Stat 145, Fri 2-Apr-2021 -- Fri 2-Apr-2021
Biostatistics
Spring 2021

Friday, April 02nd 2021

Note:: Good Friday

Friday, April 2nd 2021

Wk 9, Th
Topic:: Inference on two means
Read:: Lock5 Chapter 6

On the following pages, I have included a problem (taken mostly literally) from the Lock 5 text, Chapter 6. There are five, in all, and no clues besides the problem statement and the actual data are available for deciding on a statistical procedure for addressing the question.

pooled proportion (2-proportion hyp. tests)

$H_0: p_1 - p_2 = 0$

group has no effect. $\Rightarrow$ $\hat{p}_1$ appearing different from $\hat{p}_2$ is accidental (due to randomness)

grand sample proportion

$$\bar{p} = \frac{(\text{Success count in sample 1}) + (\text{successes in sample 2})}{n_1 + n_2}$$

1. A recent study compared 298 children with Autism Spectrum Disorder to 1507 randomly selected control children without the disorder. Of the children with autism, 20 of the mothers had used antidepressant drugs during the year before pregnancy or the first trimester of pregnancy. Of the control children, 50 mothers had used antidepressant drugs. Is there a significant association between prenatal exposure to antidepressant medicine and the risk of autism?

Which of these?

1 - proportion

1 - sample mean (t)

2 - proportion

2 - sample t

matched pairs (really 1-sample t applied to difference)

hyp. test

For SE, use pooled proportion

Case (child)	(explanatory) Have autism?	(response) Mother took antidepressant?	
1	Y	N	binary cat. vars
2	N	N	
3	N	N	
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2. A story spoiler gives away the ending early. Does having a story spoiler diminish the suspense, harming enjoyment by the reader? A study investigated this question in the following way. For twelve different short stories, the researchers created created a second version containing a spoiler paragraph at the beginning that discussed the story and revealed the outcome. Both versions were read and rated on a scale from 1 to 10 (10 being the highest enjoyment rating) by at least 30 people; the overall ratings can be found in the data frame **StorySpoilers**. Is there a difference in mean overall enjoyment rating based on whether or not there is a spoiler?

Story	1	2	3	4	5	6	7	8	9	10	11	12
with spoiler	4.7	5.1	7.9	7.0	7.1	7.2	7.1	7.2	4.8	5.2	4.6	6.7
original	3.8	4.9	7.4	7.1	6.2	6.1	6.7	7.0	4.3	5.0	4.1	6.1
difference	0.9	0.2	0.5	-0.1	0.9	-	-	-				

Which of these?

1 - proportion

1 - sample mean (t)

2 - proportion

2 - sample t

matched pairs

Cases here are stories

Each story has 2 quantitative measurements (matched pairs)

3. Do males or females eat more fiber? Use the **Fiber** variable in the data frame **NutritionStudy** to estimate, at the 92% level, the difference.

Which of these?

1 - proportion

1 - sample mean (t)

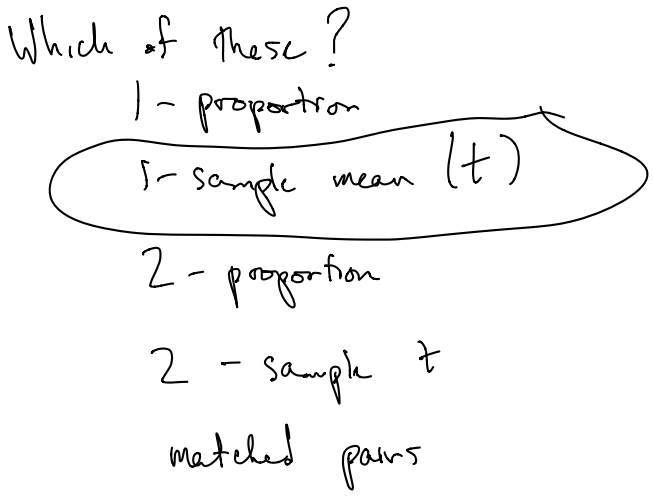
2 - proportion

2 - sample t

matched pairs

Case	Sex (expl.)	Fiber (grams) (Resp.)
1	F	
2	F	
3	M	
⋮		

4. The U.S. Food and Drug Administration has a limit for mercury content in fish of 1.0 ppm. For each lake in the **FloridaLakes** data the `AvgMercury` variable gives the average mercury level for a sample of large-mouth bass from that lake. Does it seems there is evidence that lakes in Florida, on average, have permissible mercury levels in the bass population?



5. The dataset **ICUAdmissions**, includes information on 200 patients admitted to an Intensive Care Unit. One of the variables, `Status`, indicates whether each patient lived or died (1 means the patient lived). Give a 88% confidence interval for the survivor rate.

Which of these?

1 - proportion $\hat{p}$

1 - sample mean (t)

2 - proportion

2 - sample t

matched pairs