

# [Measures and scale](https://assignbuster.com/measures-and-scale/)

[Science](https://assignbuster.com/essay-subjects/science/), [Statistics](https://assignbuster.com/essay-subjects/science/statistics/)

Running Head: Measures and Scale Measures and Scale Measures and Scale Introduction Correlation coefficient measures the linear association between two variables (Ott & Longnecker, 2010). Values of the correlation coefficient are range between -1 and +1. When the correlation coefficient is +1, this means that two variables are perfectly related in a positive linear sense. A correlation coefficient of -1 indicates that the two variables are perfectly related in a negative linear sense. 0 correlation coefficient indicates that no linear relationship between the two variables. Regression analysis identifies the relationship between a dependent variable and independent variables. Various tests have been employed to determine if the regression model is satisfactory. The model is said to be satisfactory, if the estimated regression equation can predict the value of the dependent variable given values for the independent variables. The relationship between these two measures is that they analyze the extent to which variables are related. However, these two do not assess cause and effect.
Exploring the relationship between stress and blood pressure
Stress is part of normal life though too much stress can cause emotional, psychological and physical problems such as heart disease, irregular heart, chest pains and high blood pressure (Quinn & Keough, 2002). Our main concern is to study the relationship between stress and high blood pressure. We want to ascertain whether medical researchers are right with regard to stress causing high blood pressure. Let us determine the relationship of these two by using a sample of 20 patients who had their stress test score and blood readings taken. Regression and correlation is used in ascertaining the relationship as shown below:
Patient
stress score (x)
Blood pressure score (y)
(x-x1)
(Y-Y1)
(x-x1)2
(Y-Y1)2
(xi - x)(yi - y)
ŷ = 25. 1 + 0. 58x
1
20
40
-95
(51. 80)
9, 025. 00
2, 662. 52
4, 921. 00
36. 7
2
30
50
-85
(41. 80)
7, 225. 00
1, 747. 24
3, 553. 00
42. 5
3
40
60
-75
(31. 80)
5, 625. 00
1, 011. 24
2, 385. 00
48. 3
4
50
70
-65
(21. 80)
4, 225. 00
475. 24
1, 417. 00
54. 1
5
60
75
-55
(16. 80)
55\*55
282. 24
924. 00
59. 9
6
70
85
-45
(6. 80)
2, 025. 00
46. 24
306. 00
65. 7
7
80
65
-35
(26. 80)
1, 225. 00
718. 24
938. 00
71. 5
8
90
90
-25
(1. 80)
625. 00
3. 24
45. 00
77. 3
9
100
70
-15
(21. 80)
225. 00
475. 24
327. 00
83. 1
10
110
80
-5
(11. 80)
25. 00
139. 24
59. 00
88. 9
11
120
83
5
(8. 80)
25. 00
77. 44
(44. 00)
94. 7
12
130
85
15
(6. 80)
225. 00
46. 24
(102. 00)
100. 5
13
140
87
25
(4. 80)
625. 00
23. 04
(120. 00)
106. 3
14
150
90
35
(1. 80)
1, 225. 00
3. 24
(63. 00)
112. 1
15
160
92
45
0. 20
2, 025. 00
0. 04
9. 00
117. 9
16
170
94
55
2. 20
3, 025. 00
4. 84
121. 00
123. 7
17
180
100
65
8. 20
4, 225. 00
67. 24
533. 00
129. 5
18
190
140
75
48. 20
5, 625. 00
2, 323. 24
3, 615. 00
135. 3
19
200
160
85
68. 20
7, 225. 00
4, 651. 24
5, 797. 00
141. 1
20
210
220
95
128. 20
9, 025. 00
16, 435. 24
12, 179. 00
146. 9
Total
2300
1836
0
-
63, 475
31, 192. 5
36, 800
1, 836. 00
Mean (x1)
115
91. 8

Correlation
1

Regression
ŷ = b0 + b1x

b1 = Σ [ (xi - x)(yi - y) ] / Σ [ (xi - x)2]

b1=
0. 58

b0 = y - b1 \* x
25. 1

ŷ = 25. 1 + 0. 58x .

From the above workings in the table, the correlation coefficient is one. Therefore, the relationship between stress and blood pressure is a linear one. This simply means that when stress levels increase, the blood pressure also increases. The regression model is determined is fit as we were able to predict the values of blood pressure at given levels of stress.
Relationship between BMI (Kg/m2) of pregnant mothers and the birth-weight (BW in Kg) of their newborn
The following data set provide information on 6 pregnant mothers who were contacted for this study

BMI
Birth weight
(x-x1)
(Y-Y1)
(x-x1)2
(Y-Y1)2
(xi - x)(yi - y)
1
20
2. 7
-10. 83
-0. 2
117. 2889
0. 04
4. 691556
2
30
2. 9
-0. 83
0
0. 6889
0
0
3
50
3. 5
19. 17
0. 6
367. 4889
0. 36
132. 296
4
45
3
14. 17
0. 1
200. 7889
0. 01
2. 007889
5
10
2. 2
-20. 83
-0. 7
433. 8889
0. 49
212. 60556
6
30
3. 1
-0. 83
0. 2
0. 6889
0. 04
0. 027556

185
17. 4
0. 02
8. 882E-16
1120. 833
0. 94
351. 62857
mean
30. 83
2. 9

coefficient of correlation

1

b1 = Σ [ (xi - x)(yi - y) ] / Σ [ (xi - x)2]

1. 776E-17

b1=
0. 0000
0

b0 = 2. 9 - 0 \* 30. 83
0

ŷ = 2. 9

The correlation is +1, therefore a relationship which is linear exists between BMI and birth weight. Using regression analysis, it will be not possible to predict the birth weight given the BMI because the model is ŷ = 2. 9.
References
Ott, Lyman R. & Longnecker, Micheal T. (2010). An Introduction to Statistical Methods And Data Analysis. Cengage learning
Quinn, Gerry P. & Keough, Michael J. (2002). Experimental Design and Data Analysis for Biologists. Cambridge university press