

Your Name: _____

Names of people you worked with: _____

1. What magical power would you like to have?
2. How is the data collection going, for the full dataset? What is the hardest part about collecting data?
3. Psychologist Stanley Coren has conducted several studies investigating the life expectancy of left-handers compared to right-handers, believing that the stress of being left-handed in a right-handed world leads to earlier deaths among the left-handers. In one study Coren and Halpern (1991) sent surveys to thousands of next-of-kin of recently deceased southern Californians and asked whether the person had been right-handed or left-handed. They were very careful in how they collected their data. First, they consulted a bereavement counselor who suggested that they not contact anyone unless at least 9 months had passed since the death. The counselor also suggested that they make the contact as gentle as possible and not follow up or press people for responses. The researchers also decided that they would not contact next of kin if the death had been a result of murder or suicide or if the deceased was a child age 6 or younger. They received 987 replies and found that the average age of right-handed people at death was 75 years and for left-handed people it was 66 years.¹

Scenario		Sample sizes	Sample means	Sample SDs	T score	p-value	Significant at 1% level?
1	left	99 (10% of 987)	66	15			
	right	888	75	15			
2	left	50 (5% of 987)	66	15			
	right	937	75	15			
3	left	50 (5% of 987)	66	25			
	right	937	75	25			
4	left	10 (1% of 987)	66	25			
	right	977	75	25			
5	left	99 (10% of 987)	66	50			
	right	888	75	50			

¹Taken from ISCAM Investigation 4.3; original article: Coren & Halpern (1991) at <https://pubmed.ncbi.nlm.nih.gov/2006231/>

3. Solution:

Scenario		Sample sizes	Sample means	Sample SDs	T score	p-value	Significant at 1% level?
1	left	99 (10% of 987)	66	15	5.66	0	Yes
	right	888	75	15			
2	left	50 (5% of 987)	66	15	4.13	0	Yes
	right	937	75	15			
3	left	50 (5% of 987)	66	25	2.48	0.00813	Yes, borderline
	right	937	75	25			
4	left	10 (1% of 987)	66	25	1.13	0.144	No
	right	977	75	25			
5	left	99 (10% of 987)	66	50	1.70	0.0449	No
	right	888	75	50			

When the sample size for the left handers is larger, we have more evidence against the null hypothesis (larger |t-statistics|, smaller p-values). When the sample standard deviations are larger, we have less evidence against the null hypothesis.

Scenarios 1 or 2 seem to be the most realistic as they have more a more realistic percentage of left-handers and the sample standard deviations (15) are more reasonable (the others are too large if we are expecting about 32% of data values to fall more than one standard deviation above or below the mean. We probably aren't expecting a normal distribution, but these standard deviations still feel too large).

For even the remotely realistic scenarios, the p-values were quite small indicating statistical significance. However, we can't draw any "cause-and-effect" conclusions as this was an observational study.

For those who would be in their eighties in 1991, many of them would have been encouraged to not be left-handed when they were younger. This would explain why there were fewer left-handers in the older age groups.