MEASURES OF POSITION

Module Two
Lesson Four
Part One

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Introduction

Measures of Position (Location or Relative Standing)

- Can be used to compare data values from different data sets
- Can be used to compare data values within the same data set
- Can be used to help determine outliers within a data set

- Common measure of position is PERCENTILES or quartiles (part one) and z-(standard) scores (part two)
Percentiles

- Are position measures used in educational and health-related fields to indicate the position of an individual in a group
- Are numbers that divide the data set in 100 (“per cent”) equal-sized groups, containing 1% of the data each
- Used to compare an individual data value with the national “norm”
- Symbolized by $P_1, P_2, \ldots$
- Is interpreted as the percentage of data values that fall below the specified rank
- Can be calculated using different formulas, often times depends on the researcher
Quartiles

- Are special percentiles
- Are numbers that separate the data into quarters
- May or may not be part of the data
- Is interpreted as the percentage of data values that fall below the specified rank
  - First Quartile, $Q_1$, represents the value at which 25% of the data falls below and 75% of the data is above
  - Second Quartile, $Q_2$, is the MEDIAN and represents the value at which 50% of the data falls below and 50% of the data is above
  - Third Quartile, $Q_3$, represents the value at which 75% of the data falls below and 25% of the data is above
Interquartile Range

• Is a number that indicates the spread of the MIDDLE 50% of the data.
• Can help to determine potential outliers.

• FORMULA:  Interquartile Range (IQR) = Q₃ − Q₁
Outliers

• Is a data value that is significantly different (lower or higher) from the other data values.

• Can occur within a data set related to
  • a measurement or observational error
  • a recording error—can’t read handwriting, mistyped, recorded incorrectly,
  • a response from a participant that does not belong to the defined population
  • a legitimate response that occurred by chance

• Can influence the calculations of the measures of center and measures of variation, such as mean and standard deviation.
Outlier Guidelines

• Any data value that is less than $Q_1 - 1.5 \times IQR$
OR Any data value that is greater than $Q_3 - 1.5 \times IQR$

is considered an outlier for the data set.