A Statistical Analysis: Does weather have an effect on a person's mood?

FINAL REPORT

4-17-17

Math 2

Statistics: Spring 2017

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Project Summary:

The goal of this project is to be able to understand if weather has an impact on a person's behavior. Many times people are upset for no apparent reason and our group wants to understand whether or not sunshine or rain plays a toll on a person's behavior.

A precise and concise statement of the question in which our group wants to answer?

Does weather play a factor on a person's mood?

The type of data we collected:

As a group, we formulated a series of questions and put them together as short survey. We selected two specific days with different types of weather and had people fill out our survey and recorded the data.

Our survey:

1. Are you male or female?

2. How many hours of sleep did you get last night?

3. Was your sleep last night generally good/terrible/alright?

5. How would you rate your mood today? 1 being really upset whereas 5 is happy.

6. What would you consider the weather to be like today? (There will be 5 options going from 0-4) (0- terrible, 1-bad, 2-fair, 3-good, 4-excellent)

7. How hot do you think it is today?

****Note**** There are seven questions above, but the important question is question #5: How would you rate your mood today? 1 being really upset whereas 5 is happy.

How our survey was conducted:

In order to collect data, we provided snacks as an incentive. We positioned ourselves in high-traffic areas on Columbia College Campus. The locations we chose were: In front of the Library, In the upper level of the Manzanita building, and inside the Math Lab. A poster was made to get our message out to students and teachers passing by that read: Free Candy. “Just take a quick survey”. We set out a display of the snacks we had and a sample of the survey next to the sign to show our participants that it was indeed a short survey. We used the same strategy on both days of our survey in order to avoid bias. On day 1 we conducted our survey from 10:00 to 12:30. On day 2 we conducted our survey 7:40 to 12:00.

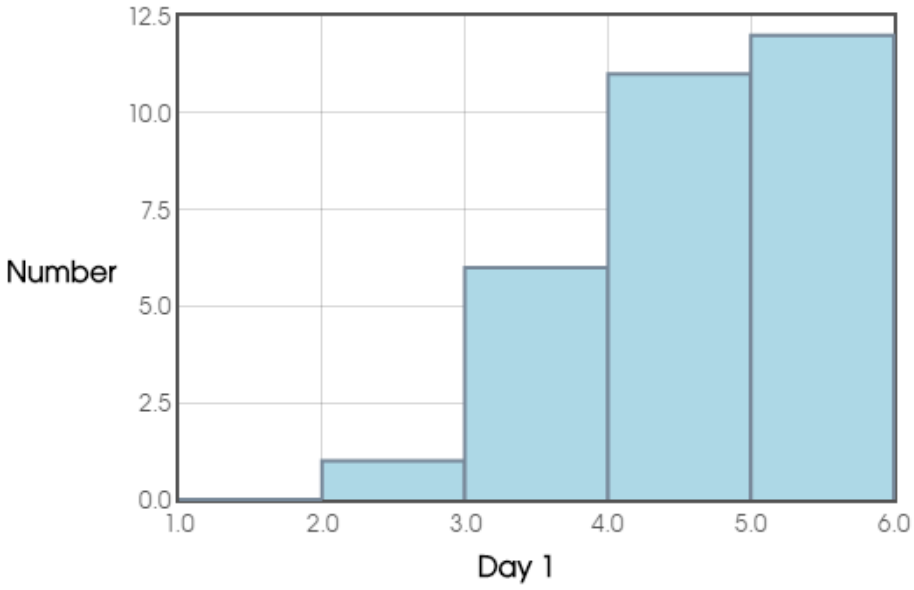
Weather conditions on Day 1: 65-69 degrees Fahrenheit. No wind. No overcast.

Weather conditions on Day 2: 50-55 degrees Fahrenheit. Rained from 7:00 to 9:00. Cloudy skies.

Day 1 Results: The following is a summary of the self- reported mood score for Day1.

Number of Data Points: $n = 30$

Mean:	$\overline{x} = 4.133333333333334$
Standard Deviation:	$s = 0.8603661343041528$
Minimum:	Min$= 2$
1st Quartile:	$Q_1 = 4$
Median:	$M = 4$
3rd Quartile:	$Q_3 = 5$
Maximum:	Max$= 5$

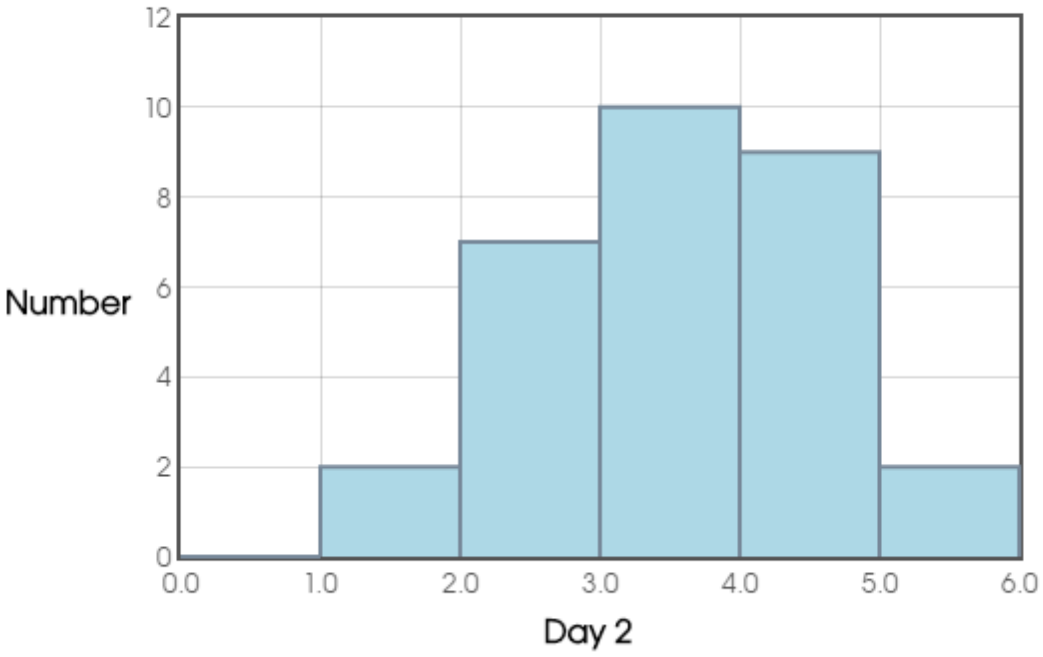


Above we see a **left-skewed** distribution with a **mean self-reported mood score of 4.133 for day 1.**

Day 2 Results: The following is a self-reported mood score for day 2.

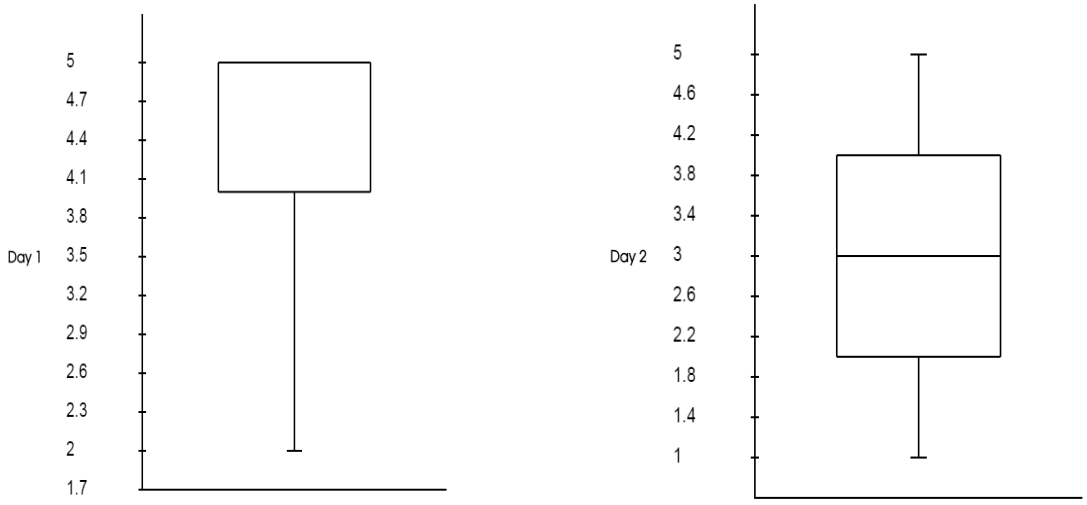
Number of Data Points: $n = 30$

Mean:	$\overline{x} = 3.066666666666667$
Standard Deviation:	$s = 1.048260737942924$
Minimum:	Min$= 1$
1st Quartile:	$Q_1 = 2$
Median:	$M = 3$
3rd Quartile:	$Q_3 = 4$
Maximum:	Max$= 5$



Above we see a **normal shaped** distribution with a **mean self reported mood score of 3.066.**

Day 1 **Day 2**



Conditions of inference: The conditions of inference for using the two sample T test are: Data must be drawn from and SRS, the samples must be independent, and be similar shaped distributions. Our data meets conditions for an SRS due to the fact that we were not in charge of selecting our participants. Also our data meets the condition of independence because our samples have no effect on each other. Even though we have two distributions with different shapes, we believe that our sample size is large enough to justify the use of the 2 sample T procedures and rely upon the results. (Moore. Notz. Flinger. 487)

Null Hypothesis:	$H_0 : \mu_1 = \mu_2$
Alternative Hypothesis:	$H_a : \mu_1$ # μ_2
Level of Significance:	$\alpha =$ 0.05

Calculate

Sample Sizes:	n_1 =30	n_2 =30
Sample Means:	$\bar{x}_1$ =4.133	$\bar{x}_2$ =3.067
Sample Standard Deviations:	s_1 =0.86	s_2 =1.048
Degrees of Freedom:	df =55	
Critical t Value:	t^* =1.67303	
90% Confidence Interval:	(0.652, 1.481)	
t statistic:	t =4.308	
p value:	p =0	

Interpretation: Assuming that $\mu_1 = \mu_2$, the probability of seeing a test statistic as far out as $t = 4.308$ is 0.

Conclusion:

Reject the null hypothesis. $(0 = p < \alpha = 0.10)$

Note above is the P score given by Holt.blue statistical software suite. Using a TI-84 calculator we found the true P Score of **0.00015334292.**

Conclusion:

After conducting this experiment we found that our data does, in fact, provide significant evidence, rejecting our null hypothesis that μ1 **= μ2**. In other words, we were able to find supporting evidence that leads us to believe that weather could have an effect on a person's mood.

References:

1. Moore. Notz. Flinger. *The Basic Practice of Statistics: 7th Edition.* New York. Freeman. 2015. Print.
2. http://holt.blue/Math_2/Resources/Stats_Suite/two_sample_t_test.html
3. Texas Instruments TI-84 Calculator
4. Android Weather App.