

Homework simple linear regression

Pen and paper. Hypertension (Rosner, 2000)

The update to the Task Force Report on Blood Pressure Control in Children reported the observed 90th percentile of systolic blood pressure in single years of age from age 1 to 17 based on prior studies. The data for boys of an average height are given in Table 11.21.

Suppose that we seek a more efficient way to display the data and choose linear regression to accomplish this task.

Rosner Table 11.21 90th percentile of systolic blood pressure (SBP) in boys ages 1-17

Age (x)	SBP ^a (y)	Age (x)	SBP ^a (y)
1	98	10	115
2	102	11	117
3	105	12	119
4	107	13	122
5	108	14	125
6	110	15	127
7	111	16	130
8	112	17	133
9	113		

^a 90th percentile for each 1-year age group

1. Fit a regression line relating age to SBP, using the data in Table 11.21. ($\hat{SBP}_i = 97.3822 + 1.9510 * \text{age}_i$)
2. Construct an ANOVA table and test ($\alpha = 0.05$) whether age and SBP are associated. ($F = 685.9296$, reject H_0)
3. Provide a 95% CI for the parameters of the regression line. ($[95.7552; 99.0092], [1.7922; 2.1098]$)
4. What is the predicted blood pressure for an average 13-year-old boy as estimated from the regression line? (122.752)
5. Construct a 95% prediction interval for SBP for an individual with age 13. ($[119.3853; 126.1051]$)
6. Construct a 95% confidence interval for the mean of SBP at age 13. ($[121.7414; 123.7488]$)
7. Calculate the correlation coefficient. (0.9892)

Note that F and t tables can be found on Toledo, in addition to a formularium with useful formulas (Extra Content).