

DECODING THE PILLARS OF HUMAN INTELLIGENCE

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ABSTRACT: The main objective of paper is to decode the pillars of human intelligence as well as to find on which factors does human intelligence depends .There are many factors that influence the human intelligence other than genetic factor. It is fact that human intelligence depends on genetic factor but these is not only factor. There are factors such as hobbies related to arts, ages of humans, internet users, job types etc. also plays key role in growth of human intelligence. In todays life due to higher competition everybody that is each and every parents wants his or her child to be the best amongst all , but they don't know what things increases the intelligence indices of there child. They only want there child to study and study. So by statistical testing such as hypothesis testing, regression, ANOVA, MS Excel, R software, we tested various factors such as hobbies related to mental strength, physical strength, arts, income of family, internet users, locality etc. And found that mostly human intelligence is depended on hobbies related to arts (related to cultural activities such as music, drawing, collection, design etc. job type, ages, internet users other than genetic factor).

Keywords:- Human intelligence, Testing of hypothesis, chi -square test, student's t test, ANOVA, regression, physical strength, cognitive strength, arts, income, age, job etc.

I. INTRODUCTION

Human intelligence is the intellectual process of humans, which is marked by complex cognitive feats and high levels of motivation to self awareness. Through their intelligence, human possess the cognitive abilities to learn, form concepts, understand, apply logic and capacities to recognize patterns. The evolution of human intelligence is closely tied to evolution of human brains and origin of language. The time line of human evolution spans approx. 7 million years ago as per "concepts of genetics" [1]. Intelligence is described as "power of mind to think in logical manner and acquire knowledge", from "The genetic basic of intelligence"[2]. Intelligence can be divided into various sub-categories such as reasoning, problem solving and memory and so creating the consistency scale by which one can measure intelligence of human. Concept of IQ was first developed by Alfred Binet, a French psychologist and lawyer in 1905. In 1914 Stern a German psychologist created measure scale of IQ. Historically, even before IQ test were invented, there were attempts to classify people into intelligence categories by observing there behavior in daily life. Those other forms of behavioral observations are still important for validating classifications based primarily on IQ test scores. The English statistician Francis Galton made the first attempt at creating a standardized test for rating a person's intelligence. Adam Hampshire [3] and Adrian M Owen [4] in "Fractionating human intelligence" stated that human intelligence is composed of multiple independent components. The higher order "genetic" factor is an artifact of task recruiting multiple networks. In 2002 in All psych journal, Grasso F. [5] in "IQ: Genetics or environment", stated that genetics has influence on human IQ. In august 2004 Farnooshtayyari[6] in "SCQ" journal stated that IQ is depending on 50% of environment and 50% DNA.

II. Scope of study

This research was focused only on human intelligence, so that we can decode the pillars of human intelligence and to find other factors which also contribute a lot in growth of human intelligence such as hobbies related to arts, ages, internet users, medium of education etc.

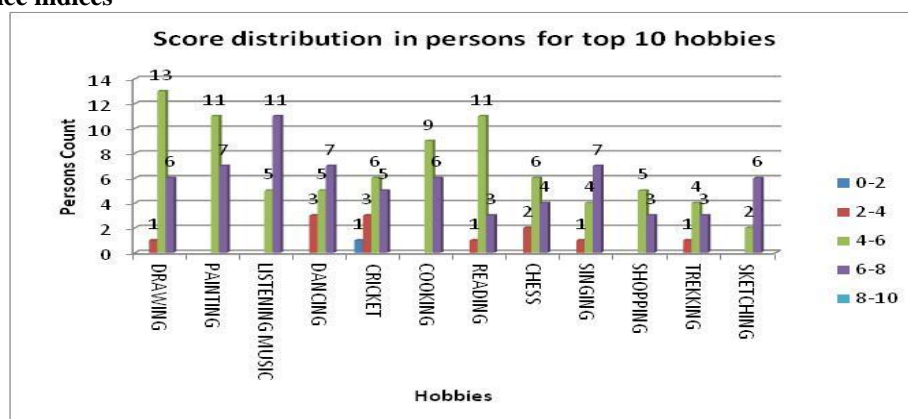
III. Research methodology

The data used in these research is of 312 students of various age groups of a school and college i.e. from Abasaheb Garware College Pune. The data is completely primary in nature, as we have asked to solve a questionnaire to each student and noted his or her all information and score of test. Factors are tested using testing of hypothesis by Chi-square test, student's t test, Kruskal Wallis test, sign test using r software and regression, correlation test using MS excel.

IV. ANALYSIS AND RESULTS

Graphical analysis

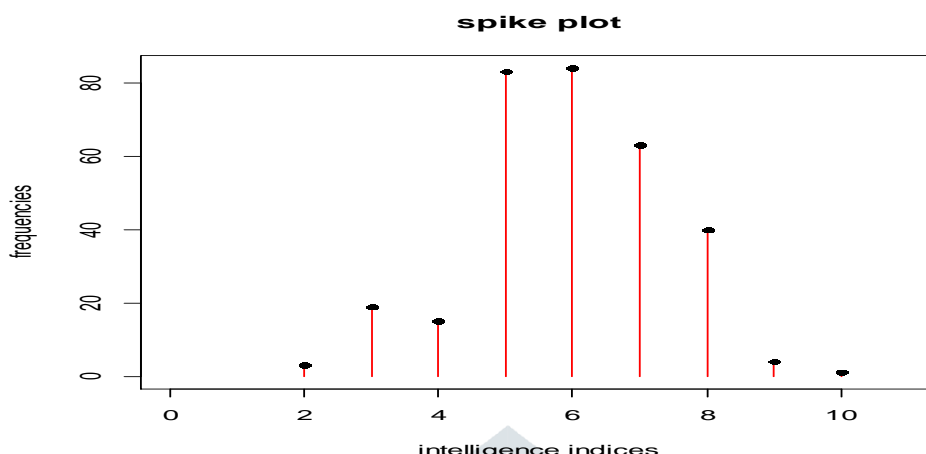
A Hobbies VS Intelligence indices



It is enlightening to see that, in the graph of humans having particular hobbies verses intelligence indices, we conclude that humans having arts has higher intelligence indices than that of other.

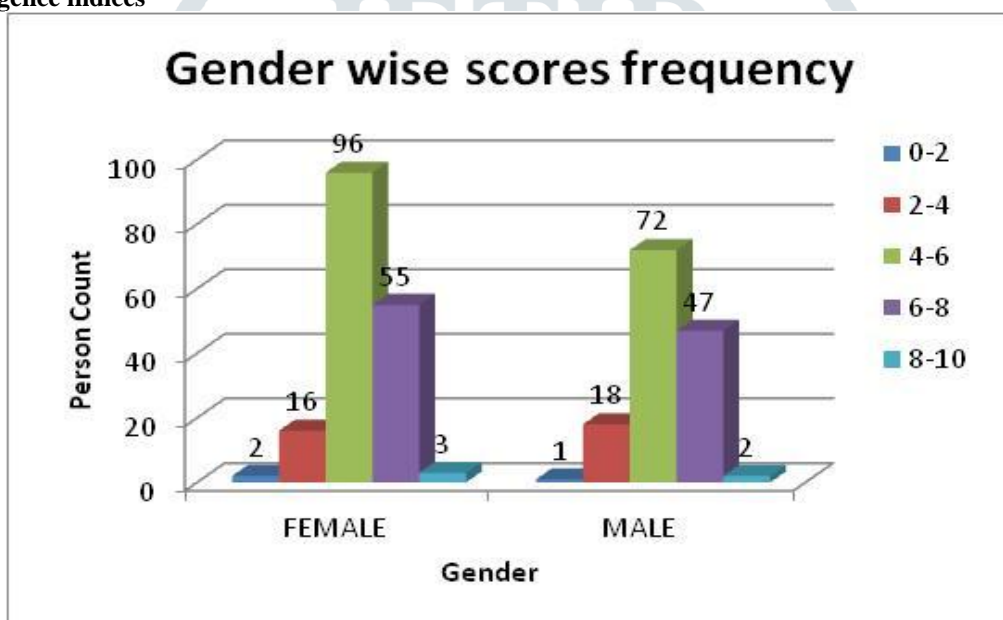
B. Intelligence indices VS No of samples

Using r, we have spike plot. Graph is of intelligence indices verses no of observations.



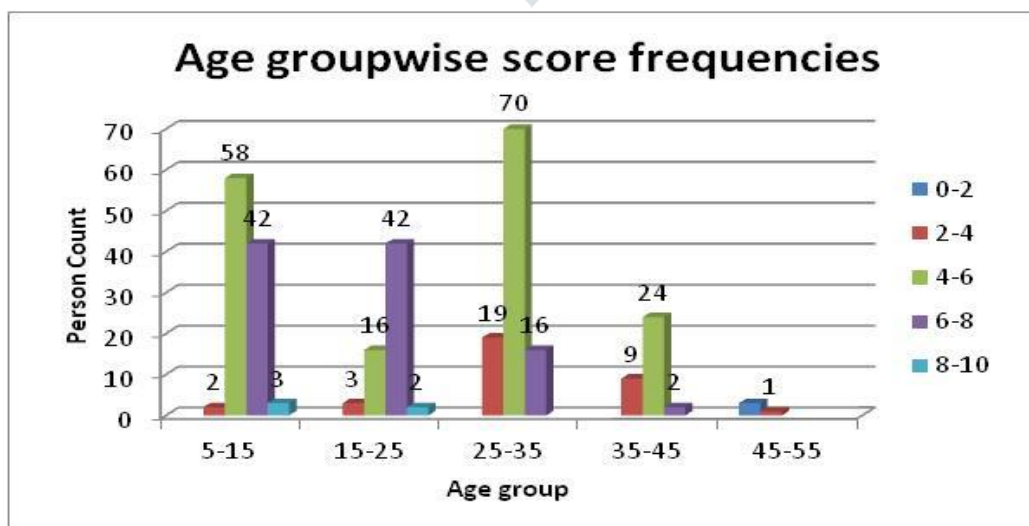
From this graph we can conclude that frequency is highest for 6.

C. Gender VS Intelligence indices



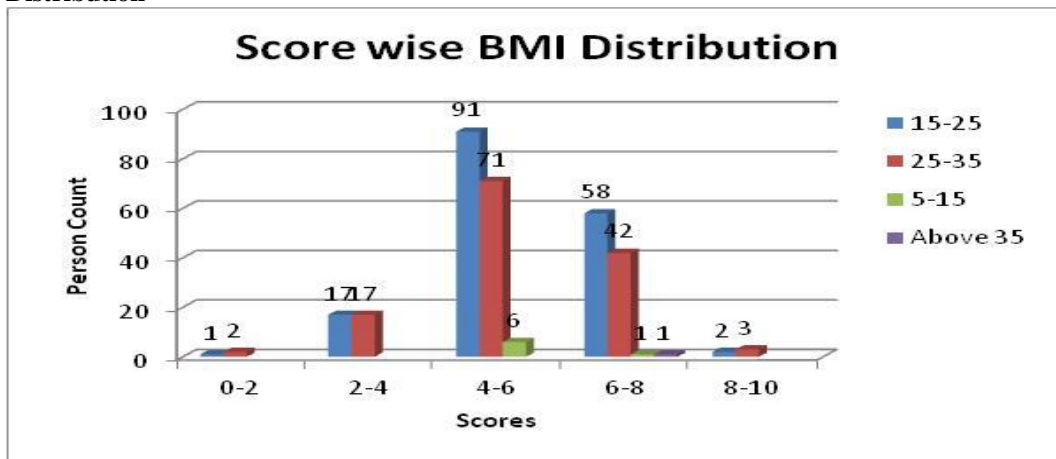
From this graph we can conclude that females have somewhat high intelligence indices than males. Mostly intelligence indices is high for score ranging from 4 – 6. Also very less people has IQ ranging from 8 – 10.

D. Age VS Score



From this graph we can conclude that IQ for age group ranging from age 25 – 35 is highest. And also IQ for age group ranging from 5 – 15 age is also somewhat significant.

E. Score wise BMI Distribution



From these we can conclude that BMI ranging between 15 – 25 has maximum intelligence indices.

V. Parametric test

Using Chi-square test to check dependence of intelligence on hobbies related to physical strength (playing various games, gym, yoga, zumba etc), cognitive strength (indoor games, solving puzzle, reading, writing etc.) and hobbies related to arts (related to music, dance, drawing, collection of things etc.)

Result no	Parameter	Test type	Test	p-Value	X squared	Mean
1	Physical strength	Parametric	Chi-square	0.7387	3.5395	5.5193
2	cognitive strength	Parametric	Chi-square	0.5386	1.2375	5.3809
3	Hobbies related to arts	Parametric	Chi-square	2.2e-16	117.54	8.25

Result 1. In this case we took null hypothesis as hobbies related to physical strengths are independent of intelligence indices against alternative hypothesis as hobbies related to physical strength are not independent of intelligence indices. Using chi-square test we got p-value = 0.7378, which is greater than α . Since in these case as per decision rule we accept Ho at 95% level of significance. Therefore we can conclude that hobbies related to physical strength are independent of human intelligence indices.

Result 2. In this case we took null hypothesis as hobbies related to cognitive strengths are independent of intelligence indices against alternative hypothesis as hobbies related to cognitive strength are not independent of intelligence indices. Using chi-square test we observed p-value = 0.5386, which is greater than α i.e.0.05. Since in this case as per decision rule, we accept Ho at 95% level of significance. Therefore we can conclude that hobbies related to cognitive strength are independent of intelligence indices

Result 3 In this case we took null hypothesis as hobbies related to Arts are independent of intelligence indices against alternative hypothesis as hobbies related to arts are not independent of intelligence indices. Using chi-square test we got p-value = 2.2e-16, which is less than α i.e 0.05. Since in these case as per decision rule, we reject Ho at 95% level of significance. Therefore we can conclude that hobbies related to arts are dependent on human intelligence indices.

We want to study that average mean of human intelligence is 5.926. So we summarized the data and obtained these result.

Min	1st Qu.	Median	Mean	3rd Qu.	Max.
2.00	5.00	6.00	5.926	7.00	10.000

Parameter	Test type	Test	p-Value	t-value	Mean
Mean of Intelligence indices is 5.926	Parametric	Student's t test	0.9972	0.0034857	5.926

In these case we took null hypothesis as mean of intelligence indices is equal to 5.926 against alternative hypothesis as mean intelligent indices is not equal to 5.926. So by Student's t test we obtained p-value is equal to 0.9972. which is greater than α i.e. 0.05. So by decision rule we accept null hypothesis Ho at 95% level of significance. Therefore we can conclude that average mean intelligence indices is 5.926.

VI. Non-Parametric test

In order to test population median is 6, we tested it using sign test.

Parameter	Test type	Test	p-Value	Median
Population median is 6	Non-Parametric	Sign test	0.2331	6

We took null hypothesis as H_0 : Population median = 6 against alternative hypothesis as H_1 : Population median is not equal to 6. Using sign test we obtained p-value= 0.2331. Since p-value is greater than 0.05 so by decision rule we accept null hypothesis at 95% level of significance. So we can conclude that population median is 6.

In order to check if there is significant difference in indices for males and females, we conducted Kruskal Wallis test using r software.

Parameter	Test type	Test	p-Value	X squared
Significant difference between males and females	Non parametric	Kruskal Wallis	0.7546	0.097671

We took null hypothesis as H_0 : There is no significant difference between the average intelligent indices for males and females against alternative hypothesis H_1 : There is significant difference between the average intelligent indices for males and females. We obtained p-value is equal to 0.7546. Since p-value is greater than α i.e 0.05 so by decision rule we accept null hypothesis at 95% level of significance. So we conclude that there is no significant difference between the average intelligent indices for males and females.

c) ANOVA 2 way classification

We wanted to test mean intelligence of ages and localities vary significant or not. So by ANOVA 2 way classification we did test by taking null and alternative hypothesis as follows

[1] H_{01} : Mean intelligence indices of ages do not vary significantly

H_{11} : Mean intelligence indices of ages vary significantly

[2] H_{02} : Mean intelligence indices of localities do not vary significantly

H_{22} : Mean intelligence indices of localities vary significantly

We got p-value in case [1] is P value= 0.042 which is less than α i.e 0.05, so we reject null hypothesis in first case therefore mean intelligence indices of ages vary significantly. Therefore ages plays role in intelligence indices. In case [2] P value=0.0279 which is less than α , therefore we reject null hypothesis and conclude that mean intelligence indices of localities vary significantly.

VII. Testing using MS Excel

a) Intelligence based on internet Usage

Using MS excel we have obtained average indices for internet users as well as non users.

Average indices of internet users	Average indices of internet non users
6.344828	6.112903

Conclusion: It shows that IQ of humans using internet is little more than non users. Amongst these almost 30% of non users do not consider internet as blessing to mankind. And it does not had significant impact on one's intelligence. So we can say that "even internet solely has not got power to decide how intelligent you are....it's only 'WE' who has got it".

b) Job and intelligence

Type of job/ profession	Average Intelligence index
Sedentary job (without constant knowledge update)	5.64
Sedentary job (with constant knowledge update)	6.885
Business	5.89
Other	6.276

Conclusion: Sedentary jobs with constant knowledge update has higher intelligence indices than other job type.

c) Income and Intelligence

To check if a good income can lead to a fairly good intelligence index, we did following analysis. Correlation between income in lakhs (annually) and intelligence index (using MS Excel)

=0.665951

We get significant but not too good positive correlation between annual income and intelligence indices. That shows that annual income of family do not play role in growth of one's intelligence. So money doesn't matter in human intelligence.

By linear regression between Income and Intelligence

X: Annual Income in lakhs

Y: Intelligence Index

	Coefficient	Standard error	t-stat	F value
Intercept	3.034753	0.193648	15.6715	3.59e-41
X variable	0.521177	0.033159	15.7176	2.39e-41

Summary output (Regression Analysis)

Multiple R	R Square	Adjusted R Square	Standard error	Observations
0.665951	0.44349	0.441695	1.067939	312

We can observe that coefficient of determination = 0.44349, which means that 44.34% variation in Y is explained by variation in X. The regression line of Y on X is $Y=3.034753+0.521177X$.

d) BMI and Intelligence

Using excel correlation for BMI and Human intelligence is 0.0738. These correlation is very negligible, although negative. So we can say that BMI and Human intelligence are not related linely to a fairly good extent.

e) Gender and Intelligence

Average intelligence indices for males	Average intelligence indices for females
5.990476	6.007692

It is always interesting topic to check whether males are intelligent than females or not. So by these we can conclude that there is no difference between intelligence of males and females.

VIII. CONCLUSION

At the end of this research paper finally human intelligence is highly dependent on humans having hobbies related to arts such as drawing, sketching, singing, dancing, reading, cooking, collecting special things etc. . It is not dependent on physical strength as well as mental strength. Other than these human intelligence is also depended on factors such as locality type i.e. rural or urban. It also depends on humans using internet, as it enhances the knowledge. The people who are doing sedentary jobs with constant knowledge update has also impact on human IQ. Income of family has no impact on intelligence of human. Many people think that if family income source is low then he or she is weak in studies but this is not the case neither the genetic factor has any impact. If you have some or the other art or skill you can develop your intellect!! Gender of human can not decide the intelligence, in our new era all men and women has equal success in each and every area. The age has also significant variation in humans intelligence. In childhood i.e from age group between 5 to 15, human intelligence indices is higher and for age group between 25 to 35 years IQ is quite higher. BMI and human intelligence is also not related. According to our research one should be all rounder in all areas. Human intelligence not only depends on genetic factor but on these above factors also.

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