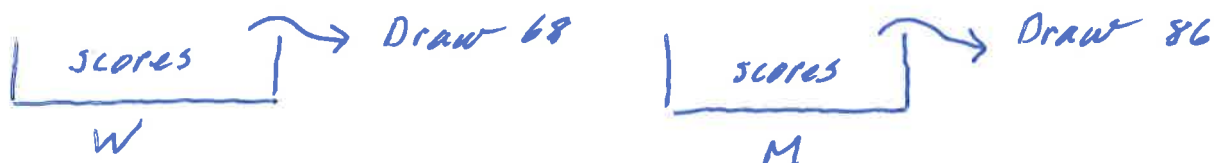


Stat 1040
Review for Quiz 10

1. Scores on the Verbal Graduate Record Examination Test were recorded. For 68 randomly selected women from a given population, the average score was 538.82 with an SD of 114.16. For 86 randomly selected men from the same population, the average score was 525.23 with and SD of 97.23. Test to see if the population average of the women is higher than that of the men for population. State the Null and Alternate Hypotheses and clearly state your conclusion.

Stat 1040
Review for Quiz 10

1. Scores on the Verbal Graduate Record Examination Test were recorded. For 68 randomly selected women from a given population, the average score was 538.82 with an SD of 114.16. For 86 randomly selected men from the same population, the average score was 525.23 with and SD of 97.23. Test to see if the population average of the women is higher than that of the men for population. State the Null and Alternate Hypotheses and clearly state your conclusion.



Null: AV for women = AV for men (no difference)

Alternate: AV for women > AV for men

Test statistic: $\frac{\text{difference in AV of draws}}{\text{SE for difference}}$

(2 sample z-test)

$$\text{SE for } W = \frac{\text{Box SD} \times \sqrt{68}}{68} \approx \frac{114.16 \sqrt{68}}{68} = 13.84$$

$$\text{SE for } M = \frac{\text{Box SD} \times \sqrt{86}}{86} \approx \frac{97.23 \sqrt{86}}{86} = 10.48$$

$$\text{SE for difference} = \sqrt{13.84^2 + 10.48^2} = 17.36$$

$$\frac{538.82 - 525.23}{17.36} = .78$$



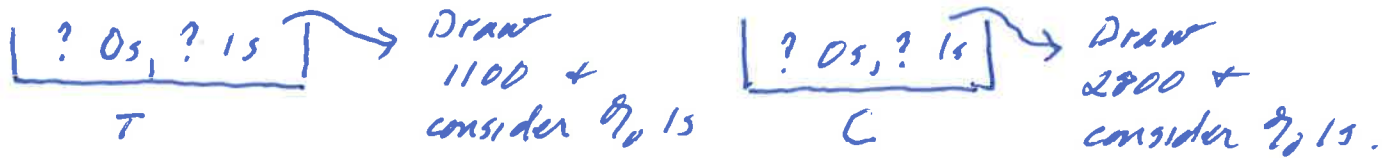
p-value $\approx 22\%$

$A(.78) \approx 56\%$

Don't reject, the difference could be just chance variation.

2. The following experiment was carried out to evaluate a drug for the prevention of heart attacks. The subjects were 3900 middle-aged men with heart trouble. Out of these men, 1,100 were randomly selected to receive the drug and the remaining 2800 were given a placebo. The subjects were followed for five years. In the group that received the drug, there were 220 deaths (20%); in the control group, there were 602 deaths (21.5%). Can the difference between the two groups be explained by chance? What do you conclude about the effect of the drug?

2. The following experiment was carried out to evaluate a drug for the prevention of heart attacks. The subjects were 3900 middle-aged men with heart trouble. Out of these men, 1,100 were randomly selected to receive the drug and the remaining 2800 were given a placebo. The subjects were followed for five years. In the group that received the drug, there were 220 deaths (20%); in the control group, there were 602 deaths (21.5%). Can the difference between the two groups be explained by chance? What do you conclude about the effect of the drug?



Null: no difference, drug is ineffective
 Alt: drug is helpful

Test statistic: $\frac{\text{difference in } \% \text{ Is}}{\text{SE for difference}}$

$$\text{SE for T} = \frac{\text{Box SD} \times \sqrt{1100}}{1100} \times 100\% \approx \frac{\sqrt{(0.20)(0.80)} \sqrt{1100}}{1100} \times 100\%$$

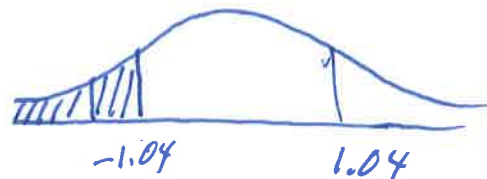
$$= 1.21\%$$

$$\text{SE for C} = \frac{\text{Box SD} \times \sqrt{2800}}{2800} \times 100\% \approx \frac{\sqrt{(0.215)(0.785)} \sqrt{2800}}{2800} \times 100\%$$

$$= .78\%$$

$$\text{SE for difference} = \sqrt{1.21^2 + .78^2} = 1.44\%$$

$$\frac{20\% - 21.5\%}{\%} = -1.04$$



$$A(1.04) = 68\% \quad p\text{-value} \approx 16\%$$

Accept the null, the drug is probably not that effective. The difference could be just chance variation.