SBS200 Exam 2 Review

Feb. 26. 2019

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Timeline

15min – review of materials
10min – solve practice questions individually
25min – go over answers and Q&A
THIS IS NOT AN ALL-INCLUSIVE REVIEW!!!

-> Students still need to review textbooks, readings, lecture PPTs, and writing/homework assignments, etc.
Seven types of studies

1) Confidence Intervals: using a sample statistic, guessing a range of the mean in the population with a level of confidence.

2) T-test: comparing means of two groups and decide the statistical significance (generalization from the sample to the population) of the difference.

3) One-way ANOVA: same with t-test, but with three or more groups/levels.
Seven types of studies

4) Two-way ANOVA: similar with one-way ANOVA, but with two independent variables. Levels of independent variable can be two or more.

5) Correlation: getting the extent to which two quantitative (continuous) variables move together.

6) Simple/multiple regression: using the correlation to predict the value of the dependent variable based on the independent variable. It could have multiple independent variables.

7) Chi Square: to test whether two categorical variables are associated.
Z-score: Why?

- Distributions often have different scales so that it is hard to compare with each other.
- e.g.) income distribution between the U.S. and European countries.
- Z-score allows distributions with all different scales to be comparable.
Z-score and raw score calculation

\[ Z - score_i = \frac{Raw \ score_i - Mean}{S.D.} \]

\[ Raw \ score_i = Mean + (Z - score_i \times S.D.) \]

This part needs to be calculated first because this is multiplication.
Characteristics of the standard normal distribution

- Mean = 0; S.D. = 1
- Total area under the curve = 1 (meaning 100% of the distribution)
- The area is **symmetrical** centering on its mean
  - The whole area of each side from the mean is 50% or 0.5
How to read the z-score table

The ones and tenths place of Z-scores

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The hundredths place of Z-scores

- e.g. z = 0.74?
  \[ z = 0.74 \]
  \[ = 1.39 \]

z = 1.39?
Finding the area under the standard normal distribution

1) Obtain z-score
2) Shade the target area
3) Read the table and give an answer
Finding the area under the standard normal distribution

1) Obtain z-score. This time it will be a negative value

2) Shade the target area

3) Read the table of the absolute value of z-score (because they are symmetric so that it will be the same area)

4) Give an answer
Finding the area under the standard normal distribution

1) Obtain z-score
2) Shade the target area
3) ① = 50% or 0.5, because it is a half
4) Obtain ② as the first type
5) Give an answer by summing ① and ② up
Finding the area under the standard normal distribution

1) Obtain z-score
2) Shade the target area
3) Obtain areas for each part as the first and second type.
4) Give an answer by summing ① and ② up
5) If absolute values of two z-scores are the same, (e.g., -2 and 2), you can obtain the area of the one part and multiply by 2
Finding the area under the standard normal distribution

1) Obtain z-score
2) Shade the target area
3) Obtain ① as the second type
4) Give an answer by subtracting ① from 0.5. It will be ②
Central Limit Theorem

As the number of observations increases,

- The sample mean will approach the population mean.
- The sampling distribution of means will be approximately normal.
- The standard error of means decreases.