

Discussion 10

1. A three-month course in marketing advertises that it increase sales for the average participant. A company wants to get some evidence that the program is truly effective before sending all of its sales people, so they start by sending only 17. The sales, before and after the course in Marketing (in Thousands of Dollars) is given in the table below.

Salesperson	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Sales Before	3	8	7	10	6	7	12	7	6	8	9	7	10	7	4	5	7
Sales After	7	12	14	8	5	7	8	6	13	9	6	8	10	10	11	12	12

- (a) What kind of tests can we consider conducting to answer company's question based on the information we have? What is an assumption that is common to all of these tests?
- (b) Perform the relevant t test and bootstrap test after specifying the hypotheses and assumptions the tests are making. Also comment on how well these assumptions are met. Compare the conclusions of the tests.
- (c) Perform a sign test and the relevant Wilcoxon (with R) to test the null hypothesis that the distribution of differences is symmetric about a median of 0 ($\mu_D = 0$) and the alternative that the distribution of differences is shifted to the right of 0 ($\mu_D > 0$). Where difference is computed as $D = \text{After} - \text{Before}$. Compare the conclusions of the tests.