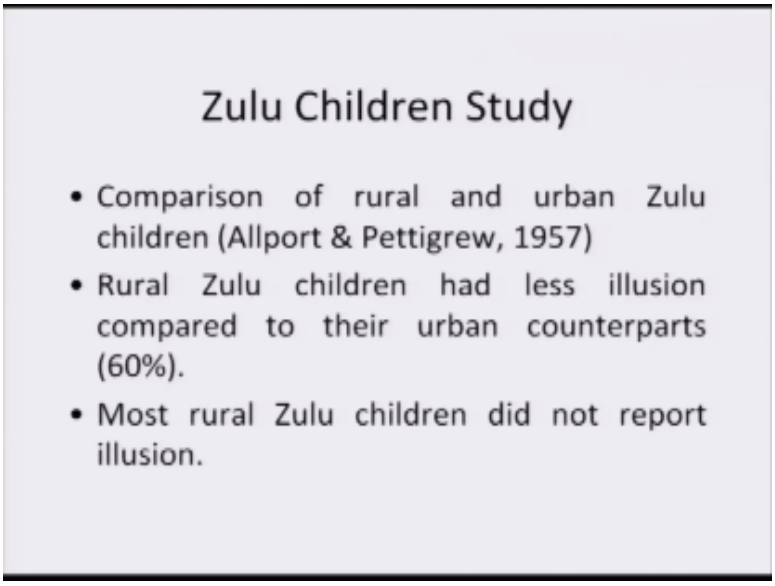

Now in an interesting study a comparison was done of rural and the urban Zulu children. The rural Zulu children had less illusion compared to their urban counterparts no to the level of 60% no. And most rural Zulu children did not report any illusion. Now if you do not have rectangular objects in your environment, if you do not have words representing them okay, you also do not have that degree of illusion. So that is an interesting no what you call effect of culture on illusions.

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Now look at these very lines, know all these lines looks as if they are very straight lines and they are parallel to each other, the moment you insert colored circles here.

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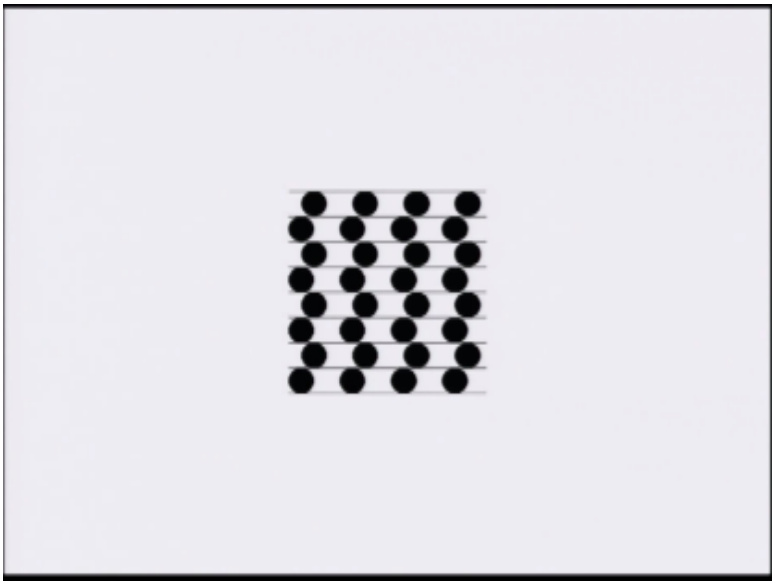

Now the line does not look as if it is straight know, it looks as if it is bent between two black spots.

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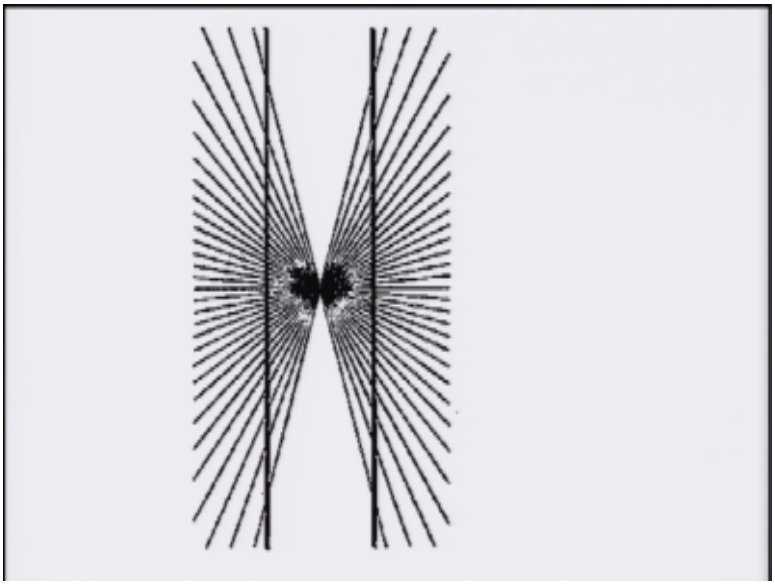

Similarly now two vertical lines and the moment you add the lines starting at a common origin, you realize that the two vertical lines it seems as if they are not straight but they are rather bent at the center okay. So these are very typical type of visual illusions that we all experience.

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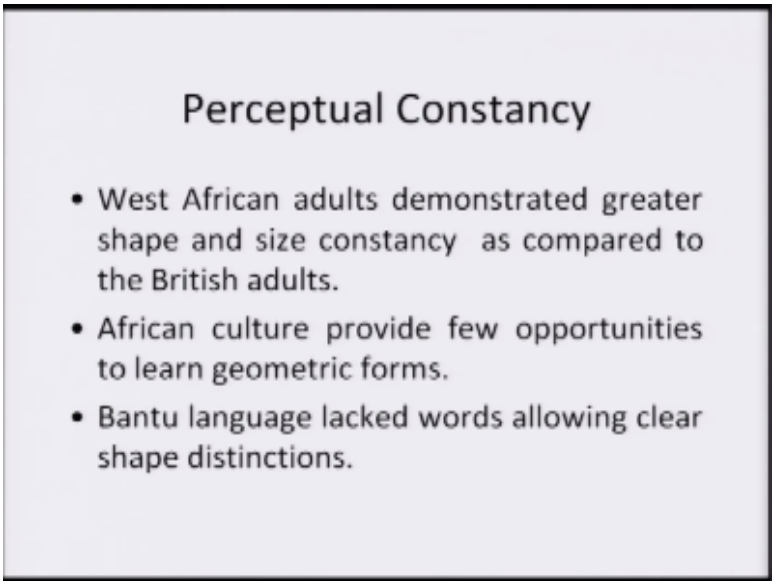

Now West African adults they demonstrated greater shape and size constancy okay, in one of the studies as compared to the British adults. And African culture basically provide few opportunities to learn the geometric forms, the Bantu language are one of the language spoken in that very area of the world, lack words allowing clear shape distinctions okay.

And that is considered no as one of the important factors that influences visual perception especially optical illusion when it comes to defining the meaning of the external world, and then you realize that the cultural factors they play extremely important role there. Now having talked about these many issues in perception, now that we are you know towards the end of our discussion on perception let us talk about the importance of a spatial orientation.

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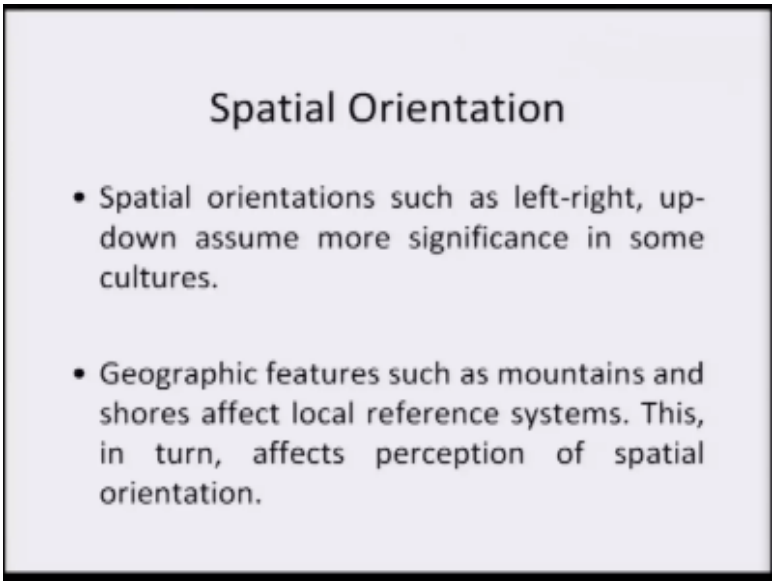

Now spatial orientation as such as left, right, or up, down okay, has its own importance in certain cultures. So for instance now there are certain type of rituals which are supposed to be performed only by the right-hand, certain type of rituals which are supposed to be performed only with the left hand. In certain cases no you are supposed to be on the left side in this space, in some cases you are supposed to be on the right side of this space.

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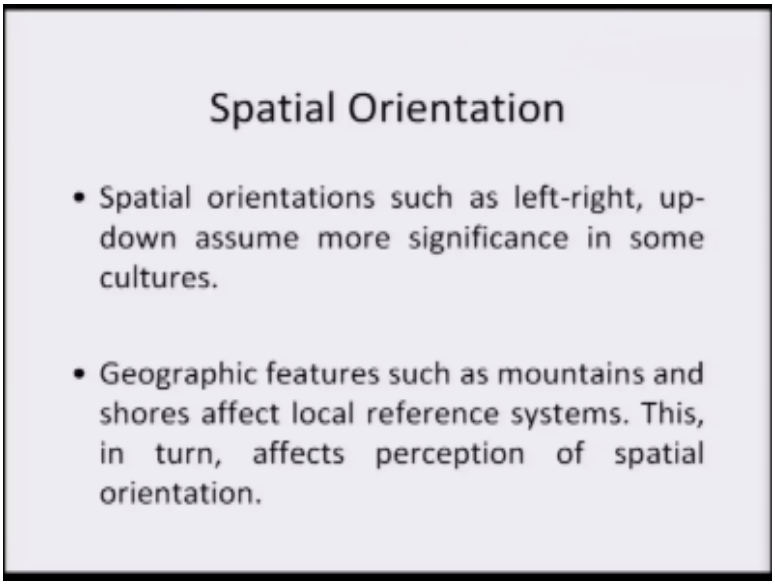

So it has its own cultural importance, interestingly the geographic features such as mountains and shores they also affect our local reference system okay. And this in turn affects our spatial orientation.

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Now importance of spatial orientation can be seen in especially in the sailors who are in the ocean and all they see on all their sides is only the blue water, nothing more than that. Now many of these sailors they use specific navigation strategies. For instance in certain locality in the oceans they look at the habit of the local sea birds, certain type of birds, their habits, and it tells them where actually they are in the ocean. Many of the seasoned sailors will also tell you that they look at the change in the color of the water okay.

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And depending on the color of the water they can very easily make out which ocean they are in, especially when they are no supposed to move from one to the other many of them, the experts can even look at the pattern of the wave formation and looking at the wave they can tell you that fine they are in this very ocean, the Indian Ocean, or they are in Pacific and so forth okay.

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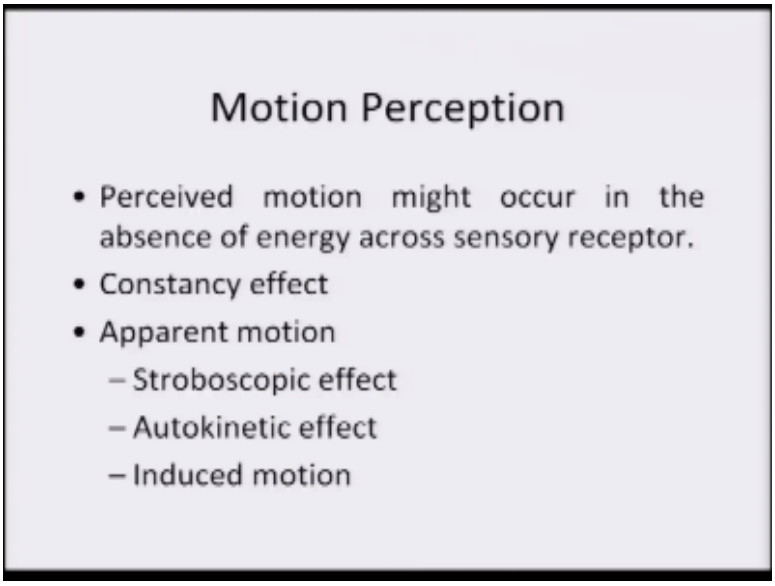

Now we come to the perception of motion, now perceived motions it might occur in the absence of energy across the sensory receptor okay. And remember one thing that the constancy effect works here also. But in case of motion perception one is of course you are moving, the external world leads are static and the other is when you are static the external world is moving, but what is far more important and very, very interesting is the apparent motion.

Three types of apparent motions we would be talking about, the stroboscopic effect, the autokinetic effect, and the induced motion.

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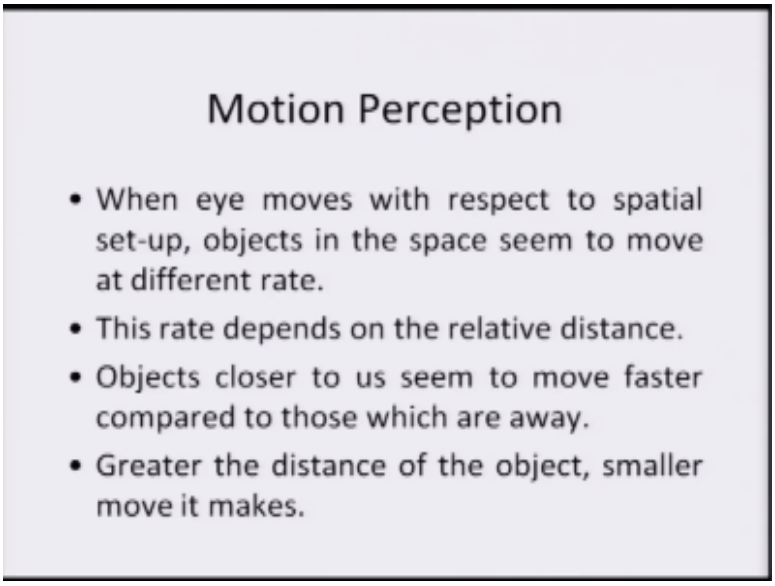

Now when I moves with respect to spatial setup, objects in this space they seem to move at different rate. And this rate depends on the relative distance, objects which are closer to us they seem to move faster compared to objects which are away from us. Greater the distance of the object, smaller no the movement it makes.

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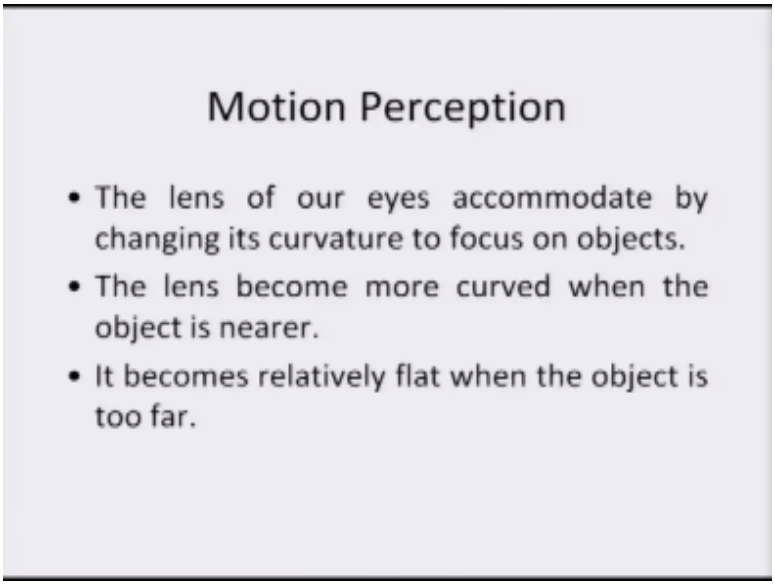

The lens of our eyes they accommodate by changing its curvature to focus on objects. The lens become more curved when the object is nearer. It becomes relatively flat when the object is too far.

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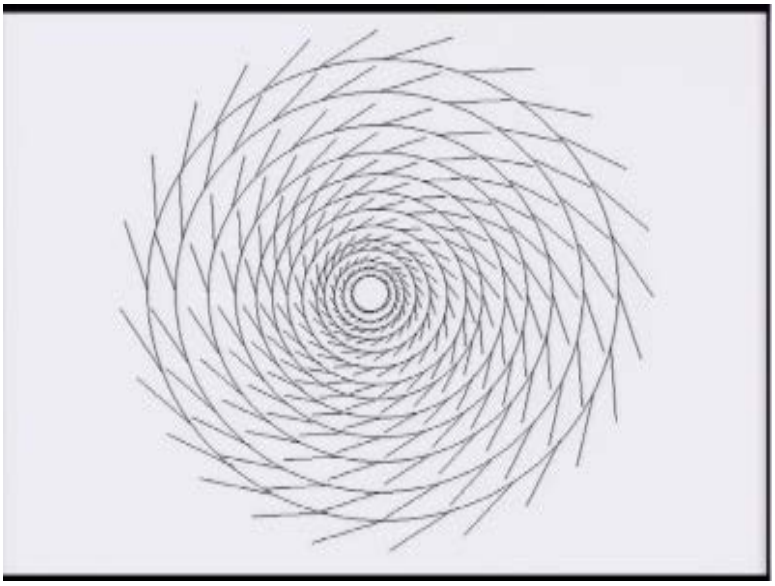

Now look at this very image, the fact that no you have independent circles and then there are small straight lines no which is put all across these circles you will sense as if something starts at the center, and then it is expanding no in a circular order it is expanding and the diameter looks as if it is increasing.

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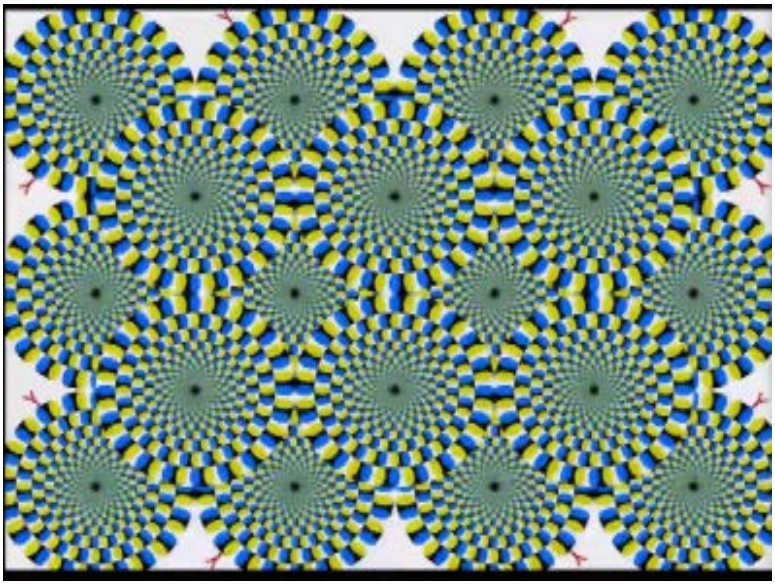

Look at your screen now, when you look at these static images it does not look static to you okay, you feel as if they are making clockwise movement, and the moment you says that it is making a clockwise movement okay, you might get a feel that the colored disc on the upper end perhaps makes an anti-clockwise movement. Although this screen is static, the image is static. The moment you will focus at it, you get a feel as if it is moving.

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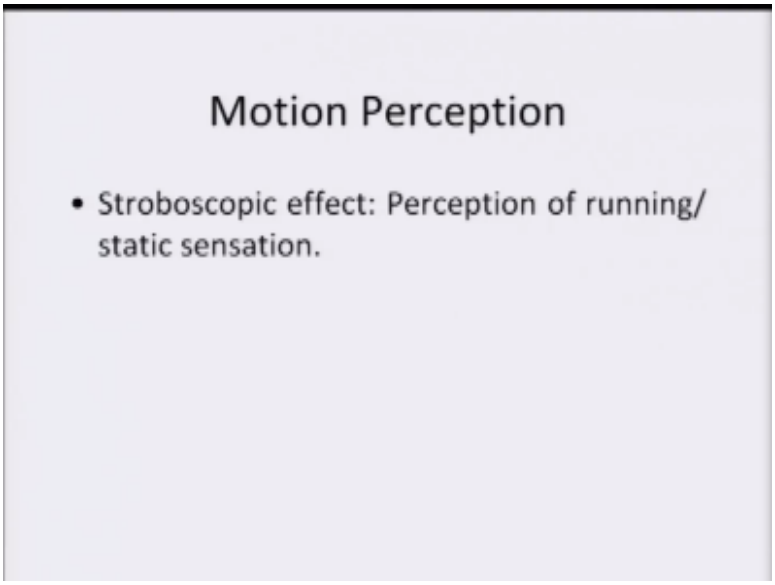

Let it has come to stroboscopic effect, stroboscopic effect basically means that you perceive a running okay, or a static sensation okay in a given type of a situation. Look at this very video.

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When you look at this fan you know that now the fan is rotating, but this movement is not perceived no, you feel as if it is starting.

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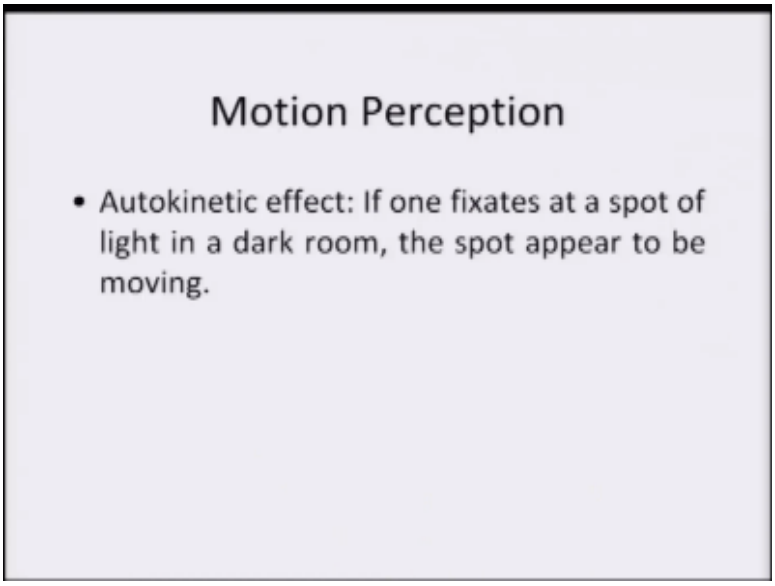

Now the other type of apparent motion is what is called as autokinetic effect. Now if you fix it at a spot in a dark room okay, you suddenly realize as if the spot is moving. So room is absolutely dark, you are looking at a spot of light, you fix it at it and the moment you fix it appears as if that light is moving on the right side, look at this very video.

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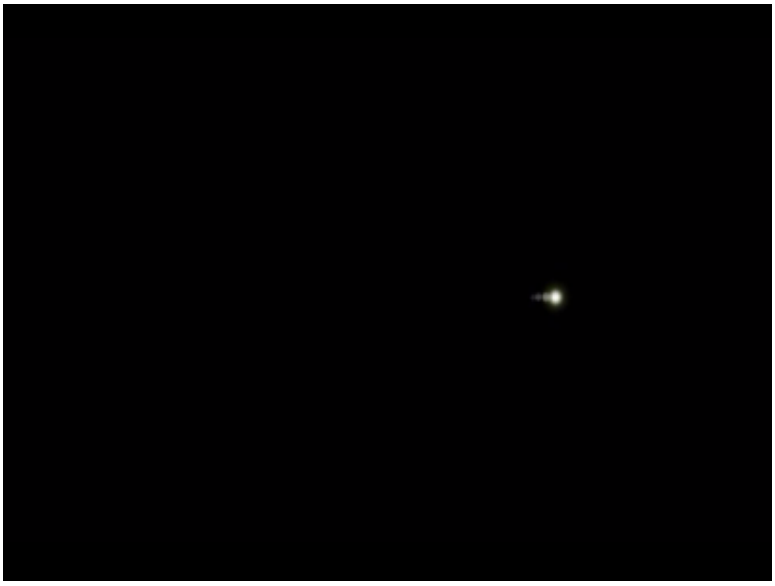

If you fix it at a spot of light in a dark room that spot appears to move, if you have a dark background now, you have a spot of light here. Now it is actually static, but if I ask you to no focus on it, it is a dark room just focus on it okay. You start getting a feel as if this – now white dot is gradually moving; this is now called autokinetic effect.

It is of course an animation to help you understand of course the light will not appear to move so fast, and of course it will not have no so many trials left behind. But then this is actually what happens, you focus on it and then you feel as if it is no moving gradually okay, of course not at the rate at which you see here on the screen right now, but you can try it out no in your own house.

Another aspect in apparent motion is induced motion. Now static objects they are perceived to move when the frame or the background moves. So it is like say I remain static and the background against which you are looking at me that starts moving, the moment you see that okay, you realize as if there is a sense of movement okay, look at this very animation.

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Now look at this animation now, you know that this man you know is not cycling here, he just you k now his foots on the pedal okay, the background is moving, but when you see that the background is moving the impression that you get is that fine this man is cycling fast okay. This is actually induced motion.

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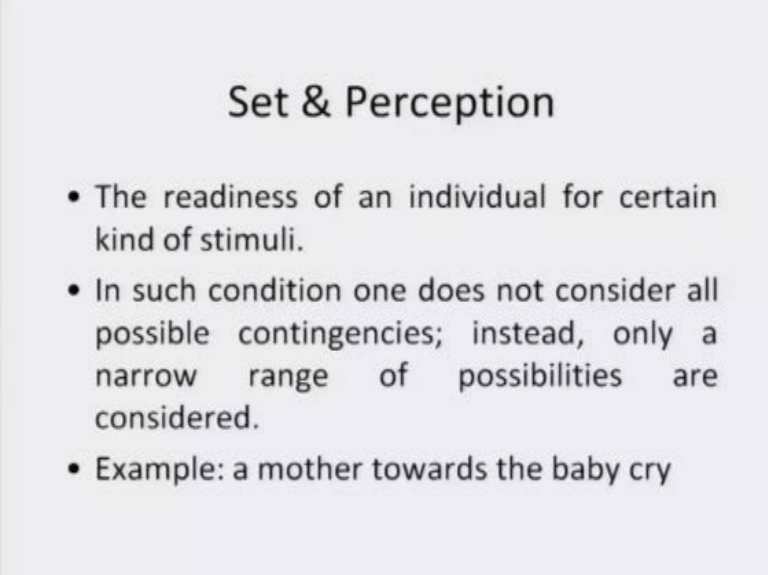

And now at the end we come to the importance of set in perception, set basically means your readiness okay to certain kind of a stimuli. You remember in the beginning we did talk about the properties you know of the stimuli, the strength of the signal, and then we also say that it is the user especially if you remember we were talking no when we were looking at the radar warning system that it is the readiness of the operator to look at the signal, and he has to make a distinction between the appearance, the presence of the signal, absence of the signal okay, and whether it is a form from and so forth.

Now in reality what actually you want to see okay. What is your degree of preparedness okay, what is your preference that is considered as set? So set basically represents your readiness to look for certain kind of a stimuli and that is considered to be one of the important factors when it comes to perception. Now in such conditions where you have a preference to look at certain kind of a stimuli one does not consider all possible contingencies, rather only narrow range of possibilities are considered okay.

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Look at this very example, what do you see here, there are two possibilities okay, possibility one where you look at an old lady this is the side profile of an old lady, and look at the change know, close to the ears okay you see the protruding nose and the eyelash and that gives you a sense that you are looking at the side profile of a baby okay, a young baby versus an old lady okay this is the distinction okay.

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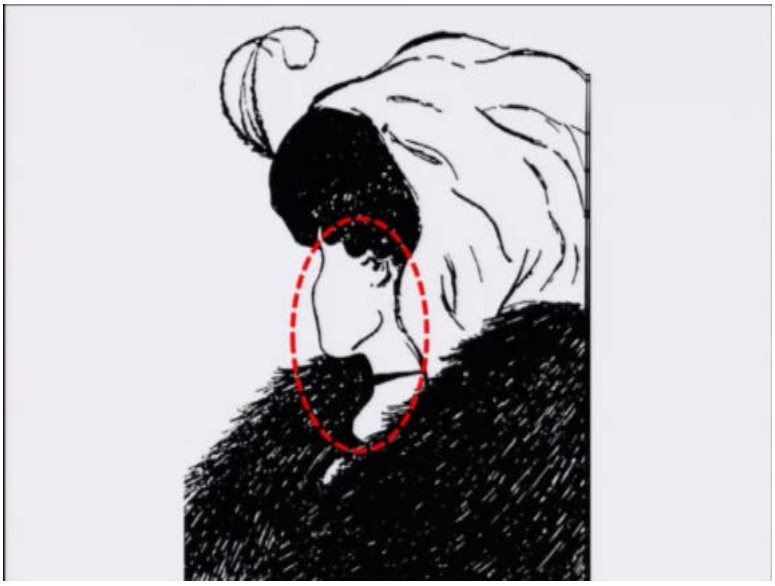

It is basically change in this very region that makes you realize okay, whether you are -- you would basically be perceiving an old woman in this very image or you would be looking at a young baby. So this is considered the importance of your readiness, your degree of preparedness, what actually you are keen looking at okay. And with this what we have done till now is that we have tried to understand that fine, there is a mechanism – a biological mechanism that we all are endowed with which helps us use our sense modalities to receive signal from the external world.

These signals okay are sent to the brain, the brain assigns accurate meaning to these sensations, if we are successful assigning meaning to it this called perception okay. Perception will depend on the strength of the signal, perception will depend on the preparedness, the willingness, okay the mental set of the respondent, the individual, then there are certain conditions okay, such as constancies that we talked about, certain apparent type of things that happens.

But that gets induced in us, and there could be a possibility when we do not succeed assigning accurate meaning to what we have sensed. If we fail assigning accurate meaning this is what is called as illusion. So with this we complete our discussion on perceptual processes. Now that I

have seen things in the external world how do I learn it? So the next segment would be a series of lectures on learning.

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