

Introduction to Psychology
Prof. Braj Bhushan
Department of Humanities and Social Sciences
Indian Institute of Technology, Kanpur

Lecture – 33
Aptitude

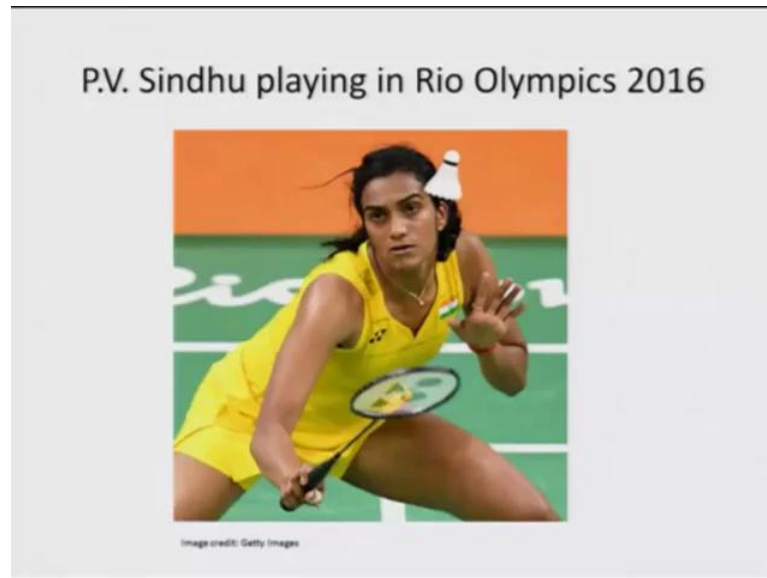
This week we are started our discussion with the fact whether genes are extremely important, whether environmental conditions are much more important, or is it that gene environment both place their own respective roles and we have somewhere confluence of the effect of the truth. Then we looked at one very celebrated construct that is intelligence. Now before I take you to the new construct watch this video.

(Refer Slide Time: 00:47)



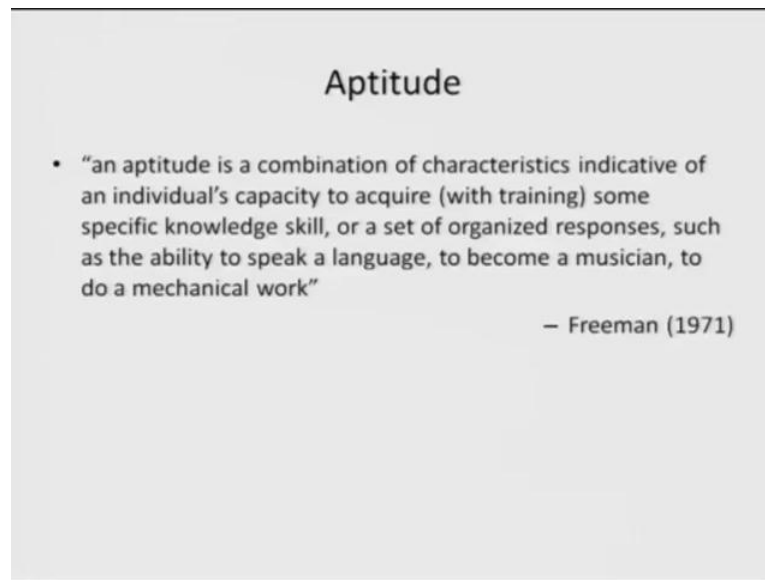
You saw the achievement of the golden girl of Indian athletics badminton.

(Refer Slide Time: 01:10)



Now imagine and try to decipher why did P V Sindhu plays so well, is it that the credits goes to her genetic makeup, is it that she was brought up in particular type of environment, is that has a genetic as well as the environmental conditions both had their respective roles to play, is it that she had some exceptional intelligence which made her learn and then perform, or is it that this required very specific set of a skill which she could acquire over period of time during her course of training and this intern made her performed exceptionally well in the field of sports and this brings us to our new topic. We took the example of this excellent 21 year old Indian badminton champion, who has brought silver medal to our country in this Rio Olympics, but we are taking this example to a understand and there could be a possibility that we all have certain specific thing within us, which can be nurtured, which can be groomed through training and this can intern help us achieve far have far better, far ahead, far greater in our life. So we would be talking about a construct called Aptitude.

(Refer Slide Time: 02:49)



Aptitude

- “an aptitude is a combination of characteristics indicative of an individual’s capacity to acquire (with training) some specific knowledge skill, or a set of organized responses, such as the ability to speak a language, to become a musician, to do a mechanical work”

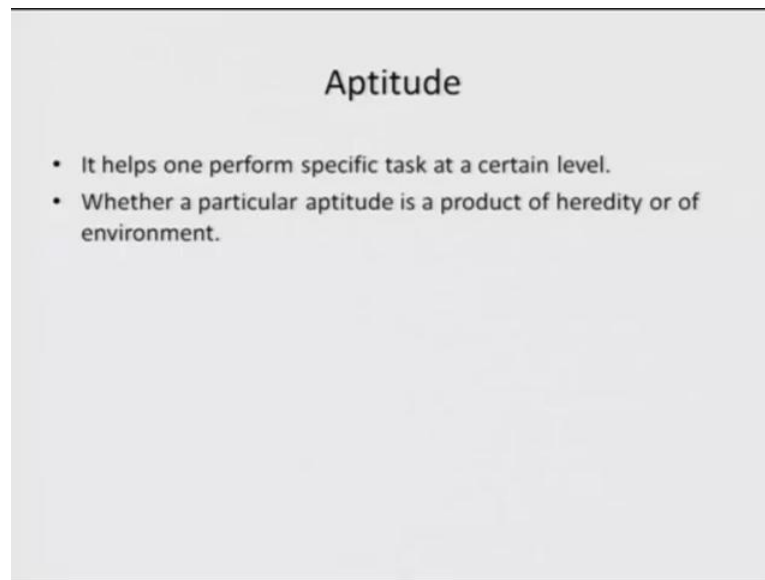
– Freeman (1971)

Now Freeman has defined that an aptitude is basically a combination of the characteristics indicative of an individual's capacity to acquire some specific knowledge skills and of course, this specific knowledge will be acquired through training or set of organized responses such as the ability to speak a language, to become a musician, to do a mechanical work and so far.

Now imagine a situation you acquire proficiency in a particular language, you are exposed to another language at certain stage in your life, you decide to learn a third language and there are certain specific linguistic skills that are needed to develop competence in that very area and you realize that few people do it nicely. Take example of a music class, large number of student they would attend the class, but then you realize that only or two of them succeed to the level of a now becoming celebrated musician. Similarly take the world of sports example, that we began with large number of children they play badminton in their houses, some of them they go to the coaching centers, some of them to go to state level, national level and then finally, you realized that there is somebody who finally, excels in this very area.

Now aptitude is basically this combined characteristic, which is actually an indicative of your capability to acquire certain specific skill. So if you are trained, if you are given a conducive environment, your capacity will now get a fully fledged royal road to move towards the goal that you are basically end out to achieve in your life.

(Refer Slide Time: 04:46)



Now basically what aptitude does is that it helps you perform a specific task up to a certain level. Now we all can play badminton, but we cannot play now to the level to which you saw P V Sindhu playing or other sports man similarly you can play flute you can play guitar, you can sing the song, but not as melodious as some of the established singers you can play a music instrument, but not as well as some of the celebrated musicians.

So some people they achieve certain level in their carrier, in terms of performing some specific task. Now we come back to the old question that whether a particular aptitude can be attributed know that it is a basically product of heredity or do we say that it is basically a product of the environment. So what leads to particular aptitude is it the heredity or the environment and this question is extremely difficult to answer.

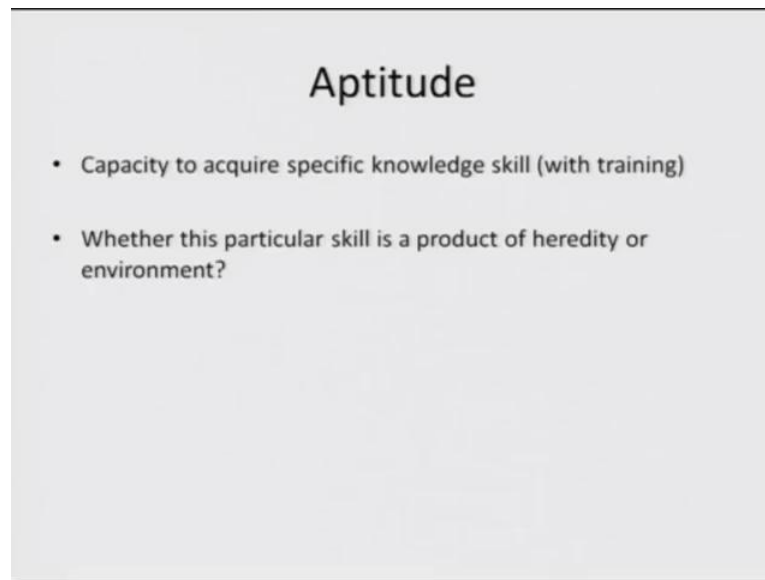
(Refer Slide Time: 05:43)



Look at the second example Rio Olympics once again we visit there. Just 23 year old a bronze medal winner in wrestling in 58 kilogram category Sakshi Malik. She became the first women from this country to win a medal in wrestling championship. I was looking at her history, I heard interview of her mother, a who said that in the family nobody is into wrestling, but then they go on to say that Sakshis grandfather happened to be a wrestler. Now imagine one thing one can very easily a commit an error of saying that see in the family you have the history of somebody playing wrestling. Hence you cannot over rule the importance of heredity here. Take the case of P V Sindhu.

Now you realize that fine it was just the Jill of an individual player, who made her achieve this very gold in her life, given the fact that she got one of the best coach in the country Pullela Gopichand. Who himself was a celebrated player in his days. Now if you take these 2 examples, both of them have been now the winners of bronze and silver medals in respective sports, but one where you have the history of somebody playing in the family and in the other case where you do not have this history.

(Refer Slide Time: 07:24)



Therefore aptitude basically is definitely a capacity to acquire a specific knowledge skill because both of them even though you considered there was a history in the family that somebody was into wrestling and there is also history in the family that there was nobody into badminton, but still you know that this specific individual, both of them respectively they excel into their given domain because they acquired very specific skill and this skill actually was used in the field of sports to overpower the other individual playing against these 2 players.

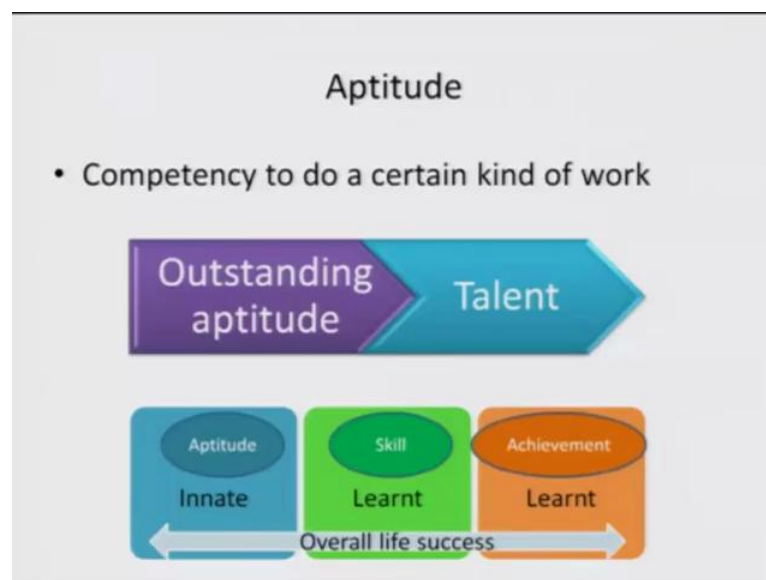
Now you can realize that, you can develop competence with the more and more a training, the harder you work, the more skillful you become. So what will aptitude finally lead to? Aptitude basically is going to add to the competency in you to do certain kind of work. So somebody would be exceptional good at badminton, somebody would be exceptionally good at wrestling, but if you go for a role reversal you realize that they utterly fail. If you ask Sakshi to play badminton and if you ask Sindhu to now go into wrestling it would be horrific type of attend and if you ask me to know either go for wrestling or badminton I would utterly fail ok.

So basically what aptitude does it provides you that competence. So that you can excel in a given domain and you can do a specific kind of a work and when you have a outstanding aptitude this is what people say that you are extremely talented, you become Sachin Tendulkar, you become Lata Mangeshkar because you have outstanding aptitude

in a given area. This aptitude was nurtured when in the case of Sachin Tendulkar, it was the elder brother who was instrumental taking into a very good coach and then it is the coach would trains you polishes you.

So before you shine as a diamond, there is whole degree of training, coaching that goes into ahead, which helps you acquire a specific abilities and these abilities you then use in your Dehli life, either in the field of a sports or in any other domain in the in the real worlds situations and then you accept people now salute to you for your talent because of your outstanding talent.

(Refer Slide Time: 10:18)

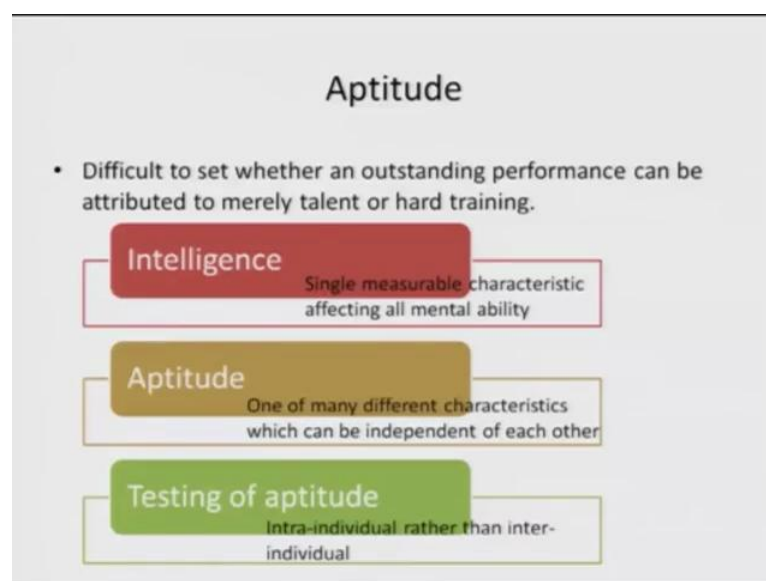


Now view take some terminologies here and try to now a draw a thin line that divides aptitude and the construct that we are going to talk now. Now if you look at the overall success in life of any individual, you realize that the person has an aptitude he or she had at specific ability or the combination of the abilities, which would a definitely help him or her to achieve certain a height in life. Then you realize that these aptitudes who are innate in nature, the parents, the neighbors, they tell you that fine right from the early childhood days, we saw that now this very girl was extremely good at music. This girl was very good at now singing, but then you have specific learnt abilities, like a say nobody knows how to become a good mechanic, but then you acquire this skill, this is a learned skill there are extremely good mechanics this is a learned skill.

Similarly once you learn a skill, once you acquire a skill and then you finally use it. You achieve certain threshold you are able to solve problem to certain degree, this intern give you a positive feel. So your achievement which is also an outcome of learnt process, intern provides and keeps providing you with the positive feel and which intern helps you polish your skill for better. Then if you have a combination where your aptitude and a skill and what you achieve they all are put on the same trajectory means you have an aptitude for a given thing, you get the training into the same area and then when you start achieve in that area, you realized that your achievement is disproportionately very high compare to others.

Now come to other situations, if one tells you that is it that the talent has to be given the credit for outstanding performance or is that the training the rigorous training that was given to this individual should get the credit for the outstanding performance again it is extremely difficult. How do you establish, that it was merely the talent or it was merely the hard training. Mostly people will say that it is a combination of both and this you have the talent you cannot be polished, you cannot be trained and unless you under grow rigorous training, your talent probably would go waste. So we will look at 2 interesting you constructs which are now closely associated and looks to be very closely know moving together in life. One is the intelligence and other is the aptitude, intelligence we discussed in our previous lecture.

(Refer Slide Time: 13:19)



So intelligence basically is a single measurable characteristic that affects our mental ability. So you just map the ability of the individual, the mental capability of individual and you come across the IQ and you say that this very individual with this level of IQ is finally going to sort out things in the world in approximately to this vary level he or she would not have a problem or depending on the level of IQ, you might say that you are under scorer and hence you might have certain intellectual deficiencies that others do not display, compare with this aptitude.

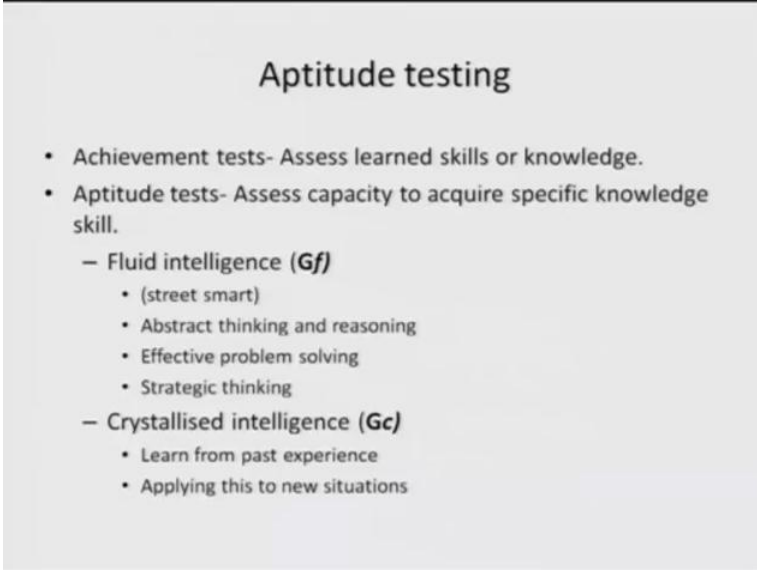
Now aptitude basically is one of the many different characteristics, which can be independent of each other. Little later we will come to the examples. Say like two of us me and you can have same level of IQ, but if both of us going in the same area and try to professionally perform the same duty, perhaps one would do better than the other one. Take a concrete example say my IQ and your IQ could be same, but you could be a very good pilot and I could be a very good doctor. Now a pilot and a doctor these 2 a specific domains of knowledge requires a very specific type of skills. Our intelligence level were same, but then I was predisposed know to have a nap for something else and you have nap for something else and therefore when it comes to testing of aptitude and that we would do towards the end of this very lecture. Aptitude basically looks at the intra individual characteristics know. Where as intelligence now usually go for inter individual type of mapping.

So, my IQ is measured, your IQ was measured, some norm has been develop and based on the norm I am told that see your IQ level is below 70 hence you fall in this category or I am told that your IQ was falls above 120 therefore you fall in the other category. So there is normative principle against which my individual score is being looked at, but that is not in the case of aptitude. There are different areas, for which my aptitude is examined. So this is an intra individual process. I am the same individual who takes of mechanical task, who takes of a spatial task, who takes of language ability, who takes of clerical aptitude, various types of aptitudes and then my aptitude score in one area is compared against my aptitude in the other area and then I am told at I would perhaps be better at this and not at that. So this is now a very cleared distinction between intelligence and aptitude.

Now if you look at achievement tests because aptitude will finally helps you succeed in that very area achieved in that specific area and then the test of achievement basically

they assess the learned skill or knowledge. So how much have you actually achieved, how much have you scored the best example would be your test, quizzes, exams that you get. So finally you achieve a set of knowledge is transmitted to you and you are supposed to learn it, acquire it and depending on the type of test that you appear finally, you get a score and that is your achievement score.

(Refer Slide Time: 17:13)



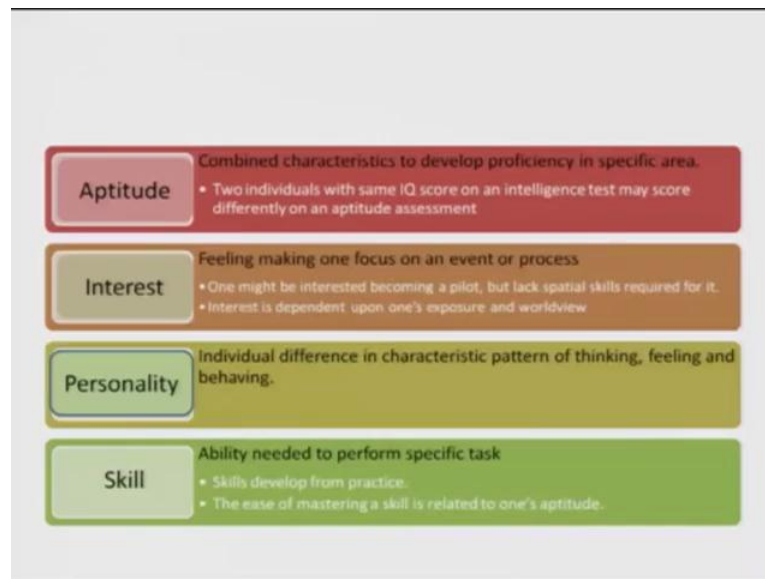
Aptitude testing

- Achievement tests- Assess learned skills or knowledge.
- Aptitude tests- Assess capacity to acquire specific knowledge skill.
 - Fluid intelligence (**Gf**)
 - (street smart)
 - Abstract thinking and reasoning
 - Effective problem solving
 - Strategic thinking
 - Crystallised intelligence (**Gc**)
 - Learn from past experience
 - Applying this to new situations

Compare to that aptitude test is different. These basically assess your capacity to acquire a specific knowledge skill. Basically 2 types of intelligence would be mapped under aptitude. One is what is called as the Fluid intelligence and other one what is called as Crystallised intelligence. So Fluid intelligence it basically would look at the abstract thinking and reasoning, effective problem solving and strategic thinking and these are the three key characteristics that will make you street smart. So when you interact with people, when you engage yourself in different type of worldly activities, you would be extremely good. When it comes to Crystallised intelligence basically you use your past experience.

How you have interacted in the past in the given situation and what was the outcome. So you learnt from that and then what you do, when you come across a new situation based on your past experience, you try to map it you try to apply it to the new situation and this is called to Crystallised intelligence.

(Refer Slide Time: 18:25)



Now let us look at again you know constructs which are very close and which will finally shift the individual achievement in life. Aptitude, interest, personality and skill aptitude of course, we are talking about it. Which basically is a combined characteristics to develop proficiency in specific area and as I was telling you something back that there could be a possibility that two individuals, who share the same IQ level might have a different scores on their assessment of aptitude. So two of us might be sharing same IQ but then high at say a spatial ability, you are good at mechanical ability, somebody else is good at linguistic ability, and somebody else is good at clerical aptitude. So that would be there.

Second how interested are you? Our interest level also matters a lot. So interest basically you know is the feeling that makes you focus on the process. We began with the now looking at the video P V Sindhu and after P V Sindhu won her silver medal and the parents and the coach both talked lot of things about the player and type of dedication, the focus that she had on the game. One interest thing I picked up and it instantly has come to my mind, is the fact that to avoid distraction and to ensure that P V Sindhu focuses on her game Pollela Gopichand her coach. He had even confiscated her mobile phone. She was allowed and access to the mobile phone, only to talk to parents for very a brief period of time.

The coach would even know replace some the items of our plate, while she was having the food because he knew what type of food was needed for our fitness. He ensured that

weight does not increase, he ensured that rest of the destructors does not per (Refer Time: 20:25).

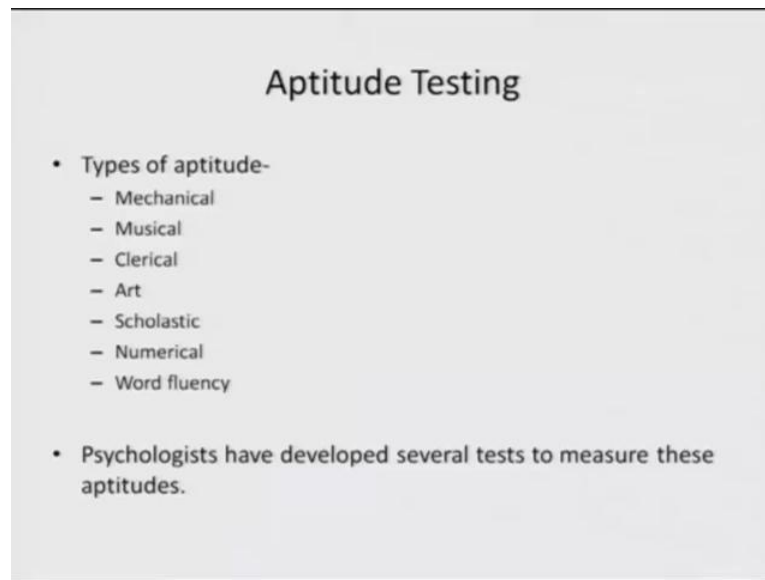
Now you are interested in game and you are interesting sacrificing several of other things. So what happens? Your interest level sustains your focused attention on the process, which intern again adds to your aptitude to excel in the given area and finally, you win a silver medal. Personality we would be talking about the in the next week.

Now personality is basically the individual difference in that characteristic pattern of thinking, feeling and behavior of the individual. So am I an individual, who has a personality of a sport person therefore I excel, do I have an interest therefore I excel, do I have an aptitude therefore, I excel or is it I basically have an ability needed to perform a specific task what is called as a skill and it is my skill which intern makes me succeed in a given domain. So this is an interesting thing. Now you would realize and the reason I am taking about it here is that you realize there is a now combined effect of all of them, you are end out with certain characteristics, you have certain personality, but your personality does not predisposed you to become a badminton player, but then say for example, you have a very dominance of something called perseverance, you are extremely resilient.

Now these are your personality characteristics and these are the characteristic which also helps you exploit your talent to the maximum possible extent to achieve the best in their field of sports. So personality does player a role. Skill of course, is the ability to perform a specific task, it would certainly know develop with practice and ease of mastering the skill has to do with the aptitude that you have. So if I have an aptitude I will very easily master their skill. Minimal training, rigorous focus, sustained focus, extremely resilient behavior and I realize that I succeed in that y given domain ok.

So this is now an interesting effect where you realize that all these factors, which are of extremely importance although for convenience we study them separately, we do not combine personality, aptitude, intelligence, interest skill in the same domain, but we are doing it right now to understand that the final achievement in life has a combined effect of all of them.

(Refer Slide Time: 23:11)



Aptitude Testing

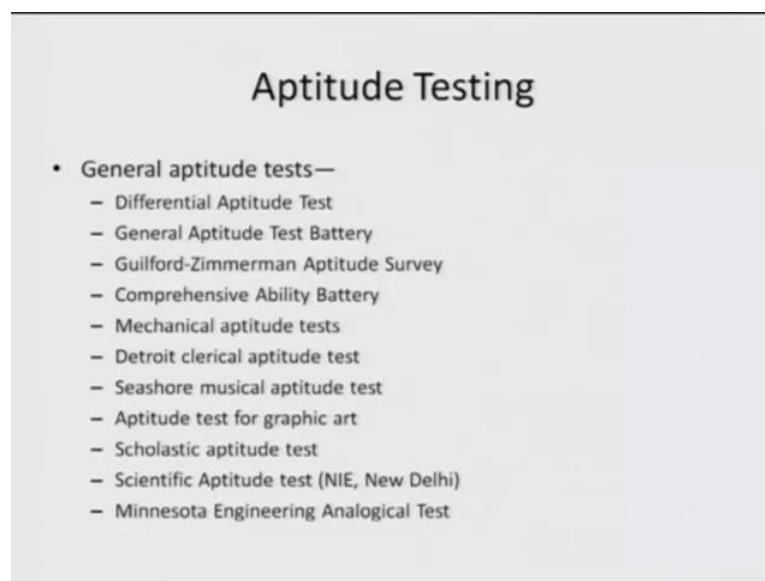
- Types of aptitude-
 - Mechanical
 - Musical
 - Clerical
 - Art
 - Scholastic
 - Numerical
 - Word fluency

- Psychologists have developed several tests to measure these aptitudes.

Now we come to aptitude testing. You would find different types of aptitude test, mechanical, musical, clerical, art, scholastic, numerical, word fluency and this is just few. There is whole lot of tests which measures one or the other aptitude.

What psychologists have done? They have developed several tests to measure these aptitudes. There are several test which have developed abroad, there are test even develop within the country.

(Refer Slide Time: 23:41)



Aptitude Testing

- General aptitude tests—
 - Differential Aptitude Test
 - General Aptitude Test Battery
 - Guilford-Zimmerman Aptitude Survey
 - Comprehensive Ability Battery
 - Mechanical aptitude tests
 - Detroit clerical aptitude test
 - Seashore musical aptitude test
 - Aptitude test for graphic art
 - Scholastic aptitude test
 - Scientific Aptitude test (NIE, New Delhi)
 - Minnesota Engineering Analogical Test

I am just naming few of them. Differential Aptitude Test popularly called as DAT, General Aptitude Test Battery, Guilford-Zimmerman Aptitude Survey, Comprehensive Ability Battery, Mechanical aptitude tests, Detroit clerical aptitude test, Seashore musical aptitude test, Aptitude test for Graphic art, Scholastic Aptitude test, Minnesota Engineering Analogical test and one test where I have even mentioned that it was developed in India scientific aptitude test, but again as I told you that these are just a few to mention there are whole lot of aptitude test, but I would specifically show you just one test that is the differential aptitude test.

(Refer Slide Time: 24:21)

DAT			
Test	Nature/ Purpose	Time	Q.
Verbal Reasoning	thinking skills and cognitive ability, in the shape of verbal analogies	20 min	30
Numerical Ability	one's ability to comprehend and deal with number-related concepts, as well as his understanding of numerical relationships	20 min	25
Abstract Reasoning	reasoning abilities via a non-verbal method	15 min	30
Mechanical Reasoning	ability to comprehend the elementary principles of mechanical tools, machinery, movement	20 min	45
Space Relations	ability to envision 3-D objects from given 2-D images	15 min	35
Language Usage	language skills, particularly correct use of capitalization and punctuation, and the ability to identify grammatical mistakes	12 min	30

Now in differential aptitude test you have basically 6 different types of test, Verbal Reasoning, Numerical Ability, Abstract Reasoning, Mechanical Reasoning, Space Relation and Language Usage. Now in verbal reasoning, you realized that there are the set of questions you are given a time limit and within that time limit you have to perform know on those very tasks, those many number of questions have to be attempted. Verbal reasoning has 30 questions, you have 20 minutes time and basically this tries to look at the thinking skills and cognitive ability in the shape of verbal analogies.

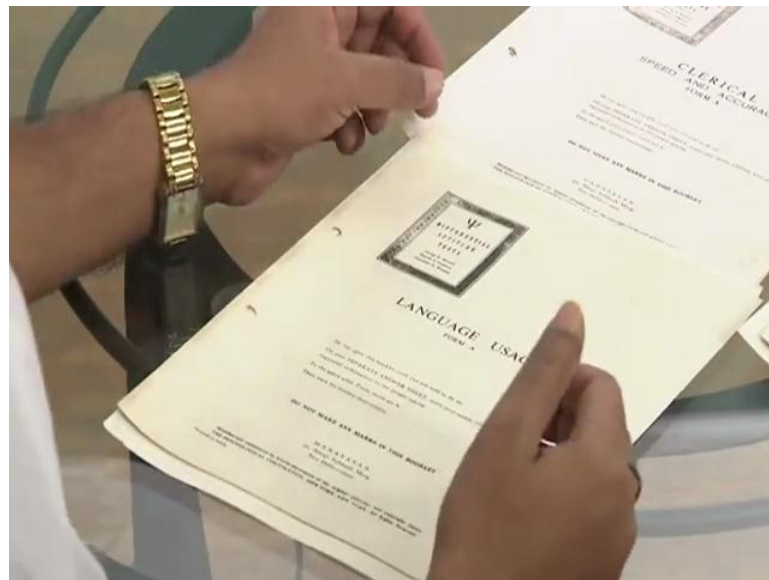
Numerical ability again a 25 item test, again time given is 20 minutes and it looks at you are ability to comprehend and deal with number related concepts. So and how do you understand the numerical relationships? Right now I will show you this test, as well

abstract reasoning 30 questions, 15 minutes time limit and it looks at the ability via non verbal method.

Mechanical reasoning 20 minute duration 45 questions and it looks at the ability to comprehend the elementary principles of mechanical tools and machinery movement.

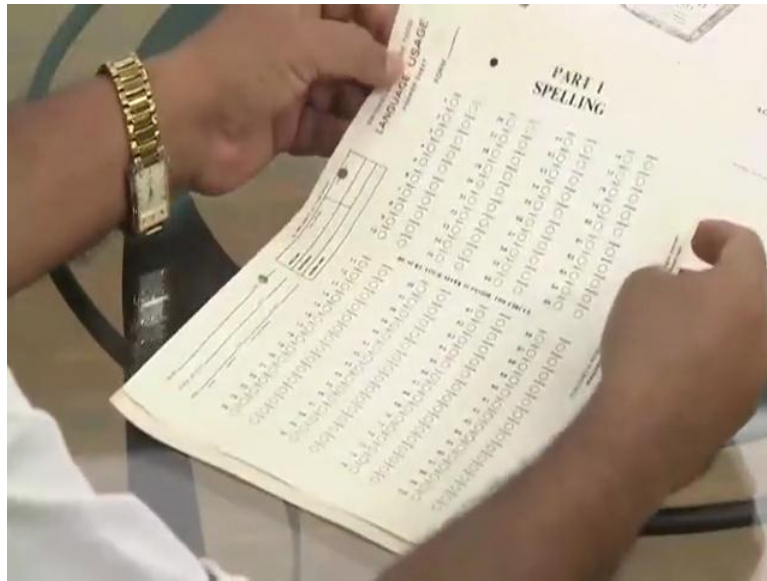
Space relation 35 questions time duration is 15 minute and this is the ability to envision of a 3-D objects from a two D images that is given to you and finally language usage, where language skills are taken into account especially know correct usage of capitalization, punctuation and define a grammatical mistakes and all this has to be done within a time frame of 12 minutes and you have 30 questions at your disposal.

(Refer Slide Time: 26:07)

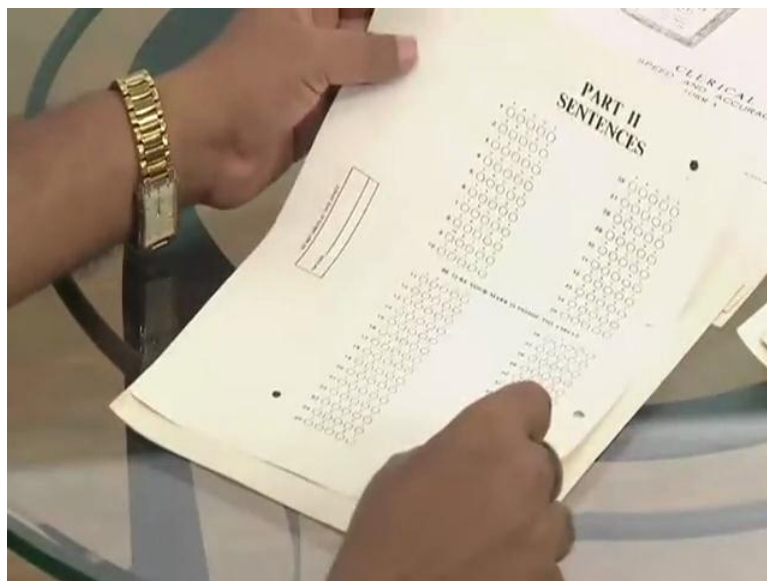


So I will now show you different tests that are used in differential aptitude battery now first one as you can say is the language usage.

(Refer Slide Time: 26:19)

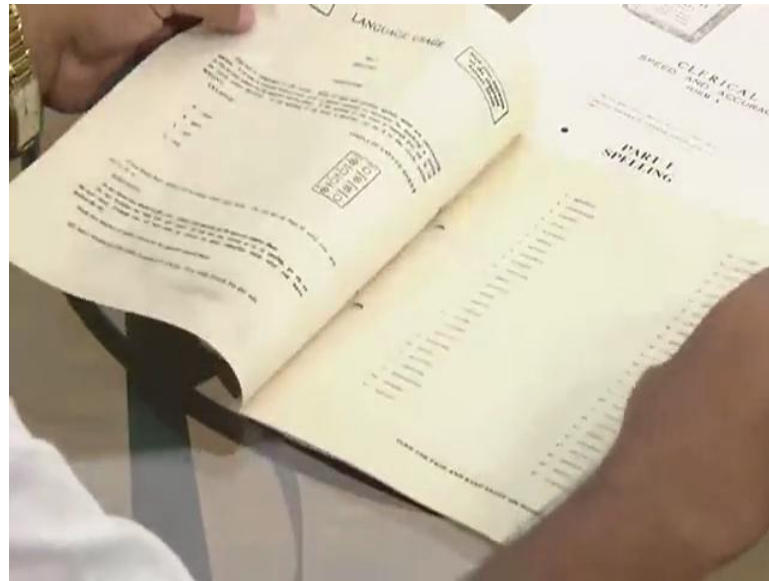


(Refer Slide Time: 26:24)



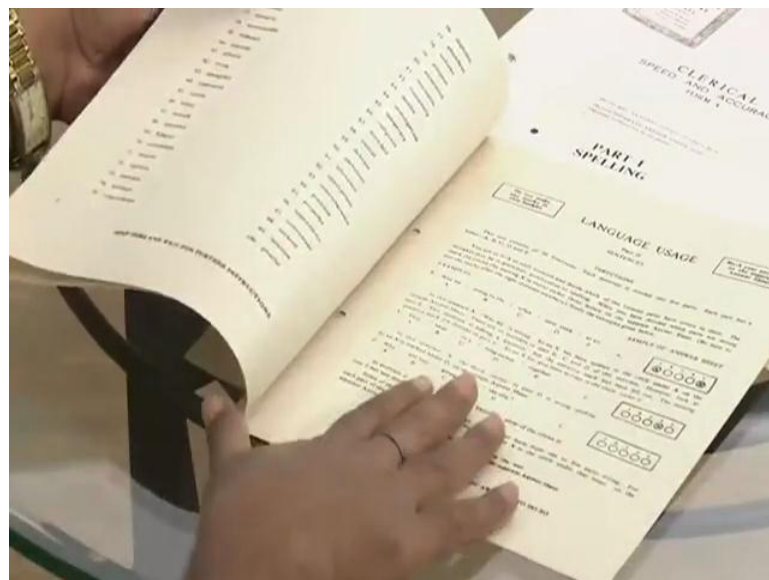
Now I will show you actually what happens you have this very response sheet, where you have part one which has to be do with spelling and then you have part two which has to do with sentences and then as you can see there are a radio buttons here where one is suppose to put the responses.

(Refer Slide Time: 26:36)



Now in language usage, in the spelling part there are actually 100 words given. Few spellings are correct, few spellings are not, what one is suppose to do is to simply know put across mark in the bubble there against all the spellings which I have an error.

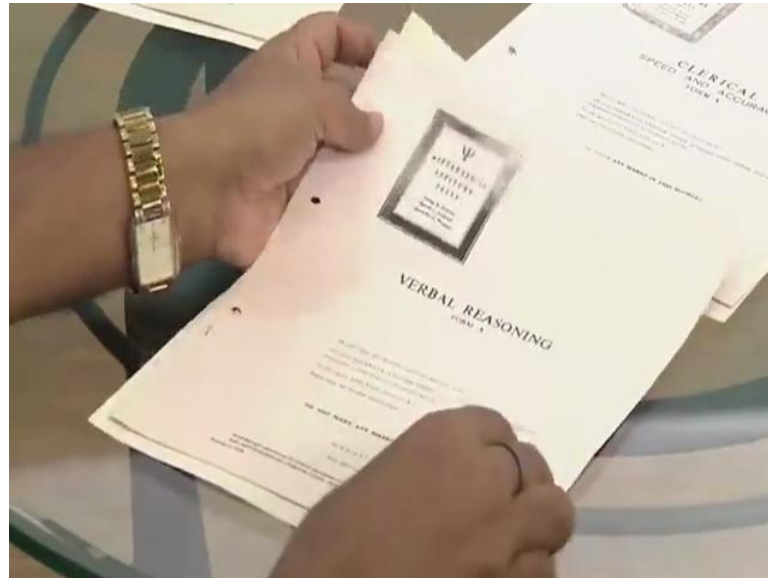
(Refer Slide Time: 26:56)



Similarly in the language part in the sentence part, in the sentence part there are 50 sentences and these sentences are broken into pieces. So as you can see the example given is, were we going to the office next week at all? Now one of this segment has an error or more than one segment would have an error and then as an individual you are

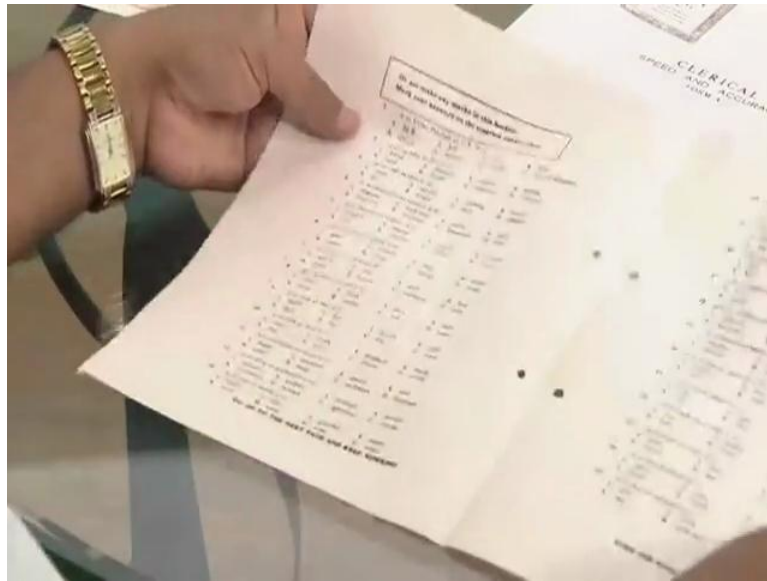
suppose to detect an error and put a cross mark in the bubble there. So this is how the language ability is tested. Your aptitude in a given language would be now just on the basis of how many character responses you have given within the time frame.

(Refer Slide Time: 27:42)

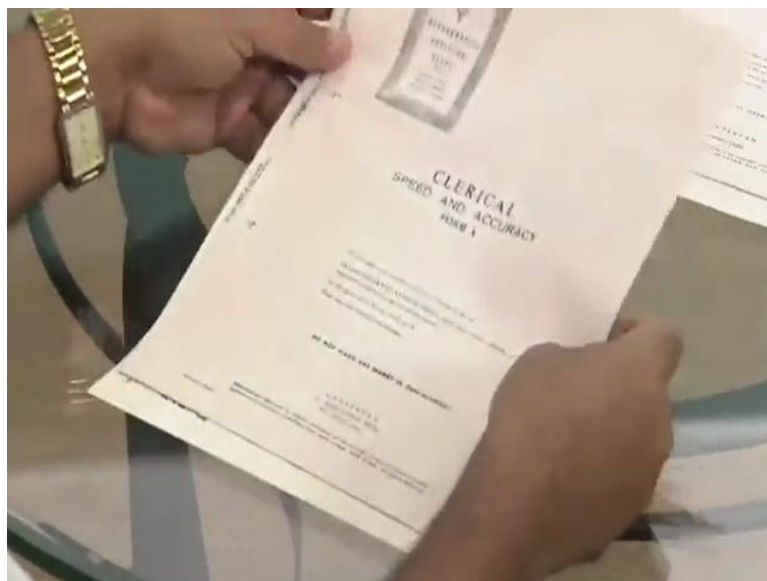


The second test is Verbal reasoning and once again you can see here this is the answer sheet where one has to mark the responses. Now in verbal listening 50 sentences are given and once again you can see the items here ok I will just read it aloud. Now first one he says dash is to Uttar Pradesh as UK is to and then there are options given here. So, you will have to know look at this and mark the answers in the separate answer sheet and this is how the verbal reasoning is mapped.

(Refer Slide Time: 28:02)

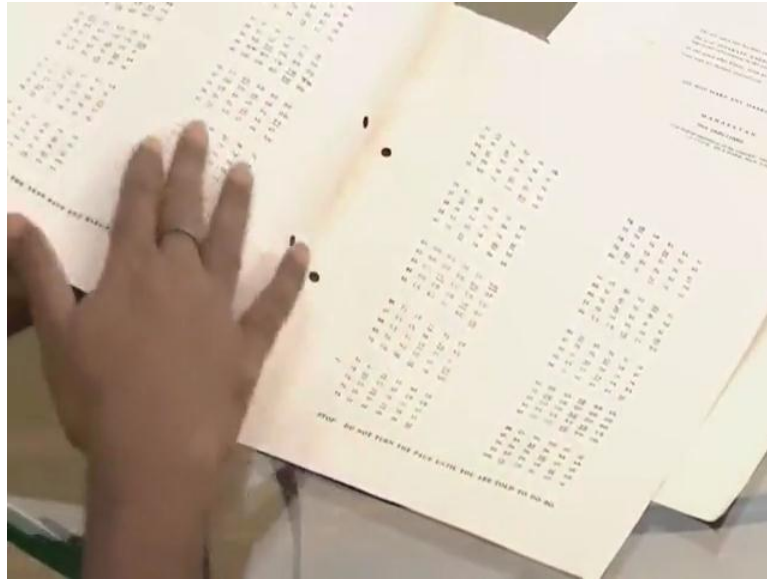


(Refer Slide Time: 28:25)



Clerically speed and accuracy, once again you can see here. Clerical speed and accuracy which has 2 parts, part 1 and then part 2. So this is actually the answer sheet and then this is a booklet. Now here what happens, you have the test items and answers are given here.

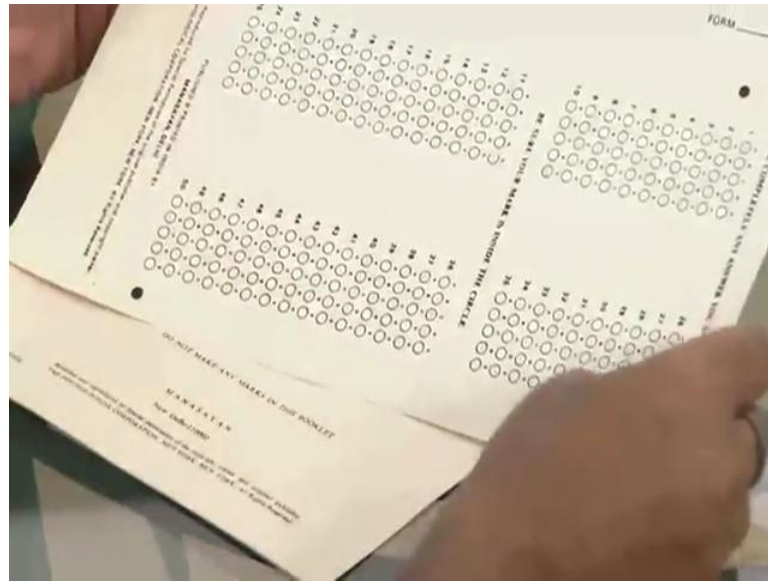
(Refer Slide Time: 28:47)



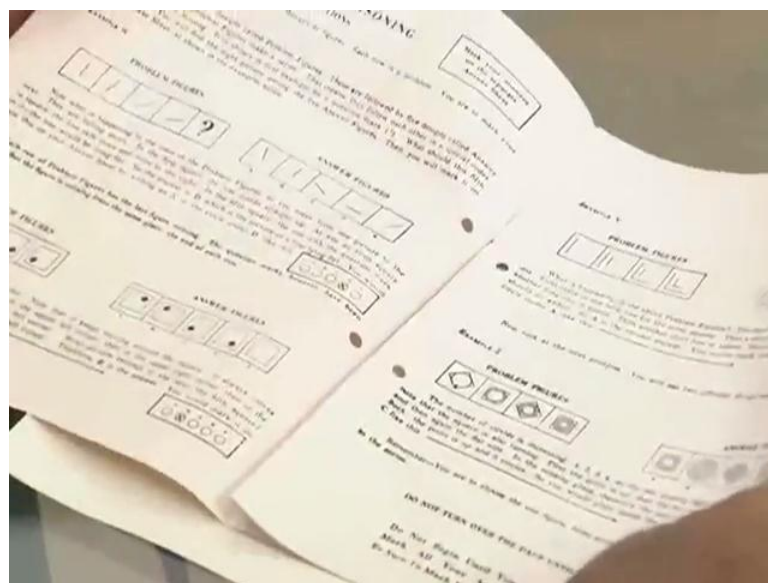
So part one you can see here there are certain instructions that you have to follow, but then as you can make out that this is clerical speed and accuracy.

So what is measured is how accurate you are and ad how quickly you perform the task. Now imagine a something like if you have seen the test materials for banking services recruitment board. There you have know all types of things now say for example, accuracy with single C, double C or U and R replace. So multiple spellings of the same word and only one spelling would be correct and you have to identify it have the earliest possible. So the skill is not only to be accurate, but also how speedily you can perform the task.

(Refer Slide Time: 29:39)

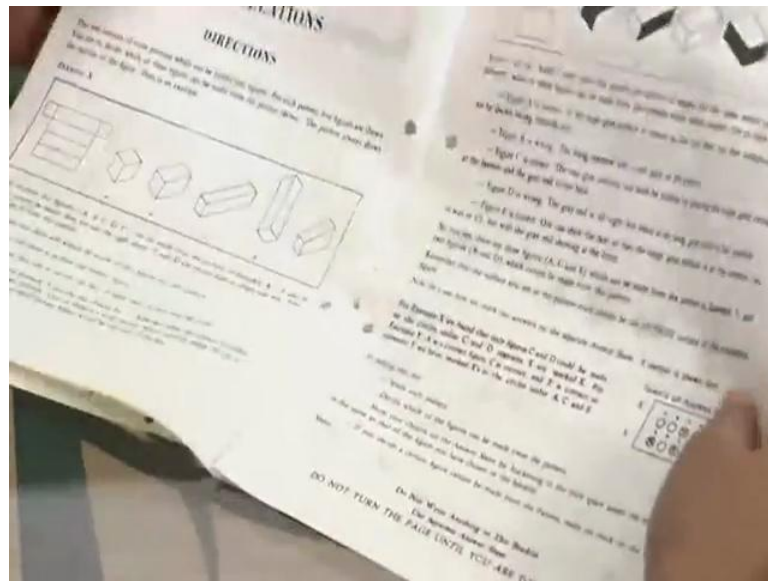


(Refer Slide Time: 29:47)



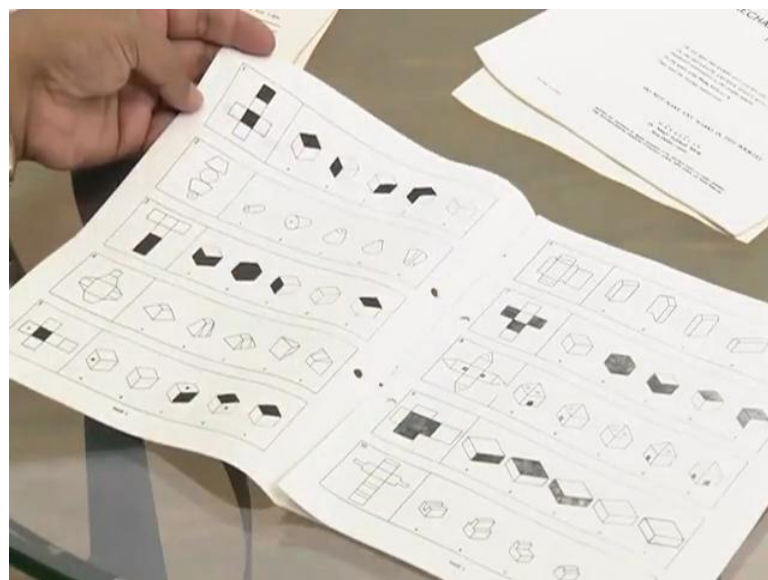
Becomes too abstract reasoning now, once again I will show you the answer sheet here. And then in abstract reasoning, you have such type of problem figures and then looking at the problem figures, you have to visualize what would be the outcome at the next step and then the answer figures are given now from within the answer figures you have to find out the possible correct answer.

(Refer Slide Time: 30:54)



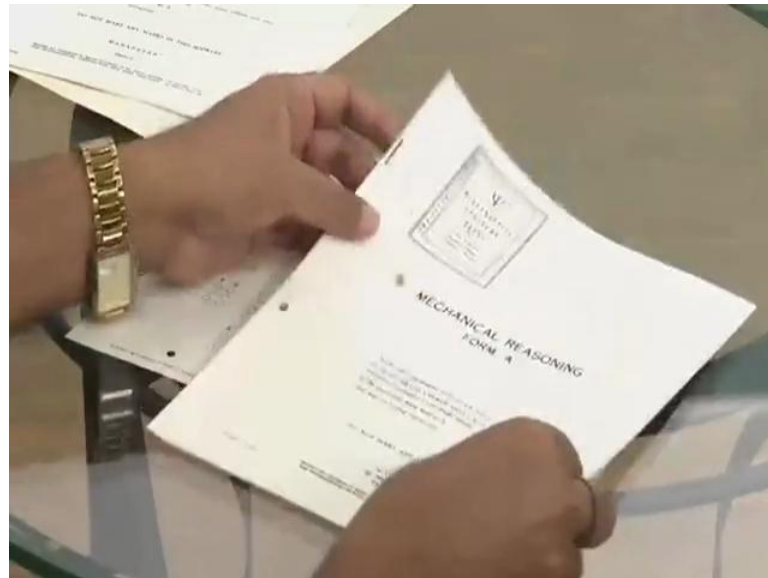
Space relation again you see the answer sheet for Space relation. All of them have the same format now it has bubbles, but then in the case of the special relations, you would be shown a pattern ok. Then you will have to basically go for mental rotations to visualize now what would be the correct response here, you can see here item number one for instance. Now it is looks like a two d image and in for options that are given to you ABCDE you have 3-D sketches there where one side or more than one side is colored it is blackened out.

(Refer Slide Time: 31:08)

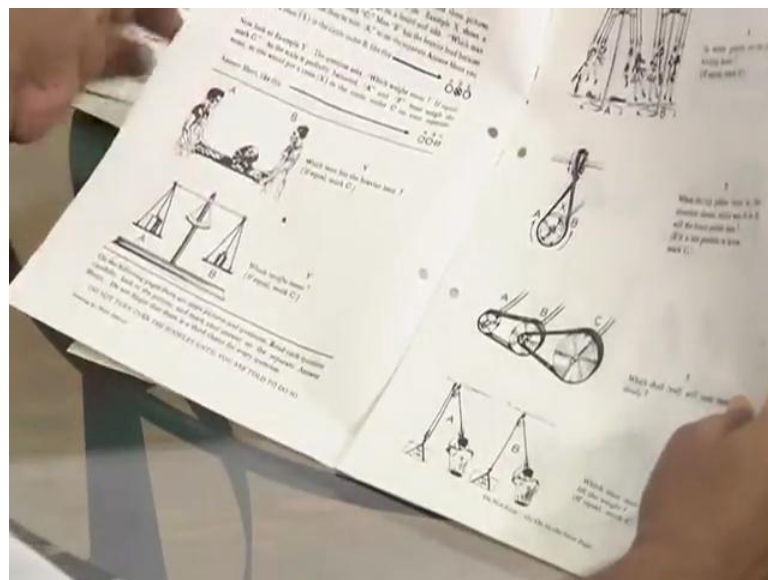


So you will have to find out, which of the 5 options actually would fit here and then finally comes mechanical reasoning.

(Refer Slide Time: 31:38)



(Refer Slide Time: 31:43)



Once again the response format is same, the same bubbles here. Now in mechanical reasoning you will have certain number of questions, you would have the figures there and then the questions written there. For instance you have a figure where a rolling weight is put at the plank, two people are holding it and it says which man has the heavier load, if you equal then mark C.

Now you can see that the weight is slightly towards the individual who is know on the B side and then the question basically asks is that who would experience the heaviness of this load more compare to the other one similarly. So say for example, you are shown a shaft and then now you are asked with shaft will turn very slow and you have three options A B and C. So this is how you have given certain tasks, you are given defined time period and then you are asked to perform the task and based on the scored that you achieve your aptitude is measured.

Now, the beauty of DAT is simply is that the score that you have achieved on different tests of aptitude, clerical, mechanical, special, language, that is taken into a account and this gives the overall comparative chart in terms of suggesting, which are your areas of instruct and if you are given training in that very area, if you focus on that very area, the chances are that you will accept. So with this we include our discussion on Aptitude.