The Relationship Between Height,Weight and Appliedforce

By

Oktay Doğanyıldız

In this report, after giving various results from 8,9,10 chapters about weight and height, I will examine the relationship of students's height and weight with their applied forces.

Human height, weight varies according to both nature and nurture. I will examine the affects of these changes with the forces of students.

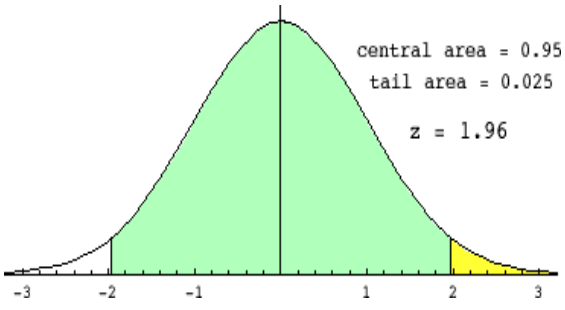
In regression analysis, contains the data regarding the heights, weights and applied force of the people.Datas were taken by the students of Marmara University. This research provides the knowledge about the dependence of dependent factors i.e., weight and height over the independent factor i.e., applied force of a person.

***In soma cases we are assuming the datas as a normal distribitions**

95% confidence interval on the heights.

$\mu \pm z_{0.025} \cdot \frac{\sigma}{\sqrt{n}}$ = 171.31+1.96x9,47/√200 = 172.622

171.31-1.96x9,47/√200 = 169.997



$z_{0.025}$ = 1.96 (Figure 1.0)

Thus, the 99% confidence bounds are 169.997 and 172.622.
Figure 1.0

169.997< μ<172.622

90% prediction interval on a measured weights.

The 99% prediction interval for a future observation is given by

$$\mu \pm \boldsymbol{z}_{\mathbf{0.05}} \cdot \sqrt{1+\frac{1}{n}}$$

65,65+1,645x14,90(√1+1/200)=90.22

65,65-1,645x14,90(√1+1/200)=41.08

$\boldsymbol{z}_{\mathbf{0.05}}$ =1.645 (Figure 1.1)

with the bounds being 90.22 and 41.08

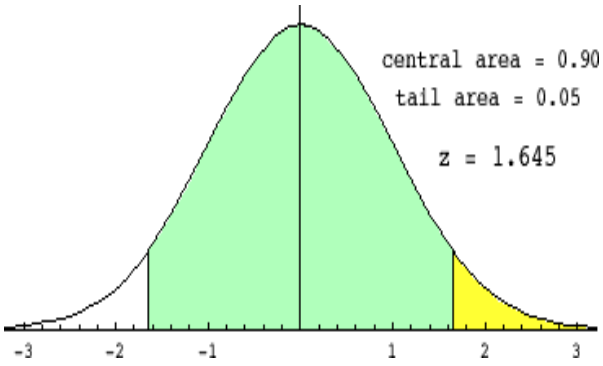


Figure 1.1

95% confidence interval for the difference of the means of applied forces male and female.

$$(\mu_1 - \mu_2) \pm z_{0.025}\sqrt{\frac{\sigma_1{}^2}{n1} + \frac{\sigma_2{}^2}{n_2}}$$

$\boldsymbol{z}_{\mathbf{0.025}}$ = 1.96 (Figure 1.0)

(82,95-52,44)+1.96√[(21.29^2/87)+(12,89^2/113)]

30,51±24,04 = **54.55, 6.47**

If we estimate that %30 of students at Marmara University are CENS students.For 0.05 level of significance, what can we say our estimate ?

H0: p = 0.30 n=200

H1: p > 0.30 CENS student = 66

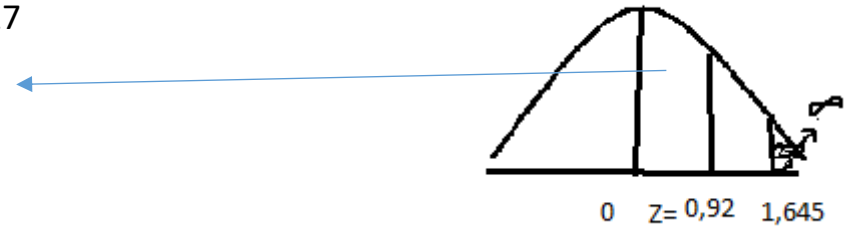
In excell,with using **''=COUNTIF(B13:B212;1)''** formula we found the number of CENS studutent.

P= 66/200 = 0,33 $z = \frac{\mu - np0}{\sqrt{\text{np0q0}}}$ $z = \frac{66-200.0.3}{\sqrt{200.0,3.0,7}}$ = 0,9

z∞=1.645

P value = P(Z>0,92) = 0,17

H0 is rejected



If we compare the applied force of left hand users males and left hand users females, at the 0.05 level of significance that the applied force left hands user males exceeds that left hands user females user by more than 30

H0: $\mu_1 - \mu_2 = 30$ $\alpha=0.05$

H1: $\mu_1 - \mu_2 > 30$ Critical Region: z> 1.645

N1=15 **N2**=12

μ1=78,57 **μ2**=47,69

S1=19,08 **S2**=12,54

DOF=15 + 12 – 2 = 25

$S_{p^2} = \frac{S_{1^2(n1-1)} + S_{2^2}(n2-1)}{n1+n2-2}$ = 273.056 **Sp=16.52**

$T = \frac{(\mu_1-\mu_2)-d0}{Sp\sqrt{\frac{1}{n1}+\frac{1}{n_2}}}$ = $\frac{28.88}{6.39} = 4.51$ **T= 4.51**

P=P(T>4.51) ≈ 0,0125 Do not reject H0

We are unable to conclude that applied force left hands user males exceeds that left hands user females user by more than 30.

Regression Analysis Part

If we examine the relationship between the applied force(the highest force they applied in 2 hand is taken into consideration) by men and women and their weights and height;

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0,603012
R Square	0,333624
Adjusted R Square	0,357163
Standard Error	18,55492
Observations	200

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	38754,6	19377,3	56,28271	0,00004
Residual	197	67824,17	344,2851		
Total	199	106578,8			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95,0%*	*Upper 95,0%*
Intercept	-112,3781	30,38807	3,6981	0,000282	172,3058	52,45045	-172,306	52,45045
Weight	0,446326	0,135669	3,289812	0,001188	0,178776	0,713876	0,178776	0,713876
Height	0,867358	0,213456	4,063415	0,006234	0,446407	1,28831	0,446407	1,28831

We use the coefficient p-values to determine which terms to keep in the regression model. In the model above, we should consider weight and height because p values<0.05. If p values>0.05 which indicates that it is not statistically significant.

R^2 for females below 20 years of age is 0.33, which indicates that about 33% of the variation on the dependent variable is explained by the predictor variable which is weak.

Independent variable the slope for the height is high, this means that as compared to other independent variable, height has stronger relationship with the dependent variable "Applied Force". Regression coefficient for height is 0.86. **This means that an increase in one rating height will cause applied force to increase by 0.86.**

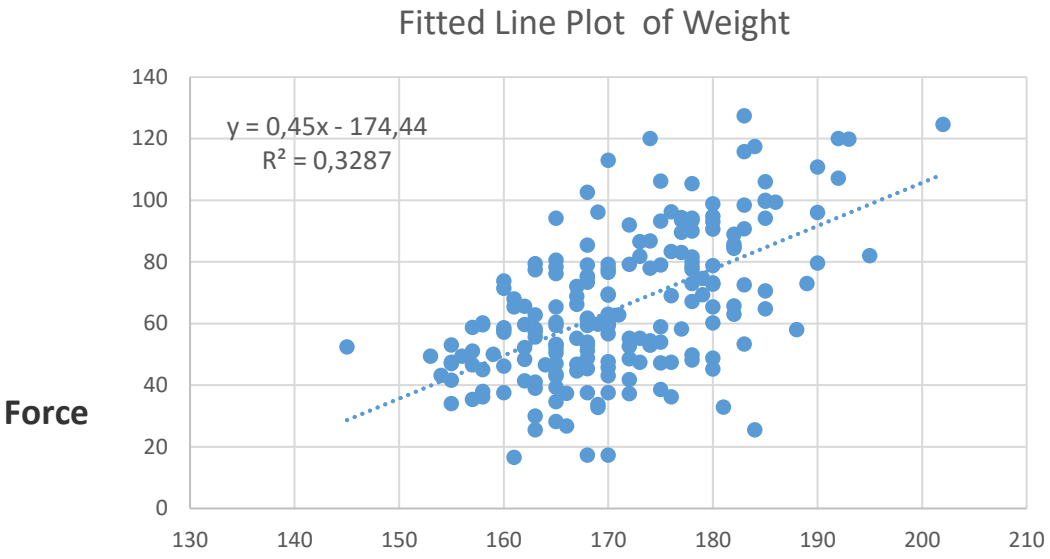


Figure 1.2

The equation shows that the coefficient for weight in meters is 0,45 The coefficient indicates that in one one rating weight ,you can expect applied force to increase by an average of 0,45

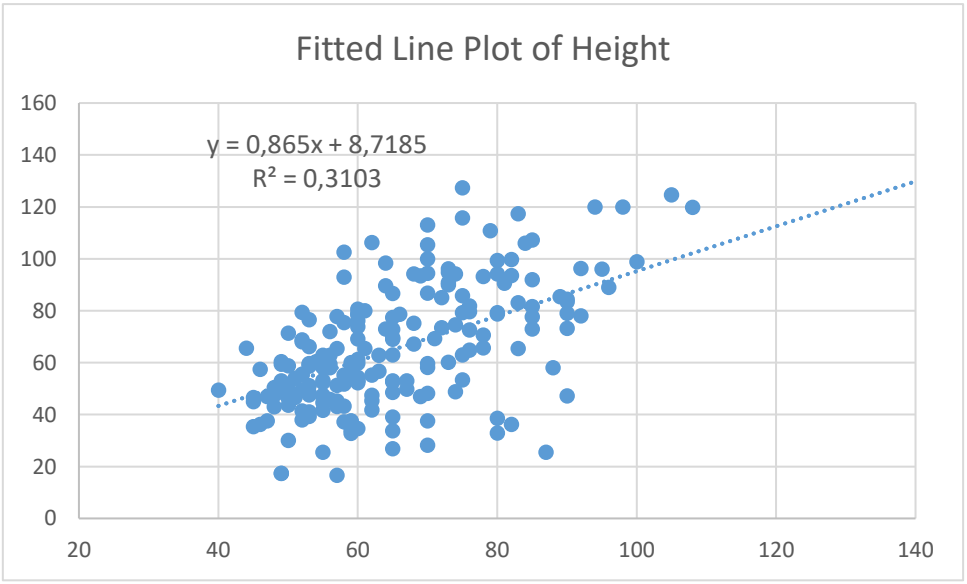


Figure 1.3

The equation shows that the coefficient for height in meters is 0,86. The coefficient indicates that in one one rating height, you can expect applied force to increase by an average of 0,86.

ANOVA One Way Test Results
Applied forces of males (Left and Right hands)

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*	*Variance*
Left hand	87	6836	78,57471	364,1868
Right hand	87	7216,5	82,94828	453,0837

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Between Groups	832,0704	1	832,0704	2,036218	0,155404	3,896092
Within Groups	70285,26	172	408,6352			
Total	71117,33	173				

H0: u1=u2
H1: At least one of the means is different

The P-value of 0.155404 is more than the significance level (0.05), so we cannot reject the null hypothesis .
F (2.036218) is greater than F crit (3.896092), so again, we cannot reject the null hypothesis.

CONCLUSIONS

The focus of the study was to determine "the relationship between height, weight and applied force . In which the independent variables were "weight" and "height", and the dependent variable was "applied force".The questionnaire administrated for the study was based on 6 items, of which 2 were related to personal data and the rest were related to the subject study "the relationship between height, weight and applied force of the human body". The sample size of the study was 200.

As a result, we have concluded that the effect of length applied force is greater than the effect of weight on applied force.

REFERENCES

1. Probability and Statistics for Engineers and Scientists by R. E. Walpole et. al., 9th edition, Pearson.
2. Statistics SCHAUM Outlines 6th edition by M. Spiegel 201