Introduction to Cognitive Psychology

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Lecture – 25
Insight and Creativity

Hello, friends. Welcome back to this lecture on problem solving and this is the third part lecture and problem solving. It is a continuation from the first two parts that we did. Now, in the first part of problem solving lecture that we did we looked at what is a problem and we defined definition of what problem solving looks like. So, basically problem solving is higher order cognitive function, a higher of cognitive process which starts after the basic cognitive processes of perception attention learning memory has taken place. And, so, what problem solving involves is to solve problems that have been or to solve those mysteries which have been generated through the other cognitive processes.

So, basically making meaning of those mental representations which have been made through the other processes; now, on the first lecture we also looked at what are the different types of problems which exist. So, what are the nature of problem solving and what are the approaches that we use in problem solving and. So, we looked at two basic approaches to problem solving in the first lecture. The first was the behavioral approach where we looked at things like something called the law of effect where we looked at how behavior is conceived problem solving and so, what behavior is tend to say is that problem solving is basically process where a number of acts are done, a number of trial and errors are done and these trial and errors then leads to solution and so, problem solving is basically understanding these assists or making associations between the correct act leading to the correct solution.

So, basically it is in terms of the law of effect which basically says that how associations are made between the correct act and the correct solution or the correct output. So, that is that is what problem solving is all about. And, we define Skinners idea of how he used cats and understood problem solving as a trial and error process and what he said is problem solving is all about generating solutions by doing an act over and over again and then finding the right solution to it.

Now, the second view of problem solving was the Gestalts view which did not support what behavior is said in terms of what problem solving is what they supported or what they went ahead and looked at is problem solving is more of reorganization of the mental representations which are created by the lower quality process. Now, when I say lower cognitive process and higher cognitive process we look into all those cognitive process or we classify all those cognitive processes it starts with perception, attention, learning problem and language and then memory all those processes are called lower cognitive process because these cognitive processes may representations.

So, they look at the problem they look at any kind of information which is impringing on a neural system and they make mental representations. Higher order cognitive processes are problem solving reasoning judgment and decision making. So, these generate solutions are these acquire solution by manipulating the mental representations. So, that is one distinction which is there. So, basically there Gestalt is believed that problem solution arises by restructuring the mental organizations or manipulating the mental organizations and they believe with certainty that there is something called an insight the idea of an insight which leads to mentally present which manipulations are mentally presentation in the right order which generates the solution. And so, this is the some of the things that we say on the first lecture.

In the second lecture we moved ahead of it and we saw the various solutions that exist to mental locks in problem solving or hindrances in problem solving and so, there are several some of these solutions are to define an analogue using problem solving hindrance sorry using heuristics as ways of problem solving or using the algorithmic approach to solve problems and so, these are the some of the solutions which may described in the second lecture on problem solving of what are the different ways of solving a problem.

So, we looked into those and we did a comparison of these and we looked at which is the better one and which is the non better when we solve some of the problems which is out there. We also looked at problem representations as a challenge to problem solving. So, what are the factors which effect problem solving which; so we saw some basic challenges in terms of how problems are represented and some of the representation problems basically what representation of a problem means is at the very outset of when a problem arises how do we encode the problem and so, we looked at those processes

also and some of the challenges in problem representation is mental set or functional fixedness and or stereotypes is something else that we saw in the earlier classes on problem solving.

Beside that looking at the challenges to problem solving in terms of problem representation in terms of the problem process we also looked at problem solutions or problem solving as a GPS device, a General Problem Solver. So, basically how human solve problem and how it is equivalent to computers or machine solving problem. So, we looked at that and we looked at the concept of GPS the general problem solver and we looked at how this solution really works or how does the GPS really works.

In addition, we also looked at something called expert versus novice problem solving we looked at how experts solve problem and how novice solve problem and what is the relation between an expert problem solver. And novice problem solver I saw that experts use a number of strategies different strategies the right combination of strategies they also know when to use what strategy. And also know which strategies work in comparison to what novices are and that is why they are called experts. They also tend to know problem configurations.

But, then being an expert in problem solving also has it is downside and so, the wrong side was some of the obvious problems that experts do not tend to know is they do not grapple or they do not go ahead and register some of the basic obvious facts in a problems. Since experts are focused on to solving a problem they are not aware of several other problem facts which is out there and so, they tend to miss on some of the facts in terms of in comparison to novices. So, that is where we ended the last section.

Now, given the fact that experts are not able to conceive some or some of the basic information or some of the extra information additional information which is given in problems it would suggest that experts would be poor in creativity, they would not be able to come up with creative solutions. Since, experts are at most of the time engaged in coming up with solutions which exists from coming up with true solutions of a problem it could hinder creativity is what the general notion would be out there, but as you look into it. You will find out that this is this is the opposite of it has been found out that experts with the very fact that since they can come up with solutions or come up with true solutions they are very good in creativity.

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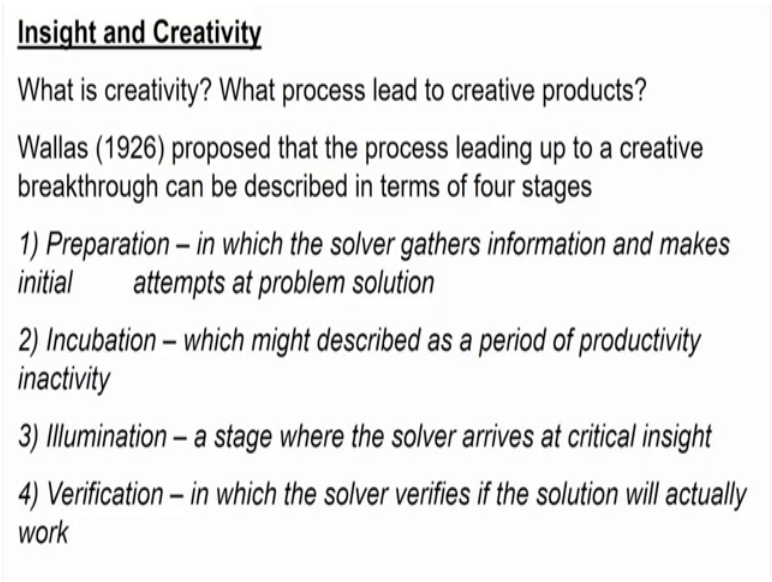

So, let us discuss that here. So, in this section what we will do is we look at and look into what is creativity and we look also into something called process of creativity and look at how insight helps into creativity and that is what we will be doing in this section.

So, how do we define creativity what is creativity and how does creative products occur? What do you call creativity? So, is it and it is it that somebody has long hair looks like an artist is a creative person or somebody giving a solution which is very different then what most people would think about is a creative solution what is a creative solution and how do people attain creativity. We often define people in terms of creative inputs in terms of this is a very creative person and this is a very non creative person kind of a thing and so, people who are called nerds are known to be a non creative, in comparison to people who are out to go out of the way to come up with solutions or think out of the box to come up with solutions and we call these people as non creative.

So, in this section we will try to see whether there are certain personality dimensions to creativity and what is creativity basically, what kind of solution to a problem is called creative solution. So, basically Wallas, 1926, he proposed that the process leading up to a creative breakthrough can be described in terms of four stages. So, what he says is that creative solutions or novel solutions of any problem it requires four steps it goes through a process of four steps by the way creativity is generally coming up with solutions which are not only more informative, but it should be also workable.

So, creative solutions are those solutions which are not only distinct it should not be that these that the solution that you are coming up a solution that you come up to a problem is called creative, when it is distinct when it is different from the general solutions which are already there at hand it that is not the only definition, now that is not the only the inclusion of what a creative solution is it should also be informative it should also be giving some kind of results it should be result oriented.

So, not only solutions which are different are called noble solutions are called creative solutions the solutions in terms of novelty it should also vary in terms of in informativeness which give means that it should give you more information it should give you a wide variety of information and it should not only solve the problem it should solve the problem in novel way and that is what creative solutions are.

So, then what Wallas says is that there are four processes in creativity or there are four steps in creativity and the how are these steps really related. So, the first step in creativity is something called the preparation stage and in this particular stage the solver gathers information and makes initial attempts to solve a problem. So, given the fact that a particular solution is given to you a particular problem is given to you for which you have to define a solution at the first stage you will look at all the information available and this is the stage where problem representation happens. You look at the problem at hand you understand what the problem is try to understand what the problem is gather basic informations or basic bits of information from the problem make mental representations of it and then mentally represent or mentally make a map of the problem at hand. This is the preparation stage and you come try to come up with initial solutions to this. So, in the preparation stage this is basically representation, problem representation stage, where you look at a problem gather basic information from problems.

At the incubation stage which is the next stage what happens is a period of productive inactivity happens. So, what well in Wallas terms the first stage is preparation where you gather all the information from a problem and try to get initial solutions, then a second stage comes in which is called the incubation stage where a productive inactivity happens. So, here people do not respond or do not give up any solution. It is basically they are sitting and thinking over it that is that is that is the thing. So, in terms of Kohlers

monkeys an experiment we saw on the first lecture on problem solving in terms of Kohlers monkey this four stages can be described.

So, the first stage when Kohlers monkey, monkeys were trying or attempting to get the banana which was on the ceiling and they were doing all kinds of fact was the preparation stage where they were trying to find out what should be done or they were trying all their maneuvers all their knowledge into getting the bananas. The incubation stage was the stage where most all the monkeys or the monkey were trying for the banana this sat down and they started thinking this is the incubation stage where productive in inactivity of productivity happens a period of relative inactivity happens.

Now, what happens here is that the what the monkeys were doing is they were mentally restructuring the problem, they were looking at what was available they looked at whatever is available to us in this particular cage and how to reach the banana. The third stage is called the elimination stage a stage where the solver arrives at the solution or a critical insight. This is the stage where you first get the solution or the first appearance of the solution happens. So, after this is this incubation stage an illumination stage happens.

In the illumination stage whatever happens in incubation all those mental processes which happen during illumination they release an insight or they give rise to an insight they give rise to a probable solutions and the four stage is a verification stage in which the observer or in which the person who solving a problem takes up the solution or takes up the insight which is developed from the illumination stage or which arises from the illumination stage and verifies this solution or insight with the problem and tries to come up with the solution.

So, basically, then two important stages in this step, that is, the incubation and illumination; so I do not gain corresponding back to Kohlers monkey the incubation stage was the stage in which the monkeys are not doing anything and just thinking or restructuring the banana problem and the illumination stage was the stage where the monkey who was trying the heart he came up with the solution that piling the crates one over the other another could be like a stair or it could give us some kind of an height and that was the illumination which he required and the verification stage was the stage in which he actually went ahead piled all the crates which were available into the cage stood into it stood over the last crate and got to the banana. So, these are the four stages

which a Wallas defined since these are the four stages in problem solution as he says appears.

Now, Wallas theory has not been accepted in entirety, however, it has been pointed out that two major this theory of Wallas has not been taken out very nicely by cognitive psychologists. They have not accepted it and as a hands down maneuver what they have done is, but what they believe is these stages do arise, but from what Wallas study comes out is two important questions on problem solving first what is the nature of inside right.

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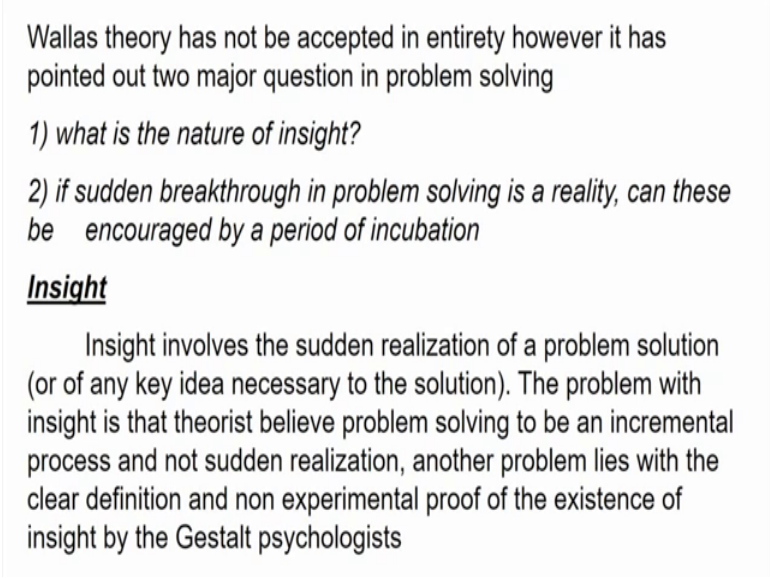

So, the solution that I am talking about the solution that Wallas talked about in the third stage of illumination that insight what cognitive psychologists wanted to do is to find out what is this insight and what is the nature of it? What are the barriers to it, what are the various factors to it or it does it improve or does it decrease under certain circumstances and what does it look like. So, that kind of thing they were interested in and second is a sudden breakthrough in problem solving is a reality can these be encouraged by a period of incubation.

So, the second thing they wanted to know is that buying increase in the incubation time can we come up with more rigorous solutions or more noble solutions right. So, we wanted to establish this relationship between the time spent in incubation and the kind of insight. So the nature of insight, the kind of insight that I generate the quality of the insight that I generate and the time I spend in incubation. They wanted to establish a

relation between that they wanted to understand if increasing or decreasing the time of incubation leads to and generation leads to the more certainty of generation of the insight which further solves of the problem. So, these are the two questions that most cognitive psychologists generated from Wallas's study.

So, basically then what is an insight let us look at what an insight is. So, insight involves basically making this realization that a problem solution occurs and what was the key idea needed for that solution and the problem with insight is that theories believe that problem solving to be an incremental process and not a sudden realization. So, the idea that insight leads to problem solving is the fact that this insight which solves a problem comes out all of a sudden right and so, what most theories believe is that this kind of realization of all of a sudden of a solution does not exist, rather what most cognitive psychologists or cognitive theorists believe is that solution to problem comes by trying over and over again or doing something called and trial and error. So, problem solving is more or less like come at doing acts towards attaining the final goal or incremental acts or incremental behaviors which successfully leads to the final goal.

Another problem lies with the clear definition and non experimental proof or the existence of inside the gestalt psychologists. So, Gestalt were the first people who came up with the idea of what an insight it and they said that this insight is basically comes out by restructuring of the mental representations which are made of the problem. And so, the non existence of experimental proof of this insight is another problem which exists outside. So, basically then the idea is that this insight has to be tested and so, there are several attempts which have been done to test what is the nature of this insight and whether the inside generates from this kind of restructuring whether this.

And, so, on also the fact that and whether this insight is suddenly nature is it comes as it comes suddenly or does this insight that we talked about which is the problem solution of a problem does it come by mentally not by mentally restructuring the problem or spending a time of incubation out there, but it how does it occur and they believe that it occurs through this incremental process of problem solving or in incremental problem solving step by step problem solving process.

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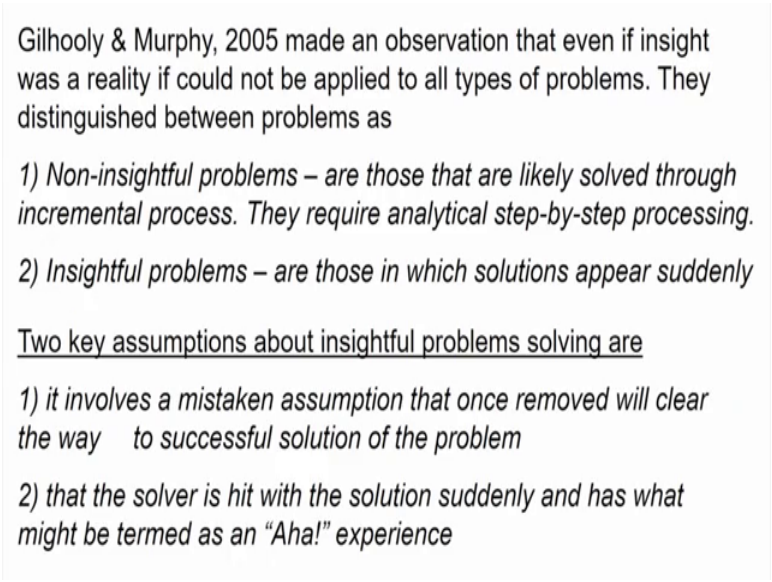

So, Gilhooly and Murphy in 2005, they made an observation that even if insight was a reality it could not be applied to all types of problems. So, they believe that there are even if the fact that in the period of incubation exist and even if the fact that this period of incubation leads to a period of elimination which generates something called insight which is probable solution to a problem they believe that there are problems in this world which can never be solved by an insight and this type of insight does not work for all type of problems. And, they pointed out that there are two different kinds of problems which exists in this world, one is called the insightful problem the other is called the anon insightful problem. So, this is the definition or this is the classification of Gilhooly and Murphy.

Now, what Gilhooly and Murphy says that the non insightful problems are those they are likely solved by incremental process of problem solving and they require analytical step by step processing. So, what Gilhooly and Murphy says is the non insightful problems are those problems which are which are analogy base which are reasoning related problems which are mathematical proof problems. And these problems will not be solved or cannot be solved through this sudden realization or this sudden insight and what they require for solution is trial and error. They realize that or they predict that non insightful problems the solution to those kind of problems arise from incremental working towards or incremental efforts towards arriving at the final solution it is like the GPS problem

solver and so, what we tend to do is to solve a larger problem we keep on solving the problem and each time improving on to it and then are changing the final solution.

In comparison there is something called insightful problems are those with solutions appear suddenly and so, what Gilhooly and Murphy says is that the fact that non insightful problems are not the only thing which is out there are certain things called insightful problems also. And so, certain problems are exist which basically give solutions or which in which solutions are occur or solutions come up by suddenly all of a sudden and you do not really have to do incremental processing or if you do not have to do incremental step by step processing of the problem.

So, how does insight help in problem solving what is the way in which insight actually leads to problem solving. So, there are two key assumptions of how in insight actually leads to solving of a problem. And, the first is that it involves a mistaken assumption that once removed will clear the way to successful problem solving and so, what it is believed is that insight as a problem solution works in this way it makes two assumption.

First, there is a problem there is an inherent problem in insightful problem solutions arise with the fact that there is some kind of a mistaken assumption to start with. So, people have started with some kind of a mistaken representation of mistaken assumption and when this mistaken assumption is taken away the solution appears suddenly and so, what insight tends to do is that it remove this mistaken assumption, right. And, so, what they believe is that sometimes our problems will not get solved because there is a problem with the assumption itself. People assume in certain ways people assume certain kind of facts or people use some kind of facts for problem representation which has a mistaken identity. And with this mistaken identity is removed in some way or is made aware people are made aware of this mistaken assumption in some way and when they remove this the solution occurs. So, this is the first way in which insight helps you to solve problem.

And, the second is that the solver is with the solution, the solver is hit with the solution suddenly and that was termed a experience and the second fact the second key assumption in insightful problem solving is the fact that the solver who solving the problem he suddenly gets this realization that the that the solution appears and this

sudden realization is called the experience. So, this is that part in which it is believed that the sudden realization of solution happens.

So, basically two assumptions in the insightful problem solving the first assumption is the fact that the solver there understands of mistaken identity or understand a mistaken assumption which he used for creating the problem and as soon as he understands that this mistaken identity is removed or replaced a solution appears and the second that this solution which appears to the solver in the elimination stage of problem solving it happens suddenly. It does not happen over a period of time over an incremental time, but it appears suddenly to the solver is suddenly the restructuring whatever the process whether it is mental restructuring or mental manipulation and mental representations due to that a sudden realization happens. So, it has to be sudden it has to be out of the blue and only then this is called the eye experience and these leads to the solutions of problems.

So, let us look at two in non insightful problems and two non insightful problems and let us see what is the whether the facts that we have dealt up till now in terms of mistaken identity and in term terms are non mistaken identity and whether there is a difference between insightful and non insightful problems. So, I will give you one minute to basically go ahead and look at these problems and arrive at the solution and then I will further give you the solutions of this. So, beginning now, I give you one minute time to look at both these problems and arrive at a solution, right.

So, I guess that you have enough time you had enough time to look at both these problems and are you aware of the solution. So, in the first case the solution is 59 days right because the lilies are doubling every 24 hours and so on. The fifty ninth day there will be half the pound and the sixteenth day, since it is doubling so, basically on the sixteenth day there will be full of the pound will full be full of lilies and some mistaken assumption is what we tend to do is very tend to create a mathematical expression of it. Remember the representation problem that we saw in the first lecture itself how the problem representation creates problem solution problem solution and that is what it is. So, this realization itself that it is doubling itself and so on the 59th day when it doubles in the 60th day the lake the lake becomes completely covered with the least. So, on the 59th day it will become half. So, what we are doing is we are halving the process and so that is how it actually goes.

I am pretty sure that you have also the answer to the second one and the answer to the second one is that he has to unwound the rope. So, since it is half the distance. So, what he has to do is unwound the rope and once you have in unwound the rope once you find out that the rope is composed of two strings which are wound together, right.

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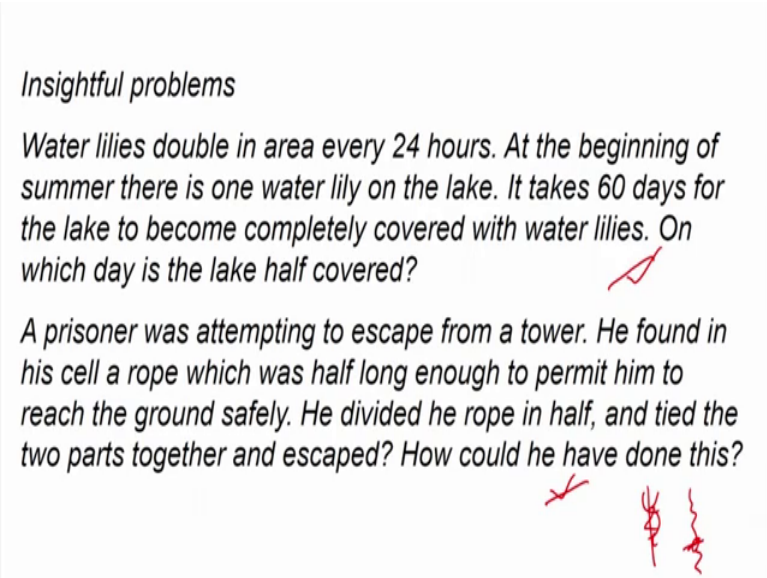

So, most of your ropes have these kind of stringing together and. So, once you unwound it will become two pieces back to back, attach them and then he can use it and so, this is the solution and so as I am pretty sure that these are the solutions which has appeared to you suddenly and so these are called insightful problems.

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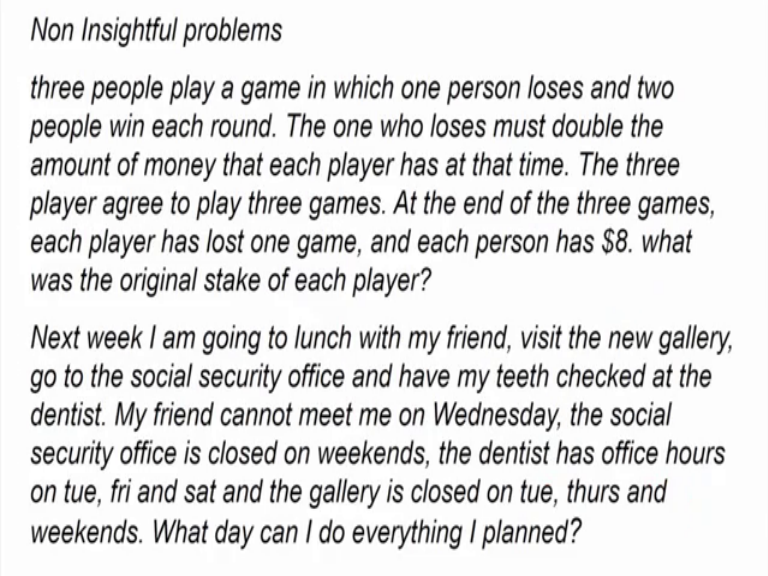

Now, we have two non insightful problems and is you as you would require that in these problems there is nothing called inside right what you need to do. So, 30 seconds to read this problem please read this problem and come up with a solution and so, as you would find out that both these problems require to create mathematical equations and once you created mathematical equations. So, the second problem is a permutation problem and the second first problem is also kind of a permutation problem. So, both of you are familiar with the concepts of computation and combination you will find out that you have to create a mathematical equation for solving these problems and so, it cannot be done through insight right and sudden realization of the solution is not there you have to create some kind of mathematical expression for it solve for that expressions all for both the x and y's and you come up with the solutions and so, this is the difference between insightful and non insightful problem.

In terms of insightful problem a mathematical equation can be generated or it you require to generate the correct expression and then solve for the expression and the solution comes in or correct the understand the correct representation in terms of combinations or permutations and based on that arrive at a solution there whereas in your insightful problem you do not have to do that, you just think of the problem and then is there is one light bulb which appears on your head and that is the solution. So, the mistaken identity is the fact that 60 is full. So, if it is doubling that 59 will be half that kind of a thing or

the fact that these ropes are intertwined together. So, if you break it apart we can attach it end to end and then can escape the prisoner can escape the cell.

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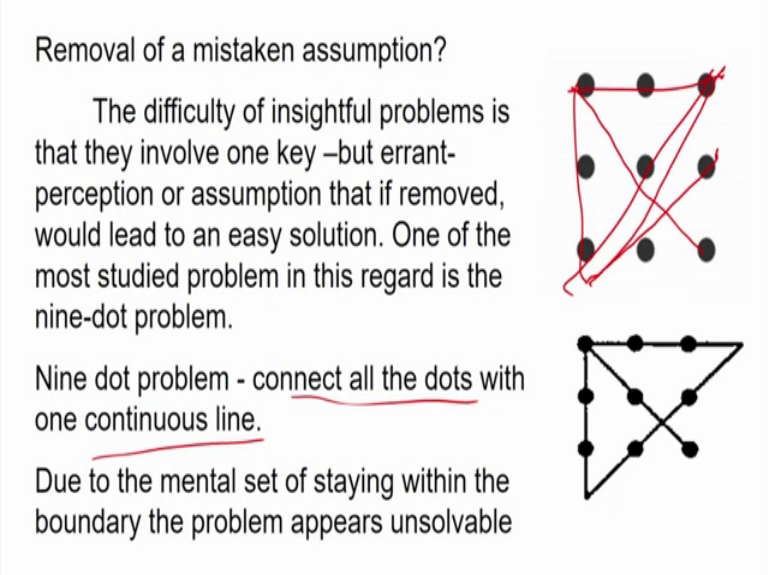

So, these are the basic solutions to both insightful and this is the nature of insightful and insightful, non insightful problem. So, the idea of removal of mistaken assumption which is there in inside the problem now the difficulty of insightful problem is that they involve one key, but a errant proposal which leads for the kind of problem that you are facing in solving a problem, right.

Now, one of the most studied problem which presents this kind of mistaken identity or which leads you to assume this mistaken identity and that further leads you to non solution of this problem is called the nine dot problem, right. So, I am going to present to you something called the nine dot problem and your job is to basically solve it. So, basically what is the nine dot problem you have to connect all the dots with one continuous line. So, these are continuous line and what you have to do is to basically join all of them with one continuous line and the problem requires or the problem is made in such a way that there is one or some key and error relating perception or assumptions and these key error perceptions or relations basically hinders you to solve the problem.

So, basically how do you connect all the dots with one continuous line and as you can see no matter how you try it is very difficult. Now, people who would have solved it may have seen this problem before and that is making them solve it, but other people they will

realize that solution to this problem is not easy no matter how what you do, no matter which configuration you look at basically joining these dots with one line is not possible. This is the solution right and so, as you realize that this solution exists and this solution is the only solution to this particular problem. So, you start from here and then this is how what you do, this is what you do, this is I mean this is what you do and then you come with the final solution and this is what the solution is all about, right.

So, what prevents you from solving this problem what is the mistaken identity.

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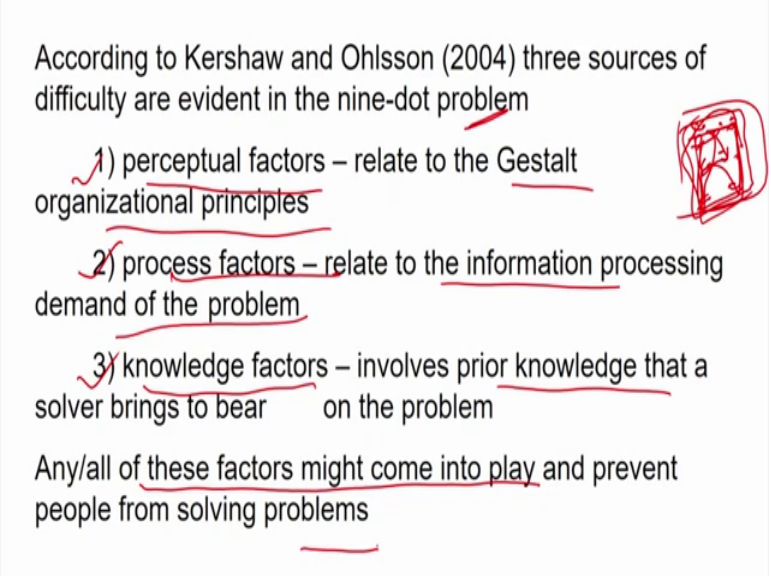

The mistaken identity that according to Kershaw and Ohlsson three sources or difficulty are evident in the nine dot problem, the three different kinds of problems can arise. Now, generally speaking the problem is the problem which makes you not see the solution is the fact that you want to create this or you want to stay within this boundary once people want to stay within this boundary of four or this idea of staying within the boundary they will never be able to solve it. So, in this as you see we violated the idea of this boundary and so, we are able to solve it and so, this is the mistaken idea.

So, Kershaw and Ohlsson they basically suggest that there are three sources of problem or there are three basic sources which leads to non solution on the nine dot problem and what is it first the perceptual factors relating to gestalt organization principle. So, Gestalt organization principle says that this mental representation most mental representation

have an organization principle they are organized together and these organization principles help you into coming up with solutions.

So, the idea of similarity, the idea of perceptual similarity, the idea of figure ground all those things leave you to stay within the boundary stay within the boundary of the line dot. So, these are the dots that I am looking at and so, most Gestalt perceptual factors or staying within boundaries of per say or perceptual organization let us you stay within the boundary and once you stay within the boundary you will never be able to solve this problem. You have to think it in a different manner; you have to break this assumption of the boundary conditions that it is a square. The idea that this is a square and these dots which are out there actually form a square, you have to break away from that and only then you can solve this problem.

The second is called the process factors relate to information processing demands of the problem. Now, since the problem is presented in such a way it looks more or less like a square and the demands of the problem is in terms of a particular way of solving it, a particular demand is out there of thinking in terms of this boundary condition and solving it and the idea that it should be a continuous line this leads to that this basic facts leads you to solving problem in a particular means or thinking about the problem in a particular way and so, not able to solve the problem.

And, the third is the knowledge factor our prior knowledge dictates the fact that these kind of solutions do not exist or these kind of solutions cannot be done no matter how you try to connect it in whatever way it is not possible or if you even if you try connecting it this way it is not possible and so, these prior knowledge or this prior mental set which is out there with problem similar to this that creates the problem in solving it. So, basically both perceptual factors, process factors and knowledge factors add up together, previous knowledge's which you have about solutions like this or problems like this that hinders you solving the problem.

So, any or all of these factors might come into play and prevent from problem solving or the nine dot problem.

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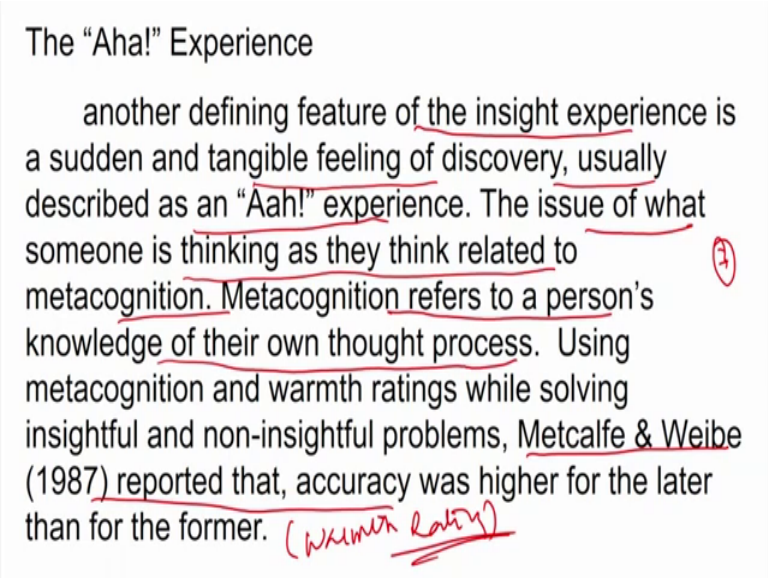

The second thing that we saw is the experience the experience of sudden insight or sudden fact that a solution exists. Now, another defining feature or the insight experience in a certain tangible feeling of discovery usually described as the experience. Now, this is the issue of what someone is thinking as they relate to metacognition. So, this idea of experience is related somewhere to something called the metacognition what is metacognition it refers to a person's knowledge of their own thought process. So, the idea of this experience of whether you come up with this sudden experience or the sudden realization the solution is there to test this we should be very sure that people are able to monitor their thoughts and that is called metacognition.

So, can people actually monitor their thoughts while solving the problem and to solve this particular fact of whether people are able to monitor their thoughts when they are solving the problem Metcalfe and Weibe they conducted something called the warmth rating problem. What is the warmth rating problem? Now, what they did was they took two groups of people for one group of people they gave an insightful problem and the other group of people they gave a non insightful problem. Now, both of them were given something called the hot cold play. And, what is the hot cold play? They were asked mostly as most of these people were asked to monitor their thoughts or to monitor the process of how they were solving the problem and they were asked to basically report to the experimenter whenever they were approaching to the problem. So, the more close

they thought that they were, coming to the solution of the problem the more warmer they would say that they were feeling.

So, if you if doing something if and attempt to solve a problem leads you to believe that you are nearer to the solution you say and warm I am one degree warm I am 1 degree warm, 2 degree warm and 3 degree warm and so on and so forth. But, if you do not feel that you are closer to the problem you say I am cold that is what the people have to say. So, basically the more closer you think you are to the problem the more warmer you will say you are and the more distinct you think you are away from a problem the more colder you would say you are. So, what could be x that the output of this kind of a result? You would believe that in generally in terms of non insightful problem people would increase their warmth rating because with number of attempts with number of the solutions or a number of attempts that making the solution they become closer and closer to the problem and so, the warmth rating will be increasing, that is what the answer to this the experiment was for insightful problem.

The hindrance or the typicality happened for the insightful problems. In insightful problems it is believed that the solution comes suddenly and so, people would mostly say that they are cold and suddenly they will say that they are warmth as the intuition comes in or at the elimination stage at the stage of elimination where the insight is generated from the second incubation stage people will say higher degrees of warm. This is not what happened. And so, as expected that people will stay cold or people will say they are cold for a longer period of time and suddenly they will say that they are feeling very warm and this is the generation of the solution, this is what did not happen. And so, from this warmth rating itself it was very difficult to say that the sudden realization happens.

And so, this verification of the sudden realization of experienced that was sort of not proved or disproved by this Metcalfe and Weibe experienced or Metcalfe and Weibe could not find out any support for this evidence.

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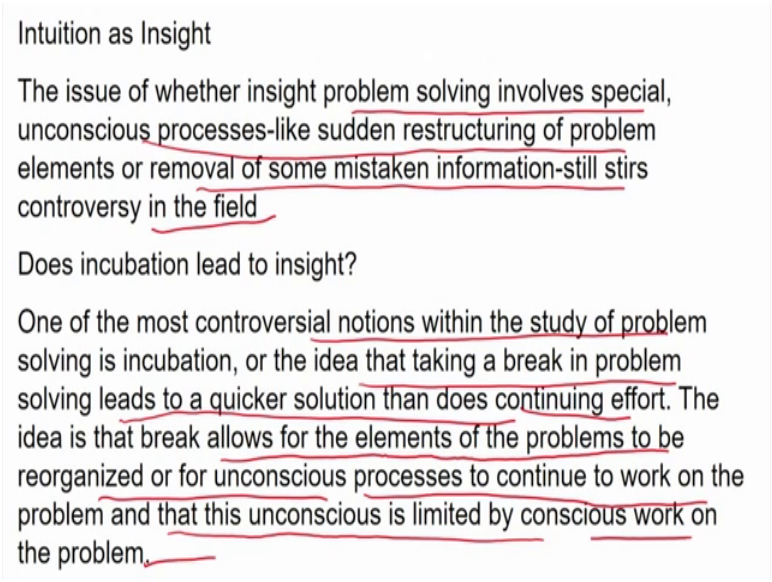

Now, in insight is also been taken as an intuition right it is believed to be an intuition. So, the issue of whether insight problem solving involves special unconscious process suddenly restructuring or the problem elements or removal of sudden mistaken assumption serious controversy in the problem. So, basically is it intuition that leads to this reason reconstruction of problem and there is this institution leads to a solution and whether this insight is the institution there is still controversy in the problem that this restructuring happens. So, this kind of controversy still exists in the field whether insight and intuition are the same thing and whether this intuition is intuition that people talk about is exactly restructuring of the problem.

Another prop fact that we saw in the beginning of this lecture was whether incubation leads to insight? Whether more time given to intuition leads to insight? So, one of the more controversial notion was within the study of the problem of incubation the idea that taking a break from problem solving leads to quicker solution than continuing effort. So, whether if I give you more time to solve a problem or if you spend more time in the incubation stage whether it will guarantee a solution or not whether that was being tested and whether this is equivalent to solving using continuous process of solving a problem. The ideas to break is that breaks allow for the elements to or the problem to be reorganized for unconscious process to continue to work on the problem and this unconscious is limited by conscious work on the problem.

So, the question was whether allowing you more time, how does it leads to insight or how does it leads to this insightful solution, and the solution which has been proposed is that taking break from problems these two more unconscious process. And these unconscious process leads to mental restructuring or the problem and providing the solution.

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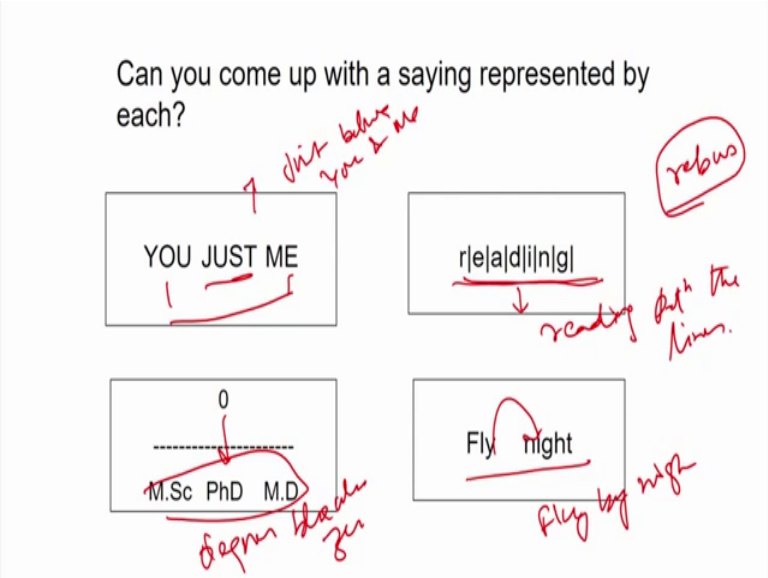

Now, to test this it people were given this kind of a these kind of problem, let me see if you can solve this problem. So, there are four problems in given to just to you in front of you these are called rebuses by the way rebus problems and can you find a solution to this. So, 10 seconds to basically find solutions and as you would see that the solution to this problem is in the first case the solution so, no matter how much I time I give you the problem solving of these cases if you are not seen these rebuses before it is very difficult for you to solve this problem. And so, giving enough time giving more time is not going to solve. Only the fact that if you have dealt with these problems before can you actually solve it and so, as you see the first box basically expresses just between you and me that is what. So, just is between you and me and that is the solution.

Now, I am pretty sure that you are able to call the second one and the second one says reading between the lines. So, reading is the word reading is between the lines and that is what it is. So, the answer is reading between the lines that is the solution to it. Third one, I am pretty sure you have guessed by now it says degrees below zero. So, these are the

degrees which are there and is a below zero that is what it is. Are you sure you are able to solve the last problem? The last no matter how much time I give you it is not going to be solved because there is a mistaken assumption out there and it basically says fly by night. Fly is by night or the side of night and so, these are the (Refer Time: 41:55). And so, several terms have been done to find out whether increasing the time leads to solution of incubation, time increasing of incubation time leads to correct solution it is found that is not what it is true.

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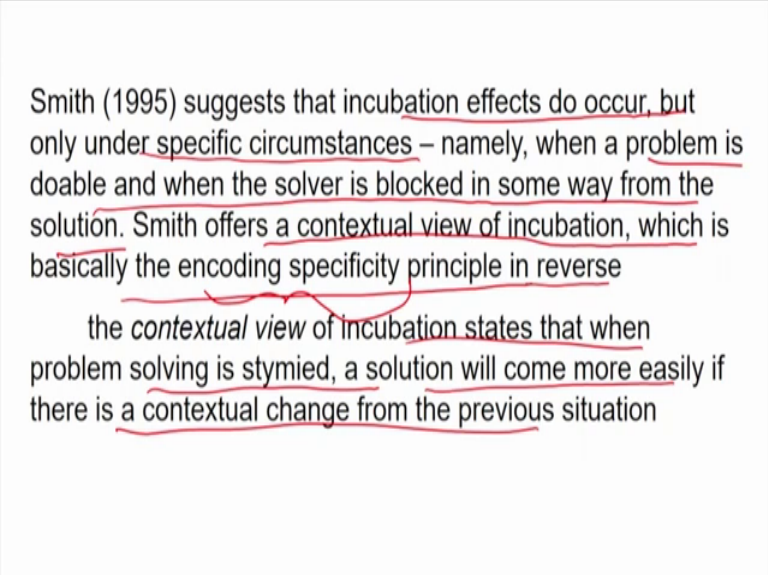

So, then what kind of factors actually leads to solution correct solutions and Smith suggests that incubation effects do occur, but only under certain circumstances. So, increasing time is going to work as generating solutions for insightful problems only under certain conditions – namely, when a problem is doable and when the solver is blocked by some way from which the solution. So, only under two conditions if a problem can be solved only in those stages you can be able to or even be able to find our solution to problems and the second is when the solver is really blocked by some kind of an idea. So, he is trying again and again and he is blocked by some kind of a problem mistaken identity, only then these problems can be given more time into incubation stage is going to solve it, but if the problem has no idea or he has represented the problem in a wrong way or there is some other problem hindrance to the problem solving it is not going to work.

So, Smith offers a contextual view of incubation which is basically the encoding principle or encoding specificity principle in reverse. What does it really mean if you basically go to encoding specificity principle, it in terms of long term memory it basically means that the more closer a solution context is to the problem context the easier the solution is. In terms of insightful problem solving in terms of using insight as a problem solving method a reverse is true, which means that the more diverse the context the more time you give to people and the more diverse the context in solving problems the better the insight is.

So, insight as a solution to a problem occurs only when you change the context in the same context is that people will be thinking in the same manner. So, if you change the context the thinking change is the restructuring of the problem of occurs or a new line of thinking arrives and because of this new line of thinking the solutions can be appeared too and this is what Smith, 1995 view of contextual problem is all about.

So, the contextual view of incubation stage that when problem solving is time the solution will come more easily if there is a contextual change and that is what I was trying to tell you.

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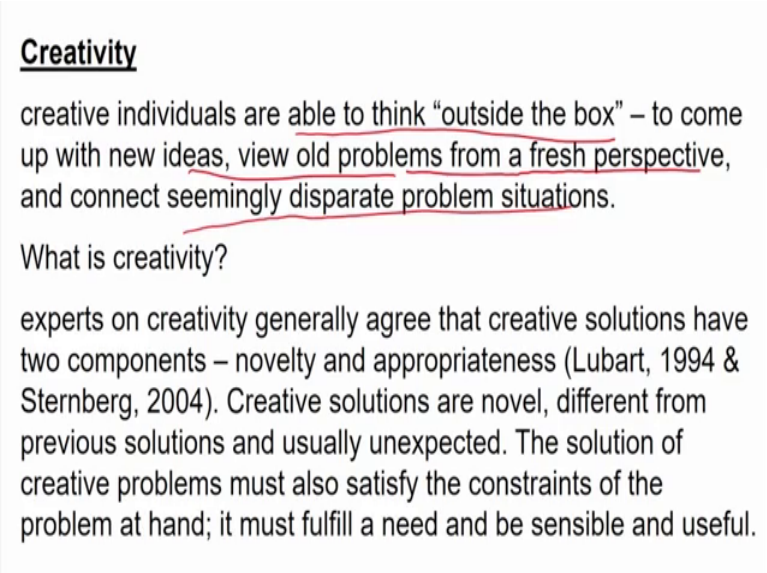

Now, what is creativity? Now, creative individuals are able to think outside the box. What does it mean? To come up with new ideas, views and old problems in a fresh perspective and connects seemingly disparate problem solutions. So, these are those

people who can come up with new ideas view old problems from a new perspective and then even with old problems they can connect the old problem or think of the problem in a new way.

So, what is creativity? The experts they believe that creativity generally agree that creative solutions have two components any creative solution, any creativity has two components to it one is called the novelty and the other is called the appropriateness. Now, as I described at the beginning of this chapter any creative solution has to be new. It should not be a copy of the solution which exists and it should be appropriate in the sense that it should give you enough information, it should give you appropriate information for a solution, only novelty is not going to solve the creative insights.

So, creative solutions are novel different from previous solutions and usually unexpected. The solution of creative problem must also satisfy the constraints of problem at hand that it that is it must fulfill a need to be sensible and useful. So, just coming up with some novel solution to a problem is not creativity. Creativity is also appropriateness which means that it should typically solve the problem in the easiest possible manner, an optimal solution to be exact.

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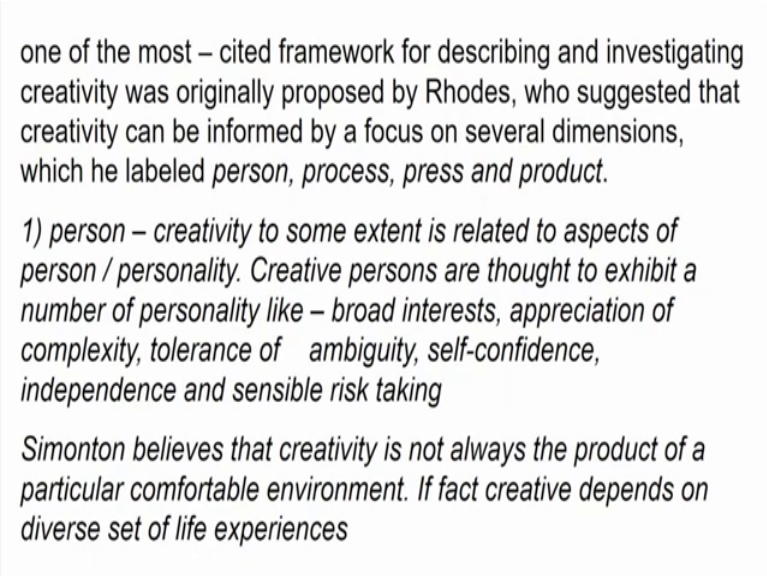

Now, one of the most cited framework for describing and investigating creativity was proposed by Rhodes, who suggested that creativity can be informed by a focus of several dimensions. So, basically what is Rhodes says is that creativity can be mapped on the

basis of four dimensions or four things which are out there and what are these first things person. For creativity four things are important the first thing is a person creativity to some extent is related to the aspect of a person or personality is believed that creativity occurs for a certain kind of personality and so, what is this kind of personality. Creative people are taught to exhibit a number of personality trait like they have broad interest, they have a number of they appreciate complexity and they can tolerate ambiguity.

So, creative people not only are those people who have just number of interests out there, but they have tolerance for ambiguity which means that they can tolerate ambiguous solutions or they can tolerate ambiguous situations and they love complex things out there right and they have higher self confidence and they are risk taking people. So, those people who are risk aversive are never creative, people who are is taking a more creative in nature. So, one of the factors will define creativity or creative solutions or how you come up with greatest solution is the kind of person that you using the personality factors.

Now, Simonton believes that creativity is not always the product of a particular comfortable environment. In fact, creativity depends on diverse and sets of life experience. So, the more life experience you have the more tolerable you are to be ambiguity the more broad interest you have and the more self confidence you have and the more risk taking you have, then you are creative. The second process or the second factor in creativity is called the process. So, creativity also refers to specific set of processes which are there. Two contradictory ideas about cognitive processing in creativity has been preferred; one is called one view is that it is a special process and abilities and like the ability to quickly restructure problem information and connect seemingly remote possibilities.

So, basically one view of creativity believes that creativity is a special process and it is the ability to restructure problem and how this restructuring happens by connecting seemingly remote probabilities. So, those probabilities are those possibilities which were not thought of before they are brought in those answers which were not thought of as an answer to a particular problem they are thought and they are included into the new solution that is how creativity works and the another view is that creative thinking is a product of garden variety of cognitive processes such as attention in memory and this first. So, first view is basically using those solutions which are not there and

restructuring problem and taking those solutions which have been given before, but we somehow did not explain the solution using all of them together and restructuring the problem and forming a solution to it.

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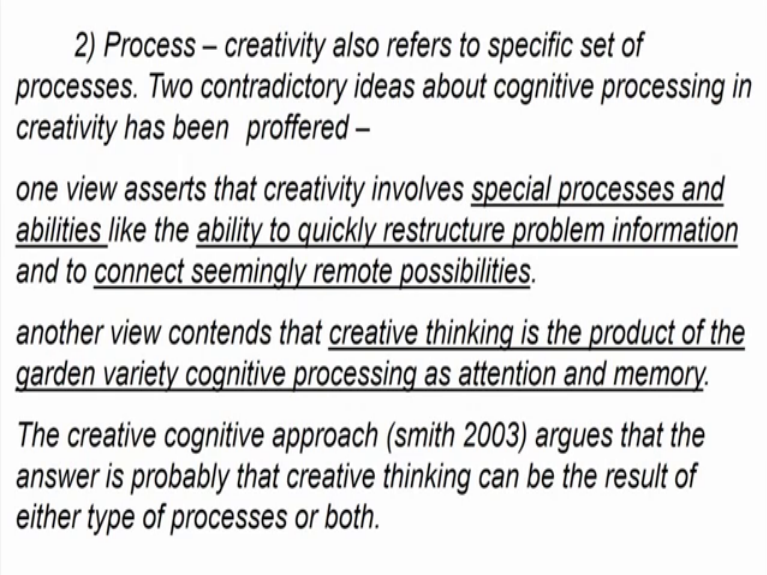

The second view believed that creative solutions are basically through higher cognitive processes or different to increase in different cognitive processes like memory and attention. So, the more memory and attention you have or the varied kind of memory intention processes that you implied the more creative you will be. The creative cognitive approach Smith 2003, they argued that the answer is probably that creative thinking can be the result of either the two. So, basically they believe that it is not just restructuring which leads to creativity, it is also a different kind of common are multiple cognitive processes and all of both of them combined together to actually generate creativity.

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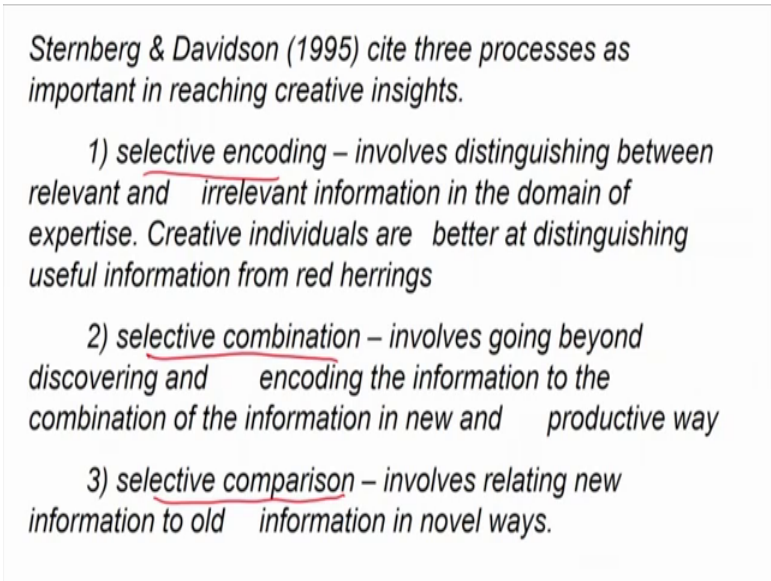

And so, Sternberg and Davidson they cite three processes as important in reaching creative insights and what are these processes one is called selective encoding, the other is called selective combination and third is called selective comparison. So, these three processes are and selectively encoding information, selectively combining information and selectively comparison of information leads to a person to doing different cognitive acts. And then restructuring problems in a different way and then also using those solutions in a not been used before or have been neglected before and coming up with creative solutions.

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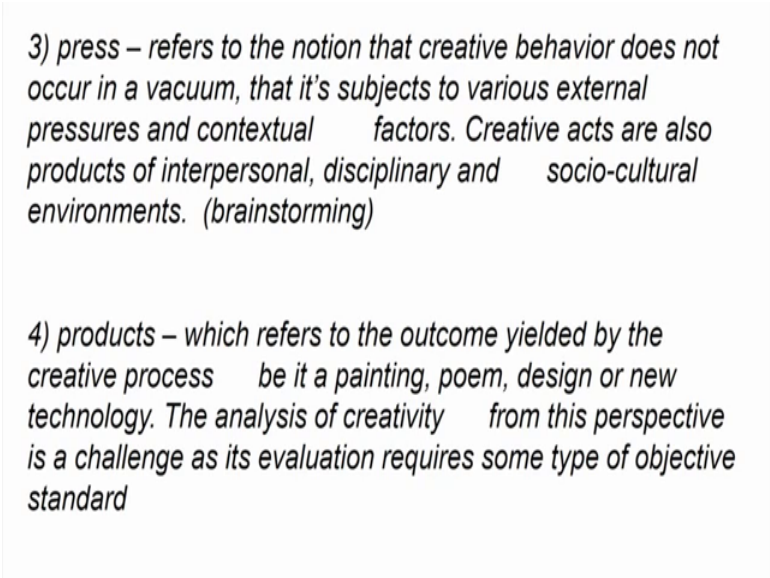

The third factor in creativity is called press. It refers to the notion that creative behavior does not occur in vacuum or rather there is a subject to various external pressure and contextual fact process. So, basically the context and the external environment has a lot of role to play into creativity. Now, creative acts are also products of interpersonal disciplinary and so, social cultural environments. So, it is believed that it is not only that internal factors cognitive process relates to creativity, it is also diverse setting diverse kind of factors which are out there. So, different kind of social environment different kind of interpersonal exchanges all these contextual factors leads to creativity.

And, the fourth factor or the fourth part of this creative in how creativity develop is the product, which refers to the outcome yielded by the creative process be it a painting poem design or a new technology. So, what kind of outcome that I am generating? The analysis of creativity from this perspective is a challenge as it is evaluation requires sometimes of objective standard. And so, basically it says that the kind of product that is generated out of creativity it also requires certain kind of to evaluate it right. And so, basically what it is that the kind of product that is generate out of creativity that requires certain evaluation standards, a different kind of evaluation standard for it to be generated. And so, there are different kind of creative out output it could be in terms of the painting or it could be in terms of novel process it could be in terms of an novel product and each of them will require a different standard for evaluation or a different kind of evaluation which is out there.

Now, there is a taxonomy which has been proposed for creative process and products and this has been done by titration, 2004 they proposed a useful scheme that imposes some order in the desperate research into creativity. So, titrates proposed that creative insights as a creativity works on two different domains one is called the processing mode and the other is called the knowledge domain. So, on two accesses nitrate try to look at creative processes what he says that any creative product or any creative process can be mapped on to two dimensional space and this two dimensional space has a dimension or something called processing mode in which mode the processing is being done of creative solutions or in which mode then the creative solutions have been generated. And the second node is second domain is called the knowledge domain or the second axis on which creative products is to be analyzed is called the knowledge domain.

So, in terms of processing domain refers to whether creativity insight is there is a result of deliberate or if a effort full search or whether it emerges spontaneously as an x and expected flash of insight. So, in terms of the processing mode in terms of the processing mode access or the processing mode dimension, there are two ways to look at creativity, right. Creativity can arise or creative solutions can arise from a thought about from a well thought about process by using most of your memory into it or using most of your cognitive process and generating a solution or creative solutions can occur suddenly after the blue and you do not do enough cognitive processing into it and so, on this dimension of the processing dimension the dimension varies from a deliberate effort full cognitive processing to a sudden realization of the solution or a sudden upcoming of the solution.

On the knowledge domain or basically on the axis of knowledge domain on the on the dimension or knowledge domain it refers to the nature of the creative insight whether it is characterized by more cognitive or more emotional breakthrough. So, basically what type of output it is creating, whether the output that the creative solution is producing is more cognitive in nature or more emotional in nature?

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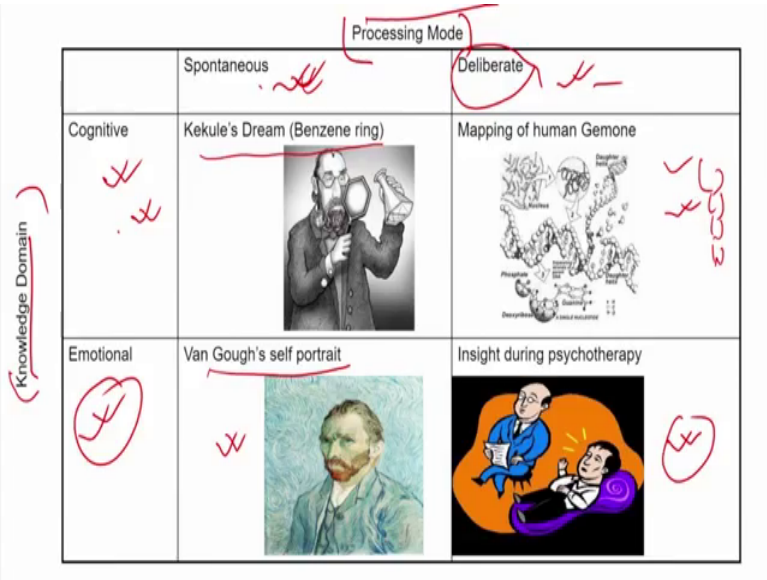

And, so, basically there is this kind of a table has been created and it is very easy to understand this table there is a two axis on to it on this table one is the processing mode and one is the knowledge domain. So, within the processing mode you have the spontaneous processing mode where is believed that creative solution happens all of a

sudden or just a deliberate solution mode in which you believe that creative solutions occur from deliberately thinking about it or doing efforts and coming up with it. In terms of the knowledge domain in terms of the fact that what kind of solution do what kind of creative solution are we coming up with, there are two things it could be more cognitive in nature which basically means that it could be more thoughtful in nature, it could be more information knowledgeable in nature or it could be an emotional product or it could be an emotional output that that is there.

And so, as you look into it a more cognitive and more spontaneous idea or creativity in terms of more cognitive and more spontaneous is Kekule's dream of what benzene ring. So, what happens is although the solution came to Kekule's in his night sleep, but he was thinking about the solution for a longer period of time and so, it was more cognitive and more spontaneous. In terms of thinking the deliberate mode was mapping the human genome. So, people. So, people who created this a human genome they were working for this over and over again and they were doing deliberate efforts to solving this and out of this deliberate efforts out of this continuous effort to solving this problem and using a lot of knowledge a knowledgeable way of mapping the human genome or creating the DNA sequencing came up.

In terms of emotional product the Van Gough's self are in portrait is actually a spontaneous output to it. So, all of a sudden Van Gough drew this idea of self portrait or the idea of Monalisa which is more emotional in nature and then the it creates it was created all of a sudden, but those insights which are generated out of psychotherapy those emotional insights or reason for emotional problems which are created or which are generated or which are evaluated in terms of psychotherapy sessions are a deliberate mode because the psychotherapist has to work with the person and he has to work backwards, right. It is not suddenly spontaneously this person will say that this is the emotional problem that I have or this is the problem which is the reason for all the emotional hindrances that I have been facing in my life what they will say is that building up using a free recall procedure that the psychotherapists go step by step to zeroing in into that emotional fight or that emotional discrepancy which leads to problems.

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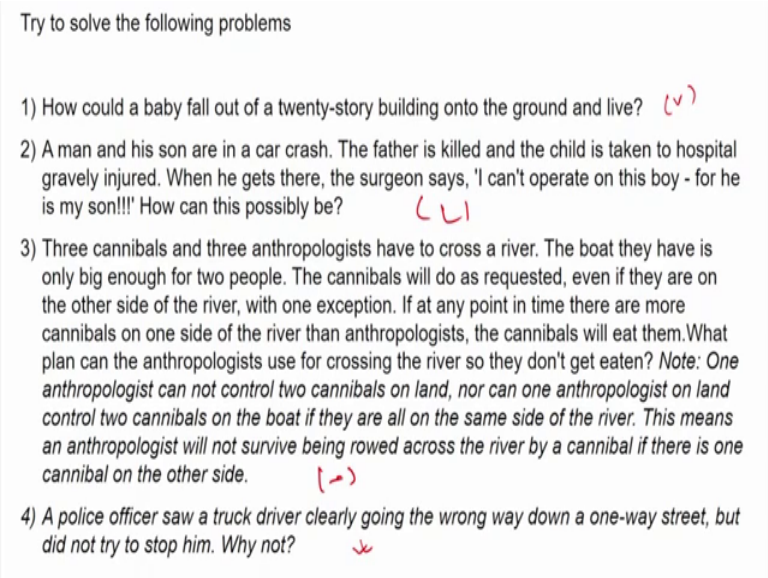

Now, I have so, I will leave you with certain problems which are out there and some of these problems are insightful, some of these forms are not insightful and you can actually look into it.

So, basically as you look into it this is this is possible because a child could have actually fallen out on the second floor right and this is a possible because the mother could have been the surgeon. So, I am just giving you the answer this is most people know it and if you are familiar with the Simpson, if there is an episode which talks about this candy base and how the Simpson father Homer Simpson he goes ahead and solves this problem. So I will refer, I will give you a hint to look into it I think in season 26 or 24 they gave a solution to this and this is possible because he was not having the truck with him and so, he can walk.

So, these are the same different number of insightful problems a non insightful problems out here which you have a solution. So, what we did in this lecture is we continued with what is insight we try to explain you what is insight and I also tried to include in introduce to you what is creativity and then looked at different kinds of how insight really works into finding solution to problems and what is the role that insight has into solving problems then I went up and explained what is creative, creative process and the four different parts of the creative process and at the end of it I explained to you that hierarchy, that taxonomy which basically goes ahead and look at in any creative product

and maps it into two domains or maps it into two dimensional axis one dimensional being in terms of the knowledge domain. So, where it is going to improve the creative product, where it is going to affect, whether it is creating knowledge or whether it is creating emotional support or emotional output and in terms of the processing mode whether on an effort was done to create the solution or whether the solution arrived on it is own.

So, this is what we did in this today's lecture and this is the last section on problem solving. So, until we meet again.

Thank you.