

STAT 110: Practice Problem 19

Fall 2017

1. Researchers at the University of South Alabama compared the attitudes of male college students toward their fathers with their attitudes toward their mothers. Each of a sample of 13 males was asked to complete the following statement about each of their parents: My relationship with my father (mother) can best be described as (1) Awful, (2) Poor, (3) Average, (4) Good, or (5) Great. The data (shown below) can be found in the file **Parents_Attitudes.JMP**.

	Student	Attitude toward Father	Attitude toward Mother	Difference
1	1	2	3	-1
2	2	5	5	0
3	3	4	3	1
4	4	4	5	-1
5	5	3	4	-1
6	6	5	4	1
7	7	4	5	-1
8	8	2	4	-2
9	9	4	5	-1
10	10	5	4	1
11	11	4	5	-1
12	13	5	4	1
13	13	3	3	0

Research Question: Do male college students tend to have on average more favorable attitudes towards their mothers than fathers?

- Explain why these samples are dependent.
- The research question is shown above. Carry out the formal hypothesis test to answer this question. Be sure to also check assumptions!
- By hand, verify the test statistic given by JMP.
- Construct a 95% confidence interval for the difference in means.
- In the context of the problem, interpret the confidence interval from part d.

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2. Determine whether each of the following scenarios is an example of a dependent/paired sample or an independent sample. Explain your reasoning.
 - a. Is autism marked by different brain growth patterns in early life, even before an autistic diagnosis is made? Studies have linked brain size in infants and toddlers to a number of future ailments, including autism. One study looked at the brain sizes of 30 autistic boys and 13 non-autistic boys who all had received an MRI scan as toddlers. The whole-brain volume (in ml) was recorded for each boy.

 - b. Woo and McKenna (*British Journal of Dermatology*, 2003) investigated the effect of broadband ultraviolet B (UVB) therapy and topical calcipotriol cream used together on area of psoriasis. One of the outcome variables from the study was the Psoriasis Area and Severity Index (PASI). The PASI score of twenty subjects were measured at baseline and after eight treatments.

 - c. A researcher interviews 64 students in their freshman year and then again in their senior year to determine if their opinion has changed regarding their ideal number of children.

 - d. Some archeologists theorize that ancient Egyptians interbred with several different immigrant populations over thousands of years. To see if there is any indication of changes in body structure that might have resulted, researchers measured the breadth (measured in mm) of a random sample of male Egyptian skulls dated from 4000 B.C. and from 200 B.C. (*Ancient Races of the Thebaid*, 1905).