

A researcher wanted to compare the emergence time of two corn varieties (A and B). Seven seeds from each variety were randomly assigned to a total of 14 pots of soil. The seeds were planted at a constant depth. The number of days until each seedling emerged from the soil was recorded. The data are provided below.

<b>Variety</b>	<b>Days Until Emergence</b>						
<b>A</b>	5	5	5	6	7	7	7
<b>B</b>	5	7	7	9	9	9	21

Is there significant evidence suggesting that one variety took longer than the other to emerge?

Certain genetic lines of rats are quite active. High activity levels can make it difficult to work with rats in laboratory experiments because active rats can be difficult to pick up and handle. Researchers wanted to determine if trimming the tails of rats would decrease their activity levels. Twenty rats were available to the researchers to investigate this issue. All the rats were initially housed in one large cage. The researchers removed rats from the large cage one at a time. The researchers trimmed the tails of the first 5 rats removed from the cage. The other 15 rats were handled in exactly the same manner as the first 5 rats except that their tails were not trimmed. Upon capture and treatment (trimmed or untrimmed), each of the 20 rats was placed in its own special cage. Each of the twenty cages had sensors that would record the distance traveled by each rat within its own cage over the course of the investigation. The data collected by the sensors in each cage were summarized into one numerical measure of activity level for each rat. Higher numbers correspond to higher activity levels. The data, along with means and standard deviations for each group, are provided below.

Treatment	Activity Level	Mean	Std Dev
Trimmed	14 19 22 26 27	21.6	5.3
Untrimmed	25 27 38 44 46 49 58 59 64 63 69 70 71 79 85	56.5	17.9

a) Use the means and standard deviations provided above to conduct a two-sample  $t$ -test for this data. Compute the test statistic, the degrees of freedom, and a one-sided  $p$ -value. (You don't need to provide a conclusion or an interpretation of your  $p$ -value for this part of the problem.)

b) Looking just at the data, name one potential problem with using of a two-sample  $t$ -test for this data. Also explain how the problem could affect the  $p$ -value.

c) The researchers concluded that trimming these rats' tails caused a decrease in activity. Explain why you agree or disagree with the researchers.