STAT 210: Quiz #3
Points: 20
Spring 2020

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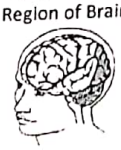
Williams-Beuren syndrome (WBS) is a rare neurodevelopmental disorder which is caused by the deletion of more than 25 genes from region q11.23 of chromosome 7. Subjects with WBS display smaller brain volumes than normal; however, they often show an excess of volume in the right occipital cortex region of the brain. There are many documented effects of WBS, e.g., increased risk of cardiac problems, higher risk of diabetes, etc. The study presented here is concerned with the left-handedness of people with WBS.

Number of Males in Study with WBS that were Left-Handed	Left-Handedness Rate for Males in the General Population
8 out of 25	12.4%

Right Occipital Cortex Region of Brain

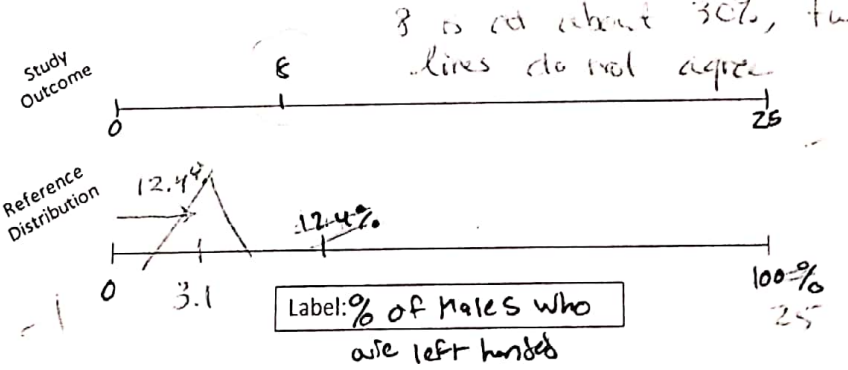


Source: Van Strien, J.W., Lagers-van Haselen, G.C, van Hagen, J.M, de Coo, I.F.M, Fens, MA, van der Geest, JN. (2005). "Increased prevalences of left-handedness and left-eye sighting dominance in individuals with Williams-Beuren syndrome." *Journal of Clinical and Experimental Neuropsychology*. 2005 Nov;27(8):967-76.

Research Question: Do males with Williams-Beuren syndrome have a greater chance of left-handedness than males in the general population?

1. Identify the smallest possible value, largest possible value, label for number line, location of the pyramid, and the outcome from the study for this situation on the number lines below. (5 pts)

- Smallest possible value
- Largest possible value
- Label for number line
- Location of pyramid
- Outcome from study



8 is at about 30%, the lines do not agree

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2. Use JMP to obtain the list of binomial probabilities and the cumulative binomial probabilities for this example. Answer the following regarding what you did in JMP (5 pts)

a. What name should be used for the sequence of numbers in the 1st column?

# of Males who are left handed

Name?	Probability Values	Cumulative Probabilites Values

b. What arguments, i.e. values, did you put in the Binomial Probability() function?

Binomial Probability (p, n, k)

and

Binomial Distribution (p, n, k)

p= .124 n= 100 (25) k= # of Males Who are left handed

3. Complete the following.

P-Value (3 pts)	P-Value = the probability of observing an outcome as extreme or more extreme than the observed outcome P-Value = 0.114 0.0085
Decision (2 pt)	Decision Rule: If the p-value less than 0.05, then the data is said to provide enough evidence for research question. ~~Data provides enough evidence for the research question~~ • Data does not provide enough evidence for research question (OK)
Conclusion (5 pts)	Write a conclusion in laymen's terms. OK The data does not provide enough evidence to say that Males with WBS have a greater chance of left handedness than males in the gen. pop. (P=0.114) (OK) With correct p-value, do have enough evidence

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