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DEPARTMENT OF STATISTICS

Project Report on

**“Statistical Analysis of Gender of
Child and Their Performance”**

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INTRODUCTION

The concept of Gender of child and its performance has long been a topic of interest in psychology, sociology, and other social sciences due to its potential impact on various aspects of personality, behavior, and development. One aspect often explored in this context is the relationship between Gender and cleverness or intelligence.

Some studies have suggested that Gender may influence intelligence. This notion is often attributed to factors such as increased parental attention and resources available to the male, as well as the role of the male and female are different in family. Hence we interested to study this topic.

While Gender may play a role in shaping certain aspects of personality and behavior, its impact on intelligence is still a topic of ongoing debate and research in the field of psychology.

METHODOLOGY

In this Project, we select such families where child's has passed S.S.C exams from different villages of Patan Taluka. We collect data from 189 families with 396 children on the basis of questionnaire attached in Appendix 1

OBJECTIVE

To study the relation between,

- 1) Gender and cleverness of child
- 2) Gender and understanding of child

ANALYSIS OF DATA

Collected data are classified and analyzed and presented in tabulated form. The different tables are given here,

Sex	Cleverness Level			Total
	Most Clever	More clever	clever	
Male	79	98	7	184
Female	110	89	13	212
total	189	187	20	396

Sex	Understanding Level			Total
	1	2	3	
Male	86	88	9	183
Female	102	99	12	213
total	188	187	21	396

TESTING PROCEDURE

Notations:

O_i ($i=1,2,\dots,n$) be the set of observed (experimental) frequencies

E_i ($i=1,2,\dots,n$) be the corresponding set of expected (theoretical) frequencies.

I) Test for independence of sex and cleverness of child

Step 1: Null Hypothesis

H_0 : Sex and cleverness is independent.

Step 2: Alternative Hypothesis

H_1 : Sex and cleverness are not independent

Step 3: Let the level of significance for this test is $\alpha=0.05$

Step 4: Computation

O_{ij}	E_{ij}	$(O_{ij}-E_{ij})^2/E_{ij}$	
79	87.8182	0.8855	
98	86.8889	1.4209	
7	9.2929	0.5657	
110	101.1818	0.7685	
89	100.1111	1.2332	
13	10.7071	0.4910	
		5.3648	

Step 5: Test statistic (under H_0)

$$\chi^2 = \sum \sum \frac{(O_{ij}-E_{ij})^2}{E_{ij}} = 5.3648$$

Step 6: Critical Region and Decision Rule

$$\{\chi^2 / \chi^2 > \chi^2_{(m-1)(n-1)}(\alpha)\} \text{ i.e. } \{\chi^2 / \chi^2 > \chi^2_2(0.05)\}$$

$$\text{i.e. } \{\chi^2 / \chi^2 > 5.991\}$$

here, $\chi^2 = 5.3648$ is in critical region

Therefore we accept H_0 . i.e. Sex and cleverness is independent

II) Test for independence of Sex and understanding of child

Step 1: Null Hypothesis

H_0 : Sex and understanding is independent.

Step 2: Alternative Hypothesis

H_1 : Sex and understanding are not independent

Step 3: Let the level of significance for this test is $\alpha=0.05$

Step 4: Computation

Oij	Eij	(Oij-Eij) ² /Eij	
86	86.8788	0.0089	
88	86.4167	0.0290	
9	9.7045	0.0511	
102	101.1212	0.0076	
99	100.5831	0.0249	
12	11.2955	0.0439	
	396	0.1654	

Step 5: Test statistic (under H_0)

$$\chi^2 = \sum \sum \frac{(O_{ij} - E_{ij})^2}{E_{ij}} = 0.1654$$

Step 6: Critical Region and Decision Rule

$$\{\chi^2 / \chi^2 > \chi^2_{(m-1)(n-1)}(\alpha)\} \text{ i.e. } \{\chi^2 / \chi^2 > \chi^2_2(0.05)\}$$

$$\text{i.e. } \{\chi^2 / \chi^2 > 5.991\}$$

here, $\chi^2=0.1654$ is in critical region

Therefore we accept H_0 .

i.e. Sex and understanding is independent

Conclusions:

Hence we conclude that,

- 1) Sex and cleverness is independent.
- 2) Sex and understanding is independent.

