

Decoding Happiness & Self Esteem: The Statistical Way...



Statistics Department,
Fergusson College,
(Established 1885)

DECODING HAPPINESS AND SELF ESTEEM: THE STATISTICAL WAY

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CERTIFICATE

This is to certify that the project report entitled

"Decoding Happiness and Self Esteem: The Statistical Way" is
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INTRODUCTION

Does one have to be happy to have high self-esteem and does one have to have high self-esteem to be happy? And what exactly do we mean by the two?

Self-esteem is based on personal belief system. It is a blend of the way we feel about ourselves and the way we believe others see us. Our sense of self influences our attitudes about what we can do, how to cope with problems, and how to get along with peers. Happiness is a state of emotion. Happiness can be experienced in many different variations such as euphoric laughter, the spiritual bliss of overwhelming love, or just a calm quiet peace.

One indicator of happiness is how little chatter there is in your internal dialog. In the happiest moments of your life, you are not thinking. You might have been keenly aware of what was going on with yourself, or fully engaged in the situation around you, but your mind was probably very quiet.

We have tried finding the various factors behind the same. Say, for instance, money. Money can buy a very basic level of happiness. In this society money is the means for your basic physical needs, such as food and shelter. We have also tried finding what role does having healthy relationships (friends, family, coworkers) play in achieving happiness? The report is about studying the ideal background/environment/factors to grow up in to being a happier person in life.

MOTIVATION

Are students more stressed than their teachers? What about the people working for MNCs and their counterparts in the government? We began with an idea to quantify the stress levels amongst individuals from various occupations and age groups. Further development of the subject led us to attributes related to the well being of an individual. These were Happiness and Self-Esteem.

The relativity and intricacy of the emotion also motivated us to define a common ground on which the human happiness thrives and measure happiness and self esteem of an individual.

METHODOLOGY

The entire project can be summarized in the following steps:

1. Making of Questionnaire :

We prepared a questionnaire with two standard psychological tests to test the levels of happiness and self esteem, the first being standard oxford happiness questionnaire and the other Rosenberg's self esteem test. Other than the two tests, we also included questions related to personal and professional details of individuals under study. The details of the test are given below:

The Oxford Happiness test

This test was developed by Michael Argyl and Peter Hills. It consists of two versions -original and compact. The original consists of 29 questions and the compact questionnaire consists of 10 questions.

The Rosenberg's Self Esteem Test

In the given test a ten item's scale that measures global self worth by measuring both positive and negative feelings about self is taken down .All answers are answered using a six point likert's scale format ranging from strongly disagree to strongly agree. It was investigated using item response theory .The reason for choosing the test being people high in self esteem claim to be more likable and attractive, have better relationships and to make better impressions on others than people with low self esteem.

The scores of the above test were computed using the afore-mentioned technique:

Step 1. The sentences marked (R) should be scored in reverse: For example, if you gave yourself a “1,” cross it out and change it to a “6” ,”2” to “5” and so on .

Step 2. Add the score given for all questions. (Use the converted numbers for the 5 items that are reverse scored.)

Step 3. Divide by the total number of questions (n=8 for happiness test and n= 10 for self esteem test). So your happiness/self esteem score = the total (from step 2) divided by n.

Mode of data collection :

For collection of our primary data, we divided the population into homogeneous strata based on the various occupations, and drew a sample size of 30 on an average. We surveyed people of different professions, some of them being IT professionals, Doctors, Teachers, etc.

The tedious job of data collection lasted for about a month.

3. Software used for analysis: We compiled and systematically arranged the data in MS-Excel and carried out various tests in MS-Excel-Software and SPC for Excel.

4. Tests used for analysis:

1) t-test for testing significance of correlation coefficient R

When the test is against the null hypothesis: $r_{xy} = 0.0$

The sampling distribution of r is approximately normal (but bounded at -1.0 and +1.0) when N is large and distributes t when N is small.

The simplest formula for computing the appropriate t value to test significance of a correlation coefficient employs the t distribution:

$t = r \sqrt{[n-2/(1-r^2)]}$, where the degrees of freedom for entering the t-distribution is $N - 2$.

2) Welch's t-test

In statistics, Welch's t-test is as a two-sample location test, and is used to check the hypothesis that two populations have equal means. Welch's t-test is an adaptation of Student's t-test, and is intended for use when the two samples have possibly unequal variances. These tests are often referred to as "unpaired" or "independent samples" t-tests, as they are typically applied when the statistical units underlying the two samples being compared are no non-overlapping.

Welch's t-test defines the statistic t by the following formula:

$$t = (X_1 - X_2) / [\sqrt{(s_1^2/N_1 + s_2^2/N_2)}]$$

where X_1 , s_1^2 and N_1 are the first sample mean, sample variance and sample size respectively and similarly the terms with subscript "2" are the defined quantities for second sample.

The degrees of freedom degrees v associated with this variance estimate are approximated using the Welch–Satterthwaite equation:

Here, $nu \approx (s_1^2/N_1 + s_2^2/N_2)^2 / (s_1^4/N_1 v_1 + s_2^4/N_2 v_2)$, where

$V_1 = N_1 - 1$ is the degrees of freedom associated with the 1st variance estimate.

3. The Kruskal Wallis test:

The Kruskal Wallis test is a non-parametric alternative to usual Analysis of Variance .In the ANOVA we assume that distribution of each group is Normal and there is approximately equal variance on the scores for each group. However in the Kruskal Wallis test, we do not have any of these assumptions.

NOTE: Different academicians hold different views about the use of the above test(regarding homogeneity of variances).

QUESTIONNAIRE

Instruction: Please tick your response in appropriate boxes.

PERSONAL DETAILS

Date: / /

- Age: _____
- Gender: Male ☐ Female ☐
- Height: _____ (ft or cm).
- Weight: _____ Kg.
- Qualification:

1. Upto Higher Secondary	2. Under Graduate	3. Graduate	4. Post Graduate	5. PhD

PROFESSIONAL DETAILS

- Status:

Student	IT Professional	Teacher	Housewife
Doctor	Senior Citizen	Businessman	Govt. Service

If any other please specify here _____.

- Family Income (Annual) (in lakhs)

Upto 2	2-4	4-6	6-8	8-10	Above 10

- No. of family members _____.
- No. of Working Hours (in hours)

Upto 4	4-6	6-8	8-10	Above 10

DAILY ROUTINE

- Average Number of Hours Of Sleep:

At Night _____ During the Day _____

- Do you exercise? Yes ☐ No ☐

If yes, for how many days in a week & for how much time?

_____ days in a week & _____ minutes in a day

- No. of hours spent Sitting (in your work including the time to travel) _____
- Time spent with Family(in hours): Virtually _____ Actually _____
- Time spent with Friends(in hours): Virtually _____ Actually _____
- No. of close friends you can call in a crisis _____

Tick your Hobbies

1. Reading	2. Writing	3. Drawing	4. Listening to Music	5. Watching TV
6. Singing	7. Playing Instruments	8. Playing Video games	9. Sports	10. Internet Surfing

If any other please specify here _____

What according to you make(s) you feel stressed?

Education	Security Issues
Own Health Problems	Problem with Finances
Family Health Problems	Problem with family members
Too many responsibilities	Problem with friends
Unhappy with the way you look	Problem with the Workplace

If any other please specify here _____

Which of the above mentioned is the most significant cause of stress _____?

Standard Oxford Happiness Questionnaire

Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.

Responses:

1 = Strongly Disagree	2 = Moderately Disagree	3 = Slightly Disagree
4 = Slightly Agree	5 = Moderately Agree	6 = Strongly Agree

✓ Answer each of these questions by using any one of the above Responses.

1. I feel that life is very rewarding.....**1 2 3 4 5 6**
2. I feel fully mentally alert**1 2 3 4 5 6**
3. I don't feel particularly pleased with the way I am.**1 2 3 4 5 6**
4. I find beauty in some things.....**1 2 3 4 5 6**
5. I am well satisfied about everything in my life.....**1 2 3 4 5 6**
6. I can fit in (find time for) everything I want to**1 2 3 4 5 6**
7. I think I look attractive.....**1 2 3 4 5 6**
8. I don't have particularly happy memories of the past.....**1 2 3 4 5 6**

Rosenberg Self Esteem Test

1. On the whole, I am satisfied with myself.....**1 2 3 4 5 6**
2. At times I think I am no good at all.....**1 2 3 4 5 6**
3. I feel that I have a number of good qualities.....**1 2 3 4 5 6**
4. I am able to do things as well as most other people.....**1 2 3 4 5 6**
5. I feel I do not have much to be proud of.....**1 2 3 4 5 6**
6. I certainly feel useless at times.....**1 2 3 4 5 6**
7. I feel that I'm a person of worth, at least on an equal plane with others.
1 2 3 4 5 6
8. I wish I could have more respect for myself.....**1 2 3 4 5 6**
9. All in all, I am inclined to feel that I am a failure.....**1 2 3 4 5 6**
10. I take a positive attitude toward myself.....**1 2 3 4 5 6**

THANK YOU

ANALYSIS

Our analysis involves comparison of the happiness and self esteem levels with various factors given below:

1. COMPARISON OF MALE VS FEMALE HAPPINESS SCORES

We want to test the Equality of Population Means of two populations, male and female.

- Let μ_1 be the population mean score of Happiness for females and μ_2 be for males.

Hence to test, $H_0: \mu_1 = \mu_2$ vs. $H_1: \mu_1 \neq \mu_2$

Using **Welch's t test** for the comparison, we have the following table

t-Test: Two-Sample Assuming Unequal Variances

	<i>Happiness Score of Females</i>	<i>Happiness Score for males</i>
Mean	4.65893586	4.673754789
Variance	0.444943081	0.404838678
Observations	98	174
Hypothesized Mean Difference	0	
df	193	
t Stat	-0.178828457	
P(T<=t) one-tail	0.429129992	
t Critical one-tail	1.652787069	
P(T<=t) two-tail	0.858259984	
t Critical two-tail	1.972331631	

- **Conclusion:** As the p-value is very large, we fail to reject H_0 . Hence there is no difference between male and female population Happiness scores.

2. COMPARISON OF MALE VS FEMALE SELF ESTEEM LEVELS

We want to test the Equality of Population Means of two populations, male and female.

- Let μ_1 be the Population Mean of Self Esteem for Females and μ_2 be for Males. Hence to

test $H_0: \mu_1 = \mu_2$ Vs. $H_1: \mu_1 \neq \mu_2$

By using **Welch's t test** for the comparison, we have the following table

t-Test: Two-Sample Assuming Unequal Variances

	<i>Self Esteem Score of Females</i>	<i>Self Esteem Score for Males</i>
Mean	4.844048	4.729406
Variance	0.568333	0.541906
Observations	98	174
Hypothesized Mean Difference	0	
df	197	
t Stat	1.214262	
P(T<=t) one-tail	0.113051	
t Critical one-tail	1.652625	
P(T<=t) two-tail	0.226101	
t Critical two-tail	1.972079	

Conclusion: As the p-value is very large, we fail to reject H_0 . Hence there is no difference between male and female population self esteem levels.

3. EFFECT OF HEIGHT ON HAPPINESS

For analyzing the effect of the individual's height on one's happiness we divided our data in two groups based on gender, because average height of males is greater than females. Then we segregated the heights into various classes .Hence the individuals in different classes of height form different populations. Then we calculated the average Happiness levels of those different classes of height, for testing the Equality of Population Means of Happiness of these classes. As there are more than two classes, the Comparison of Means is done using Kruskal Wallis test. Hence to test,

H_0 : All the population means of the classes are same, against

H_1 : At least one of the means is different from the rest.

For Males the classes where the Height is in feet are as follows:

<i>Class interval (Height in feet)</i>	<i>Average Happiness Score</i>
<=5.25	4.328571
5.25-5.4	4.8125
5.4-5.55	4.515805
5.55-5.7(h)	4.663462
5.7-5.85	4.722826
5.85-6	4.690789
Above 6	4.546875

Result of the Kruskal Wallis test is as follows:

Class	<=5.25	5.25-5.4	5.4-5.55	5.55-5.7	5.7-5.85	5.85-6	Above 6
Rank Sum	721	842	1867	2936	1807	1440	537
Count	14	10	29	39	23	19	8
Average Rank	51.50	84.20	64.38	75.28	78.57	75.79	67.13

Alpha 0.05
 kw Statistic 6.183
 p value 0.4030

➤ Conclusion: As the p-value is very large we fail to reject the Null Hypothesis. Hence there seems no effect of Height on the level of Happiness for the case of males.

For Females the Classes are as follows where the Height is in feet:

Class interval (height in feet)	Average Happiness Score
<=4.9	4.375
4.9-5.2	4.463112245
above 5.2	4.792553191

We want to test,

H₀: All the population means of the classes are same, against

H₁: At least one of the means is different from the rest.

Classes	<=4.9	4.9-5.2	above 5.2
Rank Sum	172.5	1721.5	2571
Count	5	42	47
Average Rank	34.50	40.99	54.70

Alpha 0.05
kw Statistic 6.805
p value 0.0333

Comparison	Pair wise Diff.	Critical Value	Diff?
<=4.9-4.9-5.2	6.488	30.25	No
<=4.9-above 5.2	20.202	30.08	No
4.9-5.2-above 5.2	13.714	13.58	Yes

Conclusion:

Hence, we reject H_0 .Therefore Height seems to have significant effect on the level of Happiness for females. By pair wise comparison of the means, it comes to picture that there is a significant difference between the averages of the Classes 4.9-5.2 and above 5.2.As the classes are in ascending order and the second class has greater average, we conclude that as the Height of individual (Female) increases, happiness increases.

4. EFFECT OF HEIGHT ON SELF ESTEEM

For analyzing the effect of height on self esteem, the procedure is exactly the same as that done for the case of happiness.

Hence for males we want to test:

H_0 : All the Population Means are same

H_1 : At least one of the Means is different from the rest.

For males the classes are as follows where the height is in feet is as follows:

Height (in feet)	Average Self Esteem Score
<=5.25	4.35714286
5.25-5.4	4.49
5.4-5.55	4.50957854
5.55-5.7	4.75555556
5.7-5.85	4.89951691
5.85-6	4.71257333
Above 6	4.38055556

The result from the Kruskal Wallis test is as follows

Class	<=5.25	5.25-5.4	5.4-5.55	5.55-5.7(SE)	5.7-5.85	5.85-6	Above 6
Rank Sum	760	625	1921	3012.5	1950.5	1417.5	466.5
Count	14	10	29	39	23	19	8
Average Rank	54.29	62.50	66.24	77.24	84.80	74.61	58.31
Alpha	0.05						
Statistic	7.501						
p value	0.2770						

Conclusions: As the p value is large we fail to reject H_0 . Hence The Height of males seems not affecting their self esteem levels.

For Females, the classes are:

Height (in feet)	Average Self Esteem Score
<=4.9	4.657778
4.9-5.2	4.557275
above 5.2	5.064303

The result from Kruskal Wallis test is as follows:

Class	<=4.9	4.9-5.2	above 5.2
Rank Sum	192.5	1575.5	2697
Count	5	42	47
Average Rank	38.50	37.51	57.38

Alpha	0.05
kw Statistic	12.344
p value	0.0021

Comparison	Pair wise Diff.	Critical Value	Diff?
<=4.9-4.9-5.2	0.988	30.25	No
<=4.9-above 5.2	18.883	30.08	No
4.9-5.2-above 5.2	19.871	13.58	Yes

Conclusion:

Therefore as the p value is very small we reject H_0 . Hence for females, increase in height does increase their self esteem level. By pair wise comparison of the population means we come to know that the sample averages of the classes 4.9-5.2 and *above 5.2* differ significantly, and as the classes are in ascending order and the Second class has greater average, we conclude that as the Height of an individual (Female) increases, self esteem is increases.

5. EFFECT OF BMI ON HAPPINESS

To determine whether there is any effect of one's BMI on his/her happiness we divided the BMI into different classes and calculated their average happiness level. As we require comparison of multiple population means and we shall use the Kruskal Wallis test.

We want to test:

H_0 : All the Population Means are same against

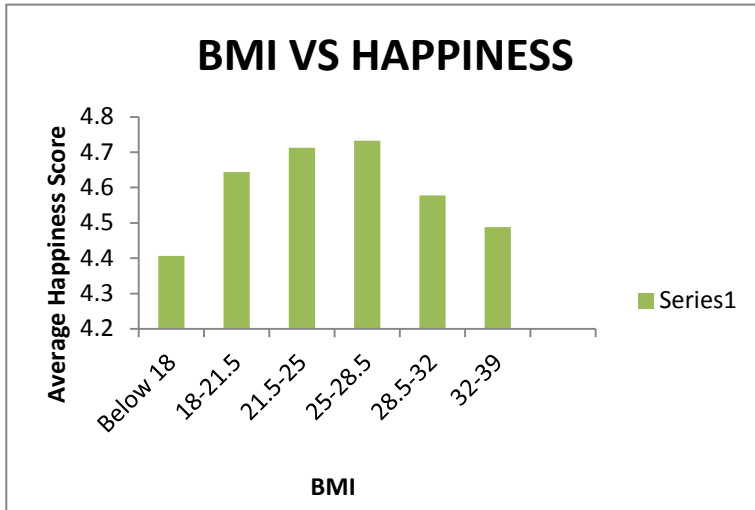
H_1 : At least one of them is different from the rest.

The Summary data is as follows:

<u>BMI range</u>	<u>Average Happiness score</u>
<=18	4.406593
18-21.5	4.644231
21.5-25	4.712887
25-28.5	4.732323
28.5-32	4.577586
32-39	4.487857

Here we observe that for unhealthy BMI classes i.e. for <=18 (underweight) and 32-39 (obese), the average levels of Happiness are lesser than those of Healthy BMI classes.

If plotted the pattern is clearly visible as follows:



The above scores are just the sample Averages; hence their significance must be checked by statistical Method. Hence we shall consider these classes as individual populations and their mean be checked for any difference. Therefore we apply the Kruskal Wallis test here to compare the equality of population means.

The result of the Kruskal Wallis test is as follows:

Class	Below 18	18-21.5	21.5-25	25-28.5	28.5-32	32-39
Rank Sum	1304.5	6768.5	13463.5	9209.5	3502	994
Count	13	52	97	66	29	8
Average Rank	100.3	130.2	138.8	139.5	120.8	124.3

Alpha 0.05
kw
Statistic 4.175
p value 0.5245

Conclusions:

Surprisingly the p value is very large in spite of the pattern observed in the Average Happiness Scores of the Classes above. Hence we failed to reject H_0 . The differences among the averages seem to be by chance.

6. EFFECT OF BMI ON SELF ESTEEM

The procedure for testing whether there is any effect of one's BMI on self esteem is same as the one done in the case of happiness.

Hence to test:

H₀: All the Population Means are same against

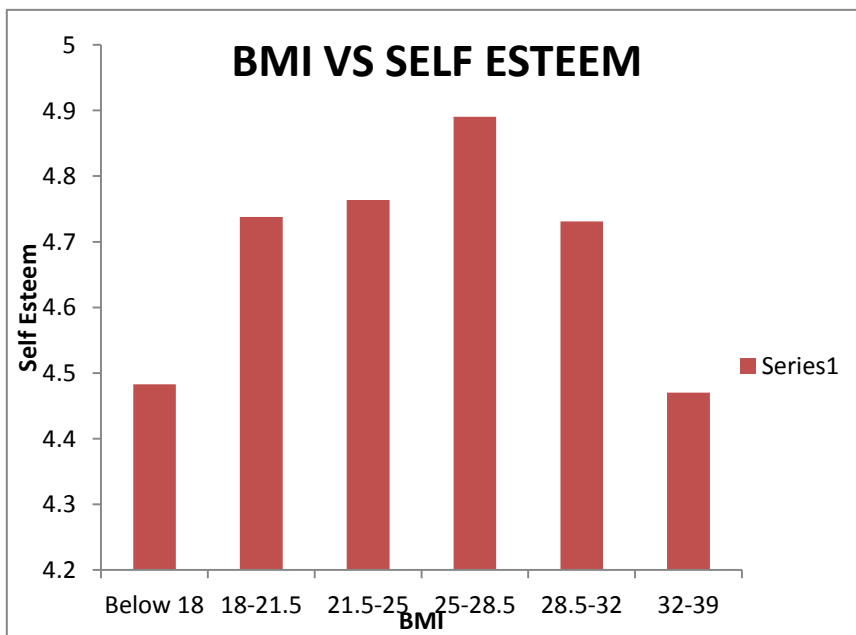
H₁: At least one of them is different from the rest.

The summary data is as follows:

<u>BMI</u>	<u>Average Self esteem</u>
Below 18	4.482906
18-21.5	4.737607
21.5-25	4.763459
25-28.5	4.890236
28.5-32	4.731034
32-39	4.469841

Here again we observe that for unhealthy BMI classes i.e. for ≤ 18 and 32-39, the average levels of Self Esteem are lesser than those of healthy BMI classes in the middle of the table.

If plotted the pattern is clearly visible as follows:



But the above scores are just the sample averages; hence their significance must be checked by statistical

method. Hence we shall consider these classes as individual populations and their mean be checked for any difference. Therefore we apply the Kruskal Wallis test here to compare the equality of Population Means.

The result of the Kruskal Wallis test is as follows:

Class	Below 18	18-21.5	21.5-25	25-28.5	28.5-32	32-39
Rank Sum	1289.5	6822	12963	9539	3730	901.5
Count	13	52	97	66	29	8
Average Rank	99.19	131.19	133.64	144.53	128.62	112.69

Alpha	0.05
kw Statistic	4.715
p value	0.4516

Conclusions:

Surprisingly the p value is very large in spite of the pattern observed in the Average Self Esteem Scores of the Classes above. Hence we failed to reject H_0 . The differences among the averages seem to be by chance.

7. EFFECT OF QUALIFICATION ON HAPPINESS

Here we have five different qualifications hence five different populations to be compared. i.e. five different population means to be checked for equality. Hence again we choose the Kruskal Wallis test for Comparison.

Hence to test: **H_0 : All the Population Means are same vs.**

H_1 : At least one of them is different from the rest.

<u>Qualification</u>	<u>Count</u>	<u>Sum</u>	<u>Average</u>
HS	17	76.38571	4.493277
UG	43	193	4.488372
GRADUATE	100	471.7583	4.717583
PG	92	437.625	4.756793
PHD	16	76	4.75

Here HS, UG and PG denote Higher Secondary, Under Graduate and Post Graduate respectively.

The result of the Kruskal Wallis test is as follows:

Qualification	HS	UG	GRADUATE	PG	PHD
Rank Sum	1878	5007	13927	13028	2206
Count	17	43	100	92	16
Average Rank	110.5	116.4	139.3	141.6	137.9

Alpha	0.05
kw Statistic	5.151
p value	0.2722

Conclusions: As the p value is very large, we fail to reject the Null Hypothesis. Hence Qualification of an individual does not affect his/her Happiness.

8. EFFECT OF QUALIFICATION ON SELF ESTEEM

Similarly to test effect of qualification on self esteem:

H₀: All the Population Means are same Vs.

H₁: At least one of them is different from the rest.

The Summary Data is as follows:

Qualification	Average Self Esteem
HS	4.723529
UG	4.460741
GRADUATE	4.8085
PG	4.913587
PHD	4.8125

And the result of the Kruskal Wallis test is as follows:

Qualification	HS	UG	GRADUATE	PG	PHD
Rank Sum	2151.5	4530.5	13903.5	13748.5	2251
Count	17	45	100	92	16
Average Rank	126.6	100.7	139.0	149.4	140.7
Alpha	0.05				
kw Statistic	12.379				
p value	0.0147				

On carrying out pair wise comparison of different levels of qualifications and their corresponding effects on level of self esteem:

Comparison	Pair wise Diff.	Critical Value	Diff?
HS-UG	25.88	60.64	No
HS-GRADUATE	12.48	55.88	No
HS-PG	22.88	56.24	No
HS-PHD	14.13	74.20	No
UG-GRADUATE	38.36	38.24	Yes
UG-PG	48.76	38.75	Yes
UG-PHD	40.01	62.00	No
GRADUATE-PG	10.41	30.77	No
GRADUATE-PHD	1.65	57.36	No
PG-PHD	8.75	57.70	No

Conclusions: As the p value is very small we reject H_0 . By pair wise comparison we come to know that the Qualifications UG and Graduate have significantly different averages and the qualifications UG and PG also have significantly different averages.

As the average self esteem of Graduate and PG are greater than that of UG, the increase here in qualification level is associated with a statistically significant increase in self esteem level.

9. EFFECT OF PROFESSION ON HAPPINESS LEVEL

We have five different professions, hence five different populations. To check for the effect of profession, is checking for differences among the population means of these different populations.

Hence to test:

H_0 : All the Population Means are same Vs

H_1 : At least one of them is different from the rest.

The summary data is as follows:

Profession	Average Score
BUSINESS	4.67083333
DOCTOR	4.7734375
GOVT	4.79166667
IT PROFESSIONALS	4.59926471
TEACHERS	4.60661765

And the result from the Kruskal Wallis test is as follows:

Profession	BUSINESS	DOCTOR	GOVT	IT PROFESSIONALS	TEACHERS
Rank Sum	2288.5	2700.5	2107.5	2467	2371.5
Count	30	32	24	34	34
Average Rank	76.28	84.39	87.81	72.56	69.75

Alpha	0.05
kw Statistic	3.513
p value	0.4759

Conclusions: As the p value is very large we fail to reject H_0 . Hence there is no effect of any of the above professions on one's level of Happiness.

10. EFFECT OF PROFESSION ON SELF ESTEEM

We have five different professions, hence five different populations. To check for the effect of profession, is checking for differences among the population means of these different populations.

Hence to test:

H₀: All the Population Means are same.

H₂: At least one of them is different from the rest.

The Summary data is as follows:

PROFESSION	AVERAGE SCORE
BUSINESS MAN	4.666667
DOCTOR	5.033681
GOVT	4.8625
IT PROFESSIONAL	4.9
TEACHER	4.692647

And the result of the Kruskal Wallis test is as follows:

Profession	BUSINESS MAN	DOCTOR	GOVT	IT PROFESSIONAL	TEACHER
Rank Sum	2084.5	2820.5	1862	2809.5	2358.5
Count	30	32	24	34	34
Average Rank	69.48	88.14	77.58	82.63	69.37

Alpha	0.05
kw Statistic	4.371
p value	0.3581

Conclusion: As the p value is very large we fail to reject H₀. Hence there is no effect of any of the above professions on one's level of self esteem.

11. Effect of Family Income on Happiness

To determine the effect of Family Income on one's Happiness level, we divided the Family Income into 6 different classes. Those different classes form individual populations. Now to check for the effect of Family Income is to check for the equality of the population happiness means.

Hence to test:

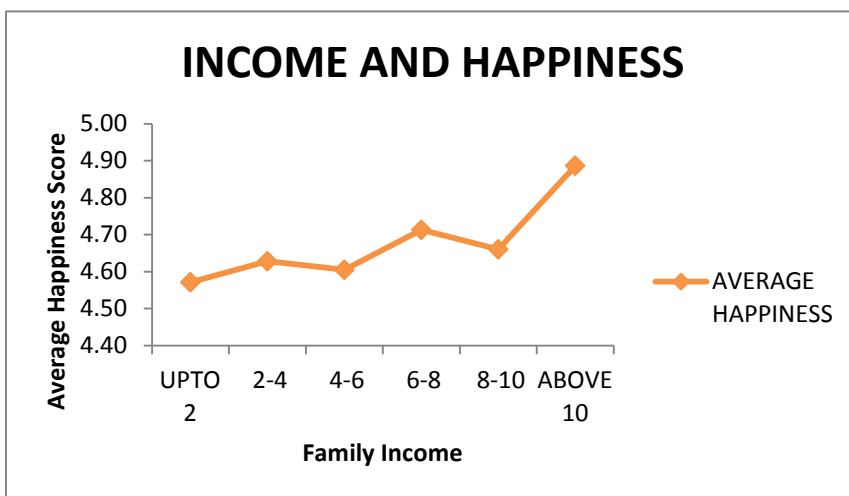
H₀: All the Population Means are same.

H₁: At least one of them is different from the rest.

The Summary data is as follows:

INCOME IN LAKHS	AVERAGE HAPPINESS
UPTO 2	4.57
2-4	4.63
4-6	4.60
6-8	4.71
8-10	4.66
ABOVE 10	4.89

If the above data is plotted an increasing pattern is observed.



And the result of the Kruskal Wallis test is as follows:

Class	UPTO 2	2-4	4-6	6-8	8-10	ABOVE 10
Rank Sum	3175.5	3987.5	7474.5	6799	4879	6834.5
Count	27	32	62	53	39	44
Average Rank	117.6	124.6	120.6	128.3	125.1	155.3

Alpha	0.05
kw Statistic	7.038
p value	0.2178

Conclusions:

- Although there is a slight increasing pattern observed in the graph of Family income vs. happiness which implies that as the Family income increases happiness increases, the p value obtained from the Kruskal Wallis test is very large, hence those differences in the averages seem to be by chance.
- Hence we failed to reject H_0 .
- Hence there seems no effect of Family Income on the level of Happiness.

12. EFFECT OF FAMILY INCOME ON SELF ESTEEM

To determine the effect of Family Income on one's Self Esteem level, we divided the Family Income into 6 different classes. Those different classes form individual populations. Now to check for the effect of Family Income is to check for the equality of the population Self Esteem means.

Hence to test:

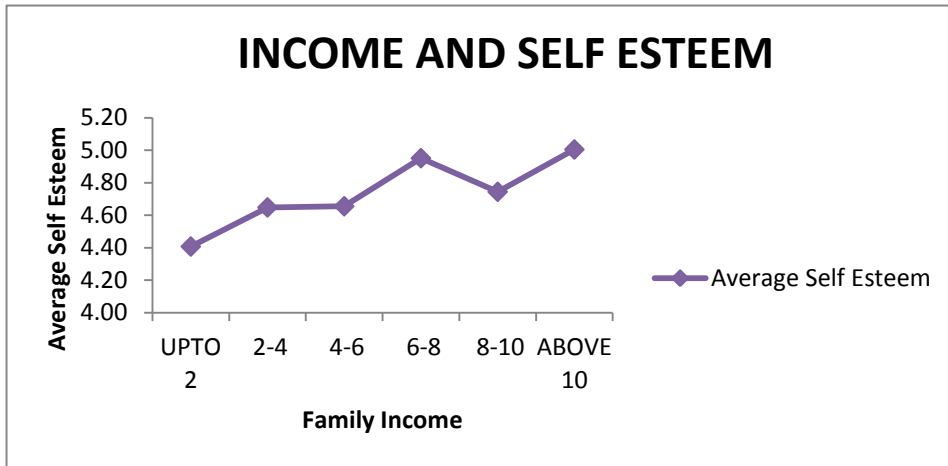
H_0 : All the Population Means are same.

H_1 : At least one of them is different from the rest.

The Summary data is as follows:

INCOME IN LAKHS	Average Self Esteem
UPTO 2	4.41
2-4	4.65
4-6	4.65
6-8	4.95
8-10	4.74
ABOVE 10	5.00

If the above data is plotted a slightly increasing trend is observed



These differences are due to sample averages hence we shall check their significance by Kruskal Wallis test. The result of the Kruskal Wallis test is as follows:

Classes	UPTO 2	2-4	4-6	6-8	8-10	ABOVE 10
Rank Sum	2504	3786.5	7334	7716.5	4940.5	6871.5
Count	27	32	62	53	39	44
Average Rank	92.74	118.33	118.29	145.59	126.68	156.17

Alpha	0.05
kw Statistic	16.929
p value	0.0046

Comparison	Pair wise Diff.	Critical Value	Diff?
UPTO 2 - 2-4	25.59	55.37	No
UPTO 2 - 4-6	25.55	48.85	No
UPTO 2 - 6-8	52.85	50.10	Yes
UPTO 2 - 8-10	33.94	53.04	No
UPTO 2-ABOVE 10	63.43	51.80	Yes
2-4- 4-6	0.04	46.12	No
2-4- 6-8	27.27	47.43	No
2-4- 8-10	8.35	50.54	No
2-4-ABOVE 10	37.84	49.23	No
4-6- 6-8	27.30	39.64	No
4-6- 8-10	8.39	43.30	No
4-6-ABOVE 10	37.88	41.77	No
6-8- 8-10	18.91	44.70	No
6-8-ABOVE 10	10.58	43.21	No
8-10-ABOVE 10	29.49	46.60	No

CONCLUSION:

As the p value is very small we reject H_0 . Hence as the family income of an individual increases self esteem increases. By pair wise comparison of the population means we come to know that the sample averages of the classes UPTO 2 and 6-8 are significantly different and the classes UPTO 2 and ABOVE 10 also have significantly different averages but for the classes 6—8 and above 10 the difference between their self esteem averages is negligible. Hence there seems a logarithmic relationship between Family Income and Self Esteem.

13 .NO. OF CLOSE FRIENDS AND HAPPINESS

We divided the Variable No. of close friends into three different classes. Now those classes form different populations. Hence to determine whether there is any effect of No. Of close friends on happiness we shall check the Equality of the population means.

Hence to test

H_0 : All the Population Means are same.

H_1 : At least one of them is different from the rest.

The Summary data is as follows:

no. of friends	Average Happiness
≤ 3	4.507596154
3--8	4.755757576
> 8	4.767288961

And the result of the Kruskal Wallis test is as follows:

Classes	≤ 3	3--8	> 8
Rank Sum	11767	15463.5	6177.5
Count	104	110	44
Average Rank	113.1	140.6	140.4

Alpha	0.05
kw Statistic	8.219
p value	0.0164

CONCLUSION

There is evidence that there are differences in the methods.

Comparison	Pair wise Diff.	Critical Value	Diff?
≤ 3 – 3-8	27.43	23.92	Yes
≤ 3 -- > 8	27.25	31.46	No
3-8 -- > 8	0.18	31.20	No

CONCLUSIONS:

- As the p value is very small we reject H_0 .
- Hence as the no. of close friends increases happiness increases.
- But for friends > 8 the happiness is not affected significantly.
- Hence this relationship between the No. Of Close friends and Happiness seems to be logarithmic as was the case with family Income and Self Esteem.

14. No. of Close friends and Self Esteem:

We divided the variable no. of close friends into three different classes. Now those classes form different populations. Hence to determine whether there is any effect of No. of close friends on Self Esteem we shall check the Equality of the population means.

Hence to test

H_0 : All the Population Means are same.

H_1 : At least one of them is different from the rest.

The Summary data is as follows:

No. of friends	Average Self Esteem
≤ 3	4.589850428
3--8	4.906363634
> 8	4.864646566

And the result of the Kruskal Wallis test is as follows:

Classes	≤ 3	3--8	> 8
Rank Sum	11663.5	15596.5	6151
Count	104	110	44
Average Rank	112.1	141.8	139.8

Alpha	0.05
kw Statistic	9.442
p value	0.0089

Conclusion

There is evidence that there are differences in the methods.

Comparison	Pair wise Diff.	Critical Value	Diff?
≤ 3 -- 3-8	29.64	23.92	Yes
≤ 3 -- > 8	27.65	31.46	No
3-8 -- > 8	1.99	31.20	No

As the p value is very small we reject H_0 . Hence as the no. Of close friends increases Self Esteem increases but for friends > 8 the Self Esteem is not affected significantly. Hence this relationship between the No. Of Close friends and Self Esteem seems to be logarithmic as was the case with family Income and Self Esteem.

15. EFFECT OF NUMBER OF FAMILY MEMBERS ON HAPPINESS

We have 3 different classes for the number of family members. To check for the effect of number of family members on Happiness we have compared the population means of these different classes.

Hence to test:

H_0 : All the class means are same.

H_1 : At least one of them is different from the rest.

The Summary data is as follows:

Number of family members	Average Happiness
1--2	4.888392857
2--4	4.692563291
Above 4	4.567632731

The results of the KRUSKAL WALLIS test are as follows:

Classes	1--2	2--4	Above 4
Rank Sum	4623.5	22170.5	10604
Count	28	158	87
Average Rank	165.1	140.3	121.9

Alpha	0.05
kw Statistic	6.889
p value	0.0319

Conclusion

There is evidence that there are differences in the methods.

Comparison	Pair wise Diff.	Critical Value	Diff?
1--2--AND 2-4	24.81	37.95	No
1-2 AND Above 4	43.24	40.21	Yes
2—4 AND Above 4	18.43	24.71	No

As the p-value is less than 0.05 and quite small we reject H_0 . and by pair wise of the population means comparison we come to know that the average happiness levels of the people having family members 1-2 and Above 4 are significantly different.

16. EFFECT OF NUMBER OF FAMILY MEMBERS ON SELF ESTEEM

We have three different classes for the number of family members. To check for the effect of number of family members on self esteem we have compared the population means of these different classes.

Hence to test:

H₀: All the class means are same.

H₁: At least one of them is different from the rest.

The Summary data is as follows:

Number of family members	Average Self Esteem
1--2	4.857142857
2--4	4.871343206
Above 4	4.58633461

And the result of the KRUSKAL WALLIS test is as follows:

Classes	1-2	2—4	Above 4
Rank Sum	4175	23221	10005
Count	28	158	87
Average Rank	149.1	147.0	115.0

Alpha	0.05
kw Statistic	9.932
p value	0.0070

CONCLUSION

There is evidence that there are differences in the methods.

Comparison	Pair wise Diff.	Critical Value	Diff?
1—2 AND 2--4	2.139	37.95	No
1—2 AND Above 4	34.107	40.21	No
2—4 AND Above 4	31.968	24.71	Yes

- As the p-value is quite small we reject H₀. And by pair wise comparison we come to know that the average Self Esteem of the people having family members 2-4 and Above 4 are significantly different.

17. EFFECT OF EXERCISE DAYS ON HAPPINESS

We have 3 different classes for the number of Exercise days. To check for the effect of number of exercise days on Happiness we have compared the population means of these different classes. Hence to test:

H₀: All the Class Means are same.

H₁: At least one of them is different from the rest.

<u>Exercise days</u>	<u>Happiness</u>
<=2	4.521777
3--5	4.698534
>=6	4.812037

And the result of the KRUSKAL WALLIS test is as follows:

Classes	<=2	3--5	>=6
Rank Sum	8791.5	7585	16776.5
Count	82	58	117
Average Rank	107.2	130.8	143.4

Alpha	0.05
kw Statistic	11.461
p value	0.0032

Comparison	Pair wise Diff.	Critical Value	Diff?
<=2-3 - 3-5	23.56	29.89	No
<=2 - >=6	36.18	25.09	Yes
3--5 - >=6	12.61	27.98	No

CONCLUSION:

As the p-value is quite small we reject H₀. And by pair wise comparison we come to know that the average happiness levels of the people doing exercise for <=2 days and that of people doing exercise >=6 days are significantly different with the latter class having a greater average happiness level. Although the Sample Average of the middle class is greater than that of the first class, the difference is not statistically significant.

18. EFFECT OF EXERCISE DAYS ON SELF ESTEEM

We have 3 different classes for the number of Exercise days. To check for the effect of number of exercise days on Happiness we have compared the population means of these different classes.

Hence to test:

H₀: All the Class Means are same.

H₁: At least one of them is different from the rest.

The Summary data is as follows:

Days	Self Esteem
<=2	4.71443095
3--5	4.85517241
>=6	4.86324786

And the results of the KRUSKAL WALLIS test is as follows

Classes	<=2	3--5	>=6
Rank Sum	9787.5	7813	15552.5
Count	82	58	117
Average Rank	119.4	134.7	132.9

Alpha	0.05
kw Statistic	2.048
p value	0.3592

Conclusion:As the p value is quite large we fail to reject H₀. Hence there is no effect of exercise days on one's level of Self esteem level.

19. EFFECT OF EXERCISE TIME ON HAPPINESS

We have 3 different classes for the number of Exercise time. To check for the effect of number of exercise time on Happiness we have compared the population means of these different classes.

Hence to test:

H₀: All the Class Means are same.

H₁: At least one of them is different from the rest.

The Summary data is as follows:

Time	Happiness
0--30	4.571104
30--60	4.706561
above 60	5.012143

And the results of the KRUSKAL WALLIS test is as follows

Classes	0--30	30--60	above 60
Rank Sum	15422	12894.5	6133.5
Count	132	95	35
Average Rank	116.8	135.7	175.2

Alpha	0.05
kw Statistic	16.767
p value	0.0002

Comparison	Pair wise Diff.	Critical Value	Diff?
0—30 - 30--60	18.90	23.90	No
0—30 - above 60	58.41	33.77	Yes
30—60 - above 60	39.51	35.12	Yes

Conclusion : As the p-value is quite small we reject H₀ I.o.s and by pair wise comparison we come to know that the average happiness level of people in the class above 60 is greater than that of people in the class 0—30. And the average happiness levels of the people in the classes 30-60 and above 60 are also significantly different with the latter having a greater average happiness level. Hence there is an increasing pattern observed of Happiness with exercise time per day.

20. EFFECT OF EXERCISE TIME ON SELF ESTEEM

We have 3 different classes for the number of Exercise time. To check for the effect of number of exercise time on Self Esteem we have compared the population means of these different classes.

Hence to test:

H₀: All the Class Means are same.

H₁: At least one of them is different from the rest.

The Summary data is as follows:

Time	Average Self Esteem
0--30	4.694066
30--60	4.86386
above 60	5.048571

And the results of the KRUSKAL WALLIS test is as follows

Classes	0--30	30--60	above 60
Rank Sum	15850.5	13180	5422.5
Count	132	95	35
Average Rank	120.1	138.7	154.9

Alpha	0.05
kw Statistic	7.210
p value	0.0272

Comparison	Pair wise Diff.	Critical Value	Diff?
0--30-30--60(SE)	18.66	23.90	No
0--30-above 60	34.85	33.77	Yes
30--60(SE)-above 60	16.19	35.12	No

Conclusion:

As the p-value is quite small we reject H_0 at 5% l.o.s. By pair wise comparison it is revealed that the average self esteem levels of the people in the classes 0-30 and above 60 are significantly different with the latter class having a greater self esteem level hence here too we observe an increasing pattern of self Esteem with Exercise Time per day.

21. EFFECT OF SEDENTARY HOURS ON HAPPINESS

We have 3 different classes for the number of sedentary hours. To check for the effect of number of sedentary hours on Happiness we have compared the population means of these different classes.

Hence to test:

H_0 : All the Class means are same.

H_1 : At least one of them is different from the rest.

The Summary data is as follows:

SEDENTARY HOURS	AVERAGE HAPPINESS SCORE
<=4	4.624484
4--8	4.604369
>8	4.704268

And the results of the KRUSKAL WALLIS test are as follows:

Classes	<=4	4--8	>8
Rank Sum	6026	10410.5	4473.5
Count	60	103	41
Average Rank	100.4	101.1	109.1

Alpha	0.05
kw Statistic	0.648
p value	0.7234

CONCLUSION

As the p value is quite large we fail to reject H_0 . Hence there is no effect of Sedentary Hours on one's level of Happiness.

22EFFECT OF SEDENTARY HOURS ON SELF ESTEEM

We have 3 different classes for the number of sedentary hours. To check for the effect of number of sedentary hours on Self Esteem we have compared the population means of these different classes.

Hence to test:

H_0 : All the Class Means are same.

H_1 : At least one of them is different from the rest.

The Summary data is as follows:

SEDENTARY HOURS	SELF ESTEEM
<=4	4.711944
4--8	4.750647
>8	4.68916

And the results of the KRUSKAL WALLIS test is as follows

Classes	<=4	4--8	>8
Rank Sum	6053.5	10817.5	4039
Count	60	103	41
Average Rank	100.9	105.0	98.5

Alpha	0.05
kw Statistic	0.420
p value	0.8106

CONCLUSION

As the p value is quite large we fail to reject H_0 . Hence there is no effect of Sedentary Hours on one's level of Self Esteem.

23. EFFECT OF NUMBER OF HOBBIES ON HAPPINESS

We have 2 different classes for the number of Number of Hobbies. To check for the effect of number of hobbies on Happiness we have compared the population means of these two classes.

Hence to test:

H_0 : The two Class Means are same.

H_1 : The two Class Means are not same.

The Summary data is as follows:

No. of Hobbies	Self esteem
1--4	4.666517857
above 4	4.696560847

And the result of the STUDENT'S T test is as follows:

t-Test: Two-Sample Assuming Unequal Variances

	No. of Hobbies <=4	No. of Hobbies >4
Mean	4.666517857	4.696560847
Variance	0.393180934	0.481793537
Observations	208	63
Hypothesized Mean Difference	0	
df	95	
t Stat	-0.307623015	
P(T<=t) one-tail	0.379521302	
t Critical one-tail	1.661051818	
P(T<=t) two-tail	0.759042604	
t Critical two-tail	1.985250956	

As the p value is quite large we accept H_0 . The population Mean Happiness Scores of the people having number of hobbies between 1-4 and Above 4 are the same.

24. EFFECT OF NUMBER OF HOBBIES ON SELF ESTEEM

We have 2 different classes for the number of Number of Hobbies. To check for the effect of number of hobbies on Self Esteem we have compared the population means of these two classes.

Hence to test:

H1: The two Class Means are same.

H2: The two Class Means are not same.

The Summary data is as follows:

No. of Hobbies	Self Esteem
1--4	4.751228654
above 4	4.852028215

And the result of the STUDENT'S T test is as follows:

t-Test: Two-Sample Assuming Unequal Variances

	<i>No. of Hobbies <=4</i>	<i>No. of Hobbies >4</i>
Mean	4.751229	4.852028215
Variance	0.557216	0.5276815
Observations	208	63
Hypothesized Mean Difference	0	
df	105	
t Stat	-0.9587	
P(T<=t) one-tail	0.169956	
t Critical one-tail	1.659495	
P(T<=t) two-tail	0.339912	
t Critical two-tail	1.982815	

As the p value is quite large we accept H_0 . Hence The Population Mean Self Esteem Scores of the people having number of hobbies in the range 1-4 and above 4 are the same.

25. EFFECT OF AGE ON HAPPINESS

We have 7 different classes for the age. To check for the effect of age on Happiness we have compared the population means of these different classes.

Hence to test:

H1: All the Class Means are same.

H2: At least one of them is different from the rest.

The Summary data is as follows:

Age	Average Happiness
10-20	4.513978495
20-30	4.648584906
30-40	4.643292683
40-50	4.522460317
50-60	4.869642858
60-70	4.8375
Above 70	5.158333333

And the results of the KRUSKAL WALLIS test is as follows

Classes	10-20	20-30	30-40	40-50(h)	50-60	60-70	Above 70
Rank Sum	3572.5	6801.5	5255	7181.5	6162	3345.5	2924
Count	31	53	41	63	40	22	15
Average Rank	115.2	128.3	128.2	114.0	154.1	152.1	194.9

Alpha	0.05
kw Statistic	19.937
p value	0.0028

Comparison	Pair wise Diff.	Critical Value	Diff?
10-20 AND 20-30	13.09	51.10	No
10-20 AND 30-40	12.93	53.79	No
10-20 AND 40-50(h)	1.25	49.58	No
10-20 AND 50-60	38.81	54.08	No
10-20 AND 60-70	36.83	63.00	No
10-20 AND Above 70	79.69	71.08	Yes
20-30 AND 30-40	0.16	47.00	No

20-30 AND 40-50(h)	14.34	42.12	No
20-30 AND 50-60	25.72	47.33	No
20-30 AND 60-70	23.74	57.32	No
20-30 AND Above 70	66.60	66.09	Yes
30-40 AND 40-50(h)	14.18	45.35	No
30-40 AND 50-60	25.88	50.22	No
30-40 AND 60-70	23.90	59.73	No
30-40 AND Above 70	66.76	68.19	No
40-50(h) AND 50-60	40.06	45.69	No
40-50(h) AND 60-70	38.08	55.97	No
40-50(h) AND Above 70	80.94	64.93	Yes
50-60 AND 60-70	1.98	59.99	No
50-60 AND Above 70	40.88	68.42	No
60-70 AND Above 70	42.87	75.67	No

Conclusion

As p value is quite small we reject H_0 . It is shown by pair wise comparison of the population means that the average happiness level of the people in the age group above 70 is significantly greater than that of the people in the age group 10—20, and 20-30, and also for 40-50. I.e. **hence one can say that older people have greater happiness level than younger people.**

26. EFFECT OF AGE ON SELF ESTEEM

We have 7 different classes for the age. To check for the effect of age on Self Esteem we have compared the population means of these different classes.

Hence to test:

H_0 : All the Class Means are same.

H_1 : At least one of them is different from the rest.

The Summary data is as follows:

Age	Average Self Esteem
10-20	4.384229391
20-30	5.536111107
30-40	4.857639
40-50	4.767283952
50-60	4.8875
60-70	5.081818182
Above 70	5.3

And the results of the KRUSKAL WALLIS test is as follows

Classes	10-20	20-30	30-40	40-50(se)	50-60	60-70	Above 70
Rank Sum	2951	6139.5	5749	8319.5	5712.5	3556.5	2817
Count	31	53	41	63	40	22	15
Average Rank	95.19	115.84	140.22	132.06	142.81	161.66	187.80

Alpha	0.05
kw Statistic	21.974
p value	0.0012

Comparison	Pair wise Diff.	Critical Value	Diff?
10-20-20-30	20.65	51.10	No
10-20-30-40	45.03	53.79	No
10-20-40-50	36.86	49.58	No
10-20-50-60	47.62	54.08	No
10-20-60-70	66.47	63.00	Yes
10-20-Above 70	92.61	71.08	Yes
20-30-30-40	24.38	47.00	No
20-30-40-50	16.22	42.12	No
20-30-50-60	26.97	47.33	No
20-30-60-70	45.82	57.32	No
20-30-Above 70	71.96	66.09	Yes
30-40-40-50	8.16	45.35	No
30-40-50-60	2.59	50.22	No
30-40-60-70	21.44	59.73	No
30-40-Above 70	47.58	68.19	No
40-50-50-60	10.76	45.69	No
40-50-60-70	29.60	55.97	No
40-50-Above 70	55.74	64.93	No
50-60-60-70	18.85	59.99	No
50-60-Above 70	44.99	68.42	No
60-70-Above 70	26.14	75.67	No

CONCLUSION

As p value is quite small we reject H_1 . It is shown by pair wise comparison of the population means that the average self esteem level of the people in the age group above 70 is significantly greater than that of the people in the age group 10—20, and 20-30. And also the average self esteem level of people in the age group 60-7- is significantly higher than that of the people in the age group 10-20. **Hence one can say that older people have greater self esteem than younger people.**

27. EFFECT OF WORKING HOURS ON HAPPINESS

We have 2 different classes for the working hours. To check for the effect of working hours on Happiness we have compared the population means of these different classes. Hence to test:

H_0 : The two Class Means are same.

H_1 : The two Class Means are not same.

The Summary data is as follows:

Working Hours	Happiness Score
0-8	4.667647059
Above 8	4.658571429

The results of the STUDENT'S T test is as follows

t-Test: Two-Sample Assuming Unequal Variances

<i>Class</i>	<i>0-8</i>	<i>Above 8</i>
Mean	4.667647059	4.658571429
Variance	0.349908088	0.395617526
Observations	85	98
Hypothesized Mean Difference	0	
df	180	
t Stat	0.100509082	
P(T<=t) one-tail	0.460026017	
t Critical one-tail	1.653363014	
P(T<=t) two-tail	0.920052034	
t Critical two-tail	1.973230782	

CONCLUSION:

- As the p value is quite large we accept H_0 .

- The Population Mean Happiness Scores of the people of working hours between 0-8 and Above 8 are equal.

28. EFFECT OF WORKING HOURS ON SELF ESTEEM

We have 2 different classes for the working hours. To check for the effect of working hours on Self Esteem we have compared the population means of these different classes. Hence to test:

H₀: The two Class Means are same.

H₁: The two Class Means are not same.

The Summary data is as follows:

Working Hours	Self Esteem Score
0-8	4.787973856
Above 8	4.76252839

The results of the STUDENT'S T test is as follows

t-Test: Two-Sample Assuming Unequal Variances

CLASSES	0-8 (hrs.)	Above 8 (hrs.)
Mean	4.787973856	4.76252839
Variance	0.506584985	0.594359986
Observations	85	98
Hypothesized Mean Difference	0	
df	180	
t Stat	0.232045369	
P(T<=t) one-tail	0.408383189	
t Critical one-tail	1.653363014	
P(T<=t) two-tail	0.816766378	
t Critical two-tail	1.973230782	

CONCLUSION

As the p value is quite large we accept H₀. The Population Mean Self Esteem Scores of the people of working hours between 0-8 and Above 8 are the same.

29. EFFECT OF NUMBER OF STRESSES ON HAPPINESS

We have 2 different classes for the number of stresses. To check for the effect of number of stresses on Happiness we have compared the population means of these different classes.

Hence to test:

H₀: The two Class Means are same.

H₁: The two Class Means are not same.

The Summary data is as follows:

NO. OF STRESS	HAPPINESS
0-2	4.732967914
Above 2	4.520466406

And the results of the STUDENT'S T test is as follows

t-Test: Two-Sample Assuming Unequal Variances

Classes	0-2	Above 2
Mean	4.732967914	4.520466406
Variance	0.413806332	0.503420047
Observations	187	73
Hypothesized Mean Difference	0	
df	121	
t Stat	2.226516291	
P(T<=t) one-tail	0.013915171	
t Critical one-tail	1.65754432	
P(T<=t) two-tail	0.027830342	
t Critical two-tail	1.979763738	

CONCLUSION

- As the p value is quite small (less than 0.05) we reject H₀
- The Population Mean Happiness of the people having number of stresses between 0-2 and Above 2 are not same hence people having fewer number of stresses (<2) are happier.

30. EFFECT OF NUMBER OF STRESSES ON SELF ESTEEM

We have 2 different classes for the number of stresses. To check for the effect of number of stresses on Self Esteem we have compared the population means of these different classes.

Hence to test:

H_0 : The two Class Means are same.

H_1 : The two Class Means are not same.

The Summary data is as follows:

NO. OF STRESS	SELF ESTEEM
0-2	4.792275697
Above 2	4.709741311

And the results of the STUDENT'S T test is as follows

t-Test: Two-Sample Assuming Unequal Variances

CLASS	0-2	Above 2
Mean	4.792275697	4.709741311
Variance	0.561988666	0.576042318
Observations	187	73
Hypothesized Mean Difference	0	
df	130	
t Stat	0.790671067	
P(T<=t) one-tail	0.215288008	
t Critical one-tail	1.656659413	
P(T<=t) two-tail	0.430576016	
t Critical two-tail	1.978380378	

CONCLUSION

- As the p value is quite large we accept H_0 .
- The population means of Self Esteem of the people having number of stresses between 0-2 and above 2 are equal.

CORRELATION BETWEEN HAPPINESS AND SELF ESTEEM

Does one have to be happy to have high self-esteem and does one have to have high self-esteem to be happy? In order to answer this question, we estimated the correlation coefficient between these two variables.

The value of the correlation coefficient obtained is **0.520301**, and the following is the procedure for testing its significance.

Let 'r' be the population correlation coefficient between the level of Happiness variable and level of self esteem variable.

Hence to test,

Let $H_0: r=0$

Against $H_1: r>0$

By using the test statistic for the significance of the correlation mentioned earlier we have the following result:

correlation coefficient	10.08511179
df	272
Test statistic value	10.0482374
p value	1.03988E-20

Conclusion:

As the p value is very small (almost equal to zero), we reject H_0 . Hence the correlation coefficient obtained is very significant, **which implies that happiness and self esteem are moderately positively correlated**. Hence an increase in one variable is associated with an increase in the other variable.

CONCLUSIONS

1. Gender has no effect on one's happiness as well as self esteem.
2. It was found that height has a significant effect on one's happiness as well as self esteem for the case of females. For males the effect observed in the sample was not statistically significant.
3. BMI has no significant effect on one's happiness and self esteem levels.
4. Family income has no significant effect on happiness but for the case of self esteem an increase in the family income of an individual was associated with an increase in self esteem level of the individual.
5. Qualification has the same function as that of family income i.e. it has no significant effect on one's happiness but self esteem of a person does increase when his/her the level of education increases.
6. Profession also has no effect on one's happiness and self esteem levels.
7. Working hours has no significant effect on both the happiness and self esteem levels.
8. No. Of Exercise days has a significant and positive effect on one's happiness level but not on self esteem level.
9. Exercise time per day has a significant positive effect on both the happiness and self esteem levels.
- 10.No. Of family members is found to be associated negatively with happiness as well as self esteem levels.
- 11.No. Of hobbies has no significant effect on both the happiness and self esteem levels.

12. The No. Of stresses one has affect one's happiness negatively. i.e. as the no. Of stresses increases the happiness decreases. Self esteem is found invariable to the no. Of stresses one has.
13. As the No. Of close friends of an individual increase the happiness and self esteem levels increase in a logarithmic pattern.
14. People of age group greater than 60 were found to be happier and having higher self esteem than those in the age group 17—50.
15. No. Of Sedentary hours has no significant effect on one's happiness and self esteem levels.
16. Happiness and self esteem are moderately positively correlated hence an increase in one of the two levels increases the other.

LIMITATIONS & SCOPE

- Data collection was one of the biggest challenges and limitations in front of us. In the first phase of data collection, most of the people did not return the questionnaires that were given to them.
- The length of the questionnaire is such that though it is interesting but people tend to miss a number of important questions in between.
- In a number of cases we got a feedback that people tend to pose an image that is not exactly theirs. This tendency in a way kills the soul of our research.
- A likert scale with more number of points would produce results which are more visual for interpretation.
- The effect of a number of other relevant factors like marital status could also be checked.