

**Emotional Intelligence**  
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**Module No # 2**  
**Lecture No # 07**  
**Measurement of Intelligence**

Well the issue of measurement of intelligence has been a great concern for psychologists however over the period of times a many scientific tools have been developed by psychologists to measure different human abilities. So let us examine what exactly those tests are first of all the first intelligence test was created by Binet and Simon using simple task to distinguish children who do well in school from those who would not.

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# Measurement of Intelligence

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The first Intelligence test was created by Binet and Simon using simple tasks to distinguish children who would do well in school from those who wouldn't

Binet and Simon used Mental age to distinguish "bright" from "dull" children

Binet and Simon use the concept mental is to distinguish the bright from the dull children's. So that was the starting point of measuring human abilities particular start measuring the intelligence level of students school going students.

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## What is IQ?

- Lewis Terman revised Simon and Binet's test and published a version known as the *Stanford-Binet Test* in 1916.
- Performance was described as an intelligence quotient (IQ) which was imply the ratio of mental age to chronological age multiplied by 100:

- $$IQ = MA/CA \times 100$$


That is in fact the historical root of concept of IQ in the field of intelligence. Lewis Terman revised in the Simon Binet test and published a person known as the stanford's Binet test in the year nineteen Sixteen. However performance was described as an intelligence questioned which was implied the ratio of mental age to chronological age multiplied by hundred and the formula

is  $IQ = MA \text{ by } CA$  into 10.0 To know more about that stand for Binet IQ test these are some of the features described here this test measure things that are necessary for school success.

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### Stanford-Binet IQ Test

- This test measures things that are necessary for school success
  - Understanding and using language, memory, the ability to follow instructions, and computational skills
- Binet's test is a set of age-graded items
  - Binet assumed that children's abilities increase with age
  - These items measure the person's "mental level" or "mental age"
- Adaptive Testing
  - Determine the age level of the most advanced items that a child could consistently answer correctly
  - Children whose mental age equal their actual or chronological age were considered to be of "regular" intelligence



Understanding and using language memory the ability to follow instructions and computational skills these are some of the important requirements for student's success at school level. However Binet test is said to of age graded items Binet has assumed that children's abilities increase with age. So therefore this items measure the person's mental level what they call or what they mean the mental age.

The developed certain adoptive testing's what that determine the age level of the most advanced items that child could consistently answer correctly. So children whose mental age is equal to their actual or chronological age considered to be of regular intelligence.

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Sample Stanford-Binet Test Items	
4	Name objects from memory; complete analogies (fire is hot; ice is ____); identify objects of similar shape; Answer simple questions (Why do we have schools?)
6	Define simple words; Explain differences (between a fish and a horse); identify missing parts of a picture; count out objects
8	Answer questions about a simple story; explain similarities and differences among objects; tell how to handle certain situations (finding a stray puppy)
10	Define more difficult words; Give explanations (about why people should be quiet in a library); List as many words as possible; repeat 6 digit numbers
12	Identify more difficult verbal and picture absurdities; repeat 5-digit numbers in reverse order; define abstract words (sorrow); fill in a missing word in a sentence
adult	Supply several missing words for incomplete sentences; Repeat 6-digit numbers in reverse order; Create a sentence using several unrelated words; Describe similarities between concepts



These are some of the same from Stanford-Benit test items. For example like name, items from memory like complete analogy like first is hot ice is dash, so what could be the answer ice is cold the simple answer is ice is cool this shows the how the child identify objects of similar shape. So answer simple questions why do we go to school or why do we have a school. So this also gives a reflection of child's analytical ability and then another sample item is called define simple words explain between fish and a horse.

So in order to know the analytical abilities the differential ability whether the person is able or child is able to distinguish between different objects living organism etc therefore the questions are designed in such a way to explore the critical appreciation of a particular object by the child say for examples what is the difference fish and a horse.

Identify missing parts of pictures suppose a picture is shown a cow picture is shown and two legs are missing now you ask is it a cow or what is missing in the picture. So that shows the analytical ability of the child then answer questions about simple story like explain similarities and differences among objects tell how to handle certain situations like finding a stray puppy.

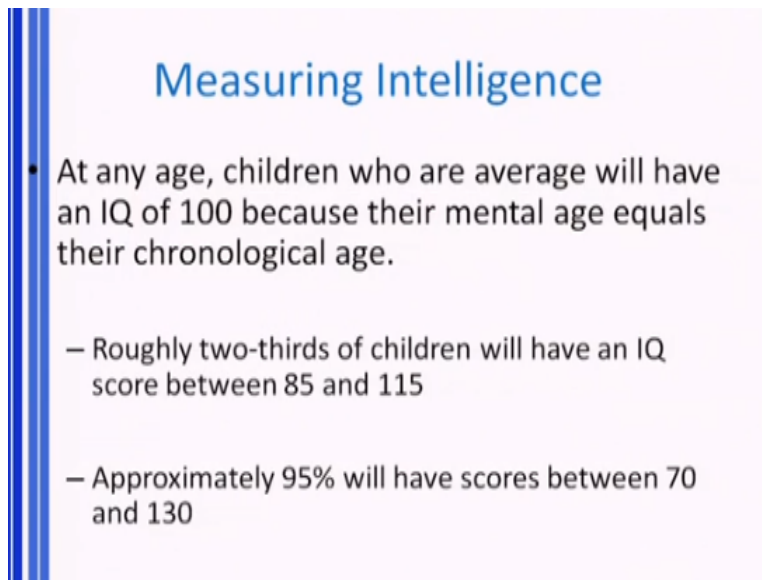
In other items define more difficult words like give explanations about why people should be quiet in a library. When you are studying in a library why there is a board in front of you please

maintain silence. What is requirement of that then there could be some other examples like identify more difficult verbal and picture reliabilities absurdities like say repeat five digit number in reverse order.

Say for if I like a to make the backward conditioning in the proper order learn the way we calculate number in a series and 1,2,5 how quickly you can count from five to one. So identify more difficult and verbal pictures absurdities or lipid five digit numbers in reverse order define abstract words like sorrow. How do you describe sorrow? How do you define happiness?

So fill in a missing word in a sentence this are some of the examples but in case of adult supply several missing words for incomplete sentence just like repeat six digit number in a reverse order create a sentence using several unrelated words describe similarities between concepts.

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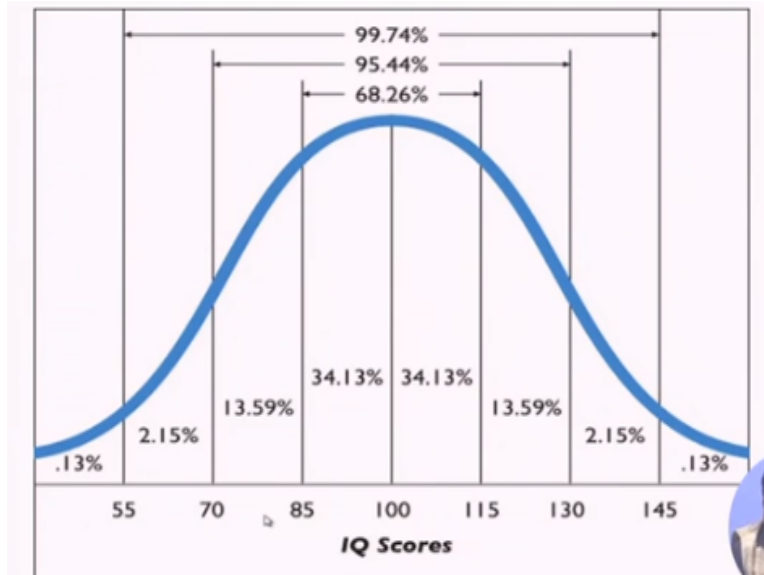


The slide features a light purple background with a blue vertical bar on the left side. The title 'Measuring Intelligence' is centered at the top in a blue font. Below the title, there is a bulleted list of three items. The first item is a main bullet point, and the other two are sub-bullets.

- At any age, children who are average will have an IQ of 100 because their mental age equals their chronological age.
  - Roughly two-thirds of children will have an IQ score between 85 and 115
  - Approximately 95% will have scores between 70 and 130

When you examine at any age children's who are average will have IQ of hundred because their mental age is equal to their chronological age. But roughly two third of the children will have an IQ score between eighty five to one one five. We have also seen that approximately ninety five percent will have scores between seventy to one thirty.

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This shows the classifications of IQ score in normal distributions.

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## Intelligence Quotient (IQ)

- This summary is used to indicate a child's intelligence relative to others of the same age
- IQ tests measure an individual's probable performance in school and similar settings
- An IQ test measures performance... but an IQ test does not explain performance

However the summary of the intelligence distribution used to indicate that child's intelligence relative to other of the same age.

IQ test measures and individuals probably performance in school and similar settings another outcome of the IQ question is that IQ test measures performance but an IQ test does not explain performance.

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## A Five-Minute IQ Test

1. Water lilies double in area every 24 hours. At the beginning of the summer, there is one water lily on a lake. It takes 60 days for the lake to become covered with water lilies. On what day is the lake half-covered?
2. A farmer has 17 sheep. All but 9 break through a hole in the fence and wander away. How many are left?
3. If you have black socks and brown socks in your drawer, mixed in a ratio of 4 to 5. How many socks will you have to take out in order to have a pair of the same color?
4. With a 7-minute hourglass, and an 11-minute hourglass, how can you time the boiling of an egg for 15-minutes?
5. Washington is to one as Lincoln is to:  
Five --or-- Ten --or-- Fifteen --or-- Fifty



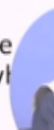
So therefore people look for some other test here is some IQ test items most of the IQ test items are best on reasoning. Say for examples like Water lilies doubles in area every 24 hours at beginning of the summer there is one way lily on the lake.

It takes sixty days for the lake to become covered with water lilies. On what day is the lake half-covered? So the second item is a farmer as seventeen sheep all but nine break through a hole in the fence and wonder away. How many are left? So this kind of questions put to the students so what could be the answer let us see what could be the answer.

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## How did you do?

1. On day 59. Remember, it doubles every day.
2. Nine sheep. It is just a matter of careful reading.
3. Three socks. The ratio information is irrelevant.
4. Allow both glasses to drain simultaneously. As soon as the 7-minute glass empties, flip it over (7 minutes have expired). Then, flip it over again after the 11-minute glass empties (11 minutes have expired). Fifteen minutes will have passed when the 7-minute glass empties.
5. The answer is five. The task here is to realize that the relation is not the sequence of their presidency but the denomination of bill upon which each face appears.



The answer is Nine sheep it just a matter of careful reading if you have black socks and brown socks in your dryer mix in a ratio of four to five. How many socks will you have to take out in order to have a pair of the same color? So the answer would be three socks because the ratio information is eleven.

Similarly if you go if you have within a seven minute hourglass and an eleven minute hourglass so how can you time the boiling of an egg for a fifteen minutes. Washington is to won as Lincoln is to dash maybe the possible answer could be five because the task here is to realize that the relations is known the sequence of their presidents but which denomination of will upon which each face appears.

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Another test used frequently are the Wechsler Intelligence Scale

- Wechsler Intelligence Scale for Children-Third Edition (WISC-III)
  - Used with children 6 to 16
- Wechsler Adult Intelligence Scale-Third Edition (WAIS-III)
  - Used with people 17 and older

So this is how the IQ test are developed and IQ test are starters are measure in students. However other test also emerged with the passes of time and with the help of scientific research. David Wechslers came up with many intelligence tests such as Wechslers intelligence scale for children and later on Wechslers intelligence scale for adults.

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## WISC-III

- Provides a profile of someone's strengths and weaknesses
- Each test is made of 12 parts
  - Each part begins with the simplest questions and progresses to increasingly difficult ones
  - Performance Scale (6 parts)
    - Spatial and perceptual abilities
    - Measures fluid intelligence
  - Verbal Scale (6 parts)
    - General knowledge of the world and skill in using language
    - Measures crystallized intelligence

So he also developed WISC three that provides the profile of someone's strengths and weaknesses intelligence tests test are very useful no evaluating the intellectual profile of the students or college going students. Each test is made up of twelve parts each part begins with simplest questions and progress to increasingly difficult ones. It also consists of the bit of scale lies in that it consist both verbal as well as performance scales.

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- Verbal IQ is based on:
  - Information
    - Measures a child's range of factual information
    - Example: What day of the year is Independence Day?
  - Similarities
    - Measures a child's ability to categorize
    - Example: In what way are wool and cotton alike?
  - Arithmetic
    - Measures the ability to solve computational math problems
    - Example: If I buy 6 cents worth of candy and give the clerk 25 cents, I would get \_\_\_\_\_ back in change?
  - Vocabulary
    - Measures the ability to define words
    - Example: What does "telephone" mean?
  - Comprehension
    - Measures the ability to answer common sense questions
    - Example: Why do people buy fire insurance?
  - Digit Span
    - Measures short-term auditory memory

It measures both verbal and nonverbal intelligence so verbal IQ is based on information, similarities, arithmetic's, vocabulary, comprehension, digit span etc. The information portion consist of a measures a child range of factual information.

How much information is available with the child say for example what day of the year is Independence Day or say for examples why which we observe or do we observe second October right. So these are certain information's that are vital for measuring information abilities in terms of similarities it measures the child ability to categorize for example in what way are wool and cotton alike right.

Similarities and differences both on measure in what way table and chairs are different. So we measures they are categorizing the differences in terms of arithmetic ability is the ability to solve computational math problems for examples if I but six cents worth of candy and give the clerk twenty cents. I would get cash back in change so this is how we measure the computational ability of the students. But in terms of vocabulary which states that it's refer the ability to define words.

For example what does telephone mean? What does a pen mean? So this refers to the vocabulary aspects because the child is trying to explain what the object exactly what the world exactly stand for. In terms of comprehension we have seen that we are trying to measure the ability of a student in terms of common sense questions for example why do people buy fire insurance or why do people go for life insurance. So these are certain questions we try to how far the students are able to comprehend a particular problem and gives us bible answer.

The next one is digits span it measures the short term auditory memory to what extend we can remember and how much information we can store to what is it like you know earlier time we use to say we can maximum remember up to six plus minus one but now a days after this mobile years where you can easily remember more than ten digits. So even it is also so the digit span capability, is also expanding with environment changes and exposures.

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- Performance IQ is based on:
  - Coding
    - Copying marks from a code; visual rote learning
  - Picture Completion
    - Telling what's missing in various pictures
      - Example: Children are shown a picture, such as a car with no wheels, and are asked: What part of the picture is missing?
  - Picture Arrangement
    - Arranging pictures to tell a story



We have also seen that performance IQ is based on coding and decoding, picture completions, picture arrangements say for examples like copying a marks from a code and visual rote learning these are also we have seen in other test likes say for examples like coding and decoding.

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**6. Coding (Verbal):**

These items are designed to measure candidate's ability to codify an information speedily and correctly. The candidate is required to understand the rule or principle followed in an item and then apply the same to solve the problem.

If ACE is coded as FHJ; KMO will be codes as:

(A) RPT    (B) TRP    (C) TPR    (D) RTP    (E) PRT

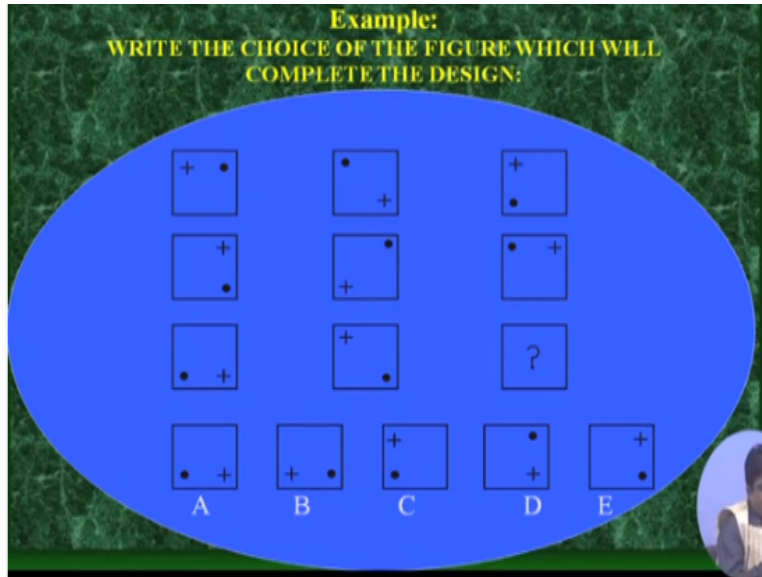
**7. Matrices (Non-Verbal):**

These items are intended to measure a candidate's ability to comprehend logical relationship of the pattern and its parts. The candidates is required to select the appropriate missing part for the completion of each pattern.

Say for examples here this is an example of the test of coding this items are designed to measure the candidates ability to codify and information speedily and correctly see the candidate is required to understand the rule of principles followed in an item then apply the same to solve the problems. If age is coded as FHJ then KMO will be coded as dash so here are the four of the choice five choices.

The candidate has to find out the answer similar kind of items is also given in the matrixes what you call nonverbal. These items are intended to measure a candidate ability to comprehend the logical relationship of the pattern and its parts the candidate is required to select the appropriate missing parts for the completion of its figure.

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This is one of the example items so the candidate as to study whole patterns how it is changing and accordingly to find out a choice that would complete the design. Right similarly in also picture completion so the matrixes also one of the example of picture completion test we are telling what is missing in the various pictures of examples like the children's are shown a picture such as a car with no wheels and are horse what part of the picture is what part of the picture is missing.


So therefore these are certain ways to test the performance IQ another way is that the picture arrangement test. Arranging the picture to tell a story say for you show a sequence of so yes series of pictures not in a sequence order in non-sequential order and you ask the students to put in a proper sequence and develop a story around that. So that would probably help them to write a story from who is you can infer of you can judge the performance IQ of that particular group.

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- Block Design
  - Arranging multi-colored blocks to match printed design
    - Example: Using the four blocks, make one just like this




- Object Assembly
  - Putting puzzles together - measures nonverbal fluid reasoning
    - Example: If these pieces are put together correctly, they will make something. Go ahead and put them together as quickly as you can.




Another way is to measure their intelligence through block designs for examples arranging multicolor blocks to match the printer design. For example using the four blocks make one just like this sorry yeah the next is object assemble this is also a thought of like putting puzzles together like it measures nonverbal fluid reasoning. For examples if these pictures are put together correctly they will make something go ahead and put them together as quickly as you can.

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The Stanford-Binet and the WISC-III cannot be used to assess infant intelligence

The Bayley Scales of Infant Development are often used for infant assessment



Well the Stanford Binet and the whisk three cannot be used to asses intend intelligence because the Bayley scale of infant development are often used for infant assessments.

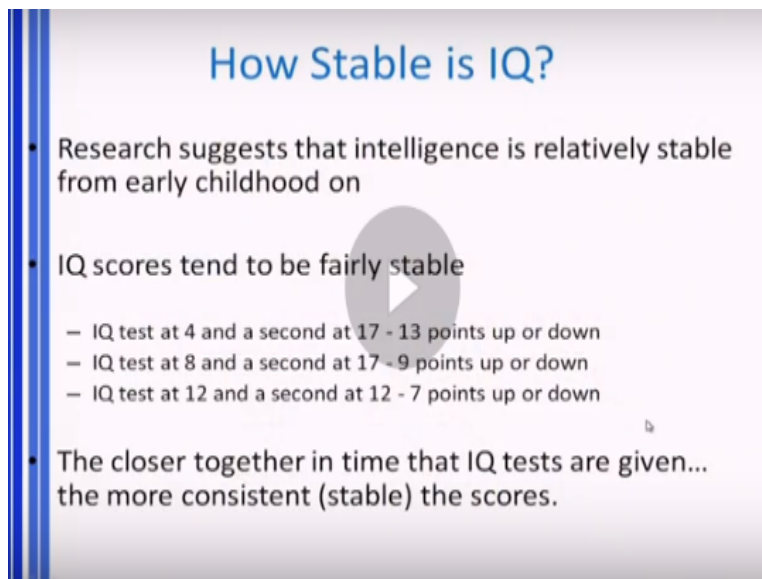
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## Do Intelligence tests work?

To answer this question we must examine *Reliability* and *Validity*

However certain this this different versions of whiskey and Wechslers they are different because they are applicable to different age levels and grade levels. So then do intelligence test to work to what extends we can make use of once test score or intelligence score. So to answer these questions we must examine the reliability and the validity of test. So what is that reliability and validity.

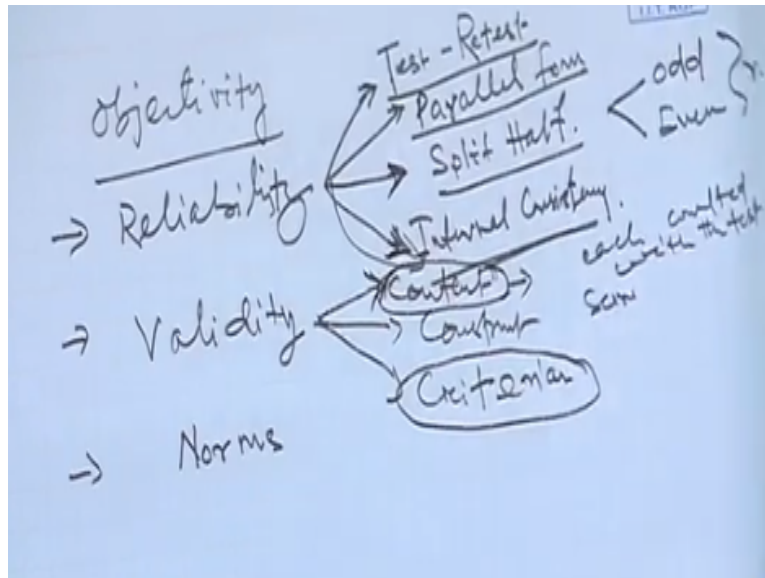
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### How Stable is IQ?

- Research suggests that intelligence is relatively stable from early childhood on
- IQ scores tend to be fairly stable
  - IQ test at 4 and a second at 17 - 13 points up or down
  - IQ test at 8 and a second at 17 - 9 points up or down
  - IQ test at 12 and a second at 12 - 7 points up or down
- The closer together in time that IQ tests are given... the more consistent (stable) the scores.

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When you talk about objectivity of a test. So there are three important dimensions that we look into one is reliability, second is validity and the third is norms. So there are various types of you know ways or types of reliability or ways of calculating reliability.

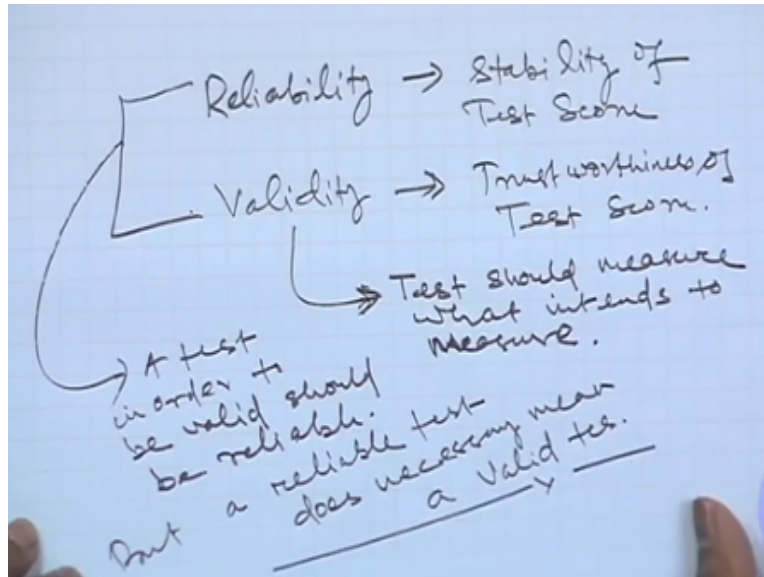
One is called test retest method, second is called parallel forms, third is called split half and fourth one is called internal consistency right. So there are different formulas available to measure this so anyone test in case of test retest measures. Suppose you have developed a test particular test and you are trying to calculate its test retest reliability the same test is repeated (()) (20:43) in two different occasions and the test reliability is ascertained by calculating the correlation between the two forms of that the two occasions the two sets of scores.

And second is the parallel forms means two sets of parallel tests are developed and they are correlated with each other's. So in case of split half the test is divided into two halves odd and even numbers and then the correlation is calculated between these two sets of tests. But in case of internal consistency each item is correlated with the test scores with the test scores.

Once the reliability of the test is established then we go for calculating the validity. So there are various forms of validity say for like but majorly we look into three important domains like content validity, construct validity and criterion validity. The criterion validity is more important

and for intelligence types of tests and the content validity the content validity it's refers to that how well the contents have been included to measure a particular dimension of intelligence.

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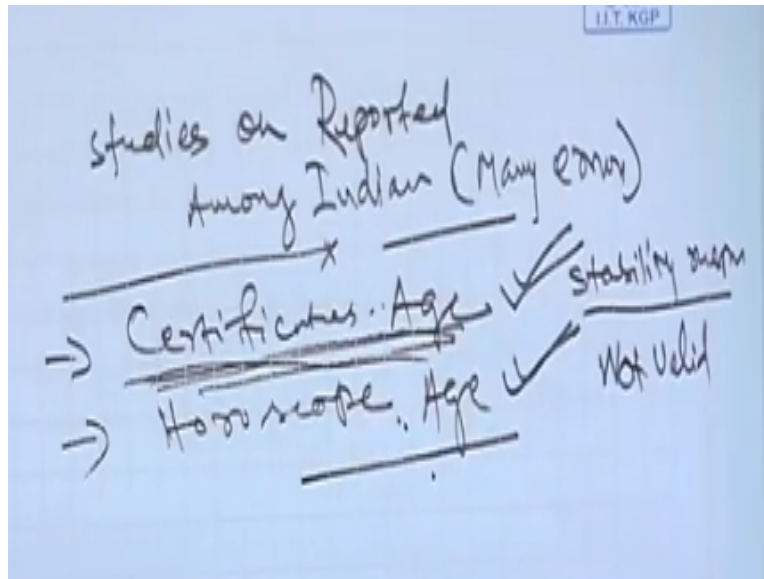
So valid is refers to sorry reliability refers to the stability of test score while the validity refers to the trustworthiness of test score. In others words you can say test should measure the test should measure what it intends to measure to make it more simpler that suppose you are you have developed a test score a test of political science the test item should measure political science not history.

So that is why many times in many places the candidates object's that most of the questions were out of syllabus. So what does it mean the test suffers from contend validity that means the test contents are not properly or not well covered in the test.

Many times it happens so therefore one has to be very careful about while developing a test and establishing its reliability and validity but is there any relationship between these two reliability and validity it is yes there are relations the only important relationship is that test in order to be valid in order to be valid should be reliable. But a reliable test does not necessarily mean a valid test why it is so?



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There it as reasons say for examples studies on reported aging's studies on reported aging's amount Indians is shows that many era's or huge era's how suppose if I ask your age all my students they respond the age that is mentioned as per their certificate age but when they celebrate their birthday the celebrate as per the horoscope age right.

But you ask them n number of time what is your age they will say this age nobody says suppose somebody stick to horoscope age then they also keep on saying horoscope age. But mostly people use their certificate age as reported aging but that is not actuals. If a person repeatedly saying the certificate age that is reliable because his consistent across time people and places,

So this is showing the stability of response so he is reliable but is not valid because that his not his valid age not valid right. So that is why a test in order to be valid needs to be reliable but a reliable test need not be a valid test. So therefore a test maker should be very careful while developing a test thank you. We will come back in a short while