Applied Statistics for the Behavioral Sciences

Chapter 5
Other Descriptive Statistics

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Combination Statistics

- Standard Scores (z scores)
- Boxplots
- Effect size index (Cohen's d) – interpretive guidelines
- Descriptive statistics report

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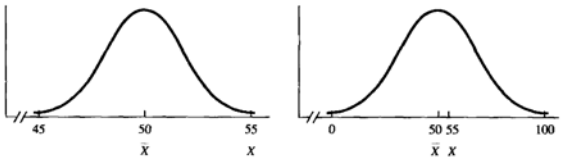
Standard Scores

- If we want to directly compare standing on measures with different scales



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Standard Scores

- Even with same mean, distributions may be very different
- standard scores: convert to common scale
- z-scores: standard scores expressed in standard deviation units

$$z = \frac{X - \overline{X}}{S}$$

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A problem

- At her recent graduation from Whassamatta U., Sarah Cerebral was tops in her class; her GPA was 4.00. Sarah's grandmother congratulated her and commented on how much smarter Sarah was than she. "Why, I was tops in my class at Whassamatta U., but my GPA was only 3.72." Representative GPAs from the two eras are given below. Determine whether there is evidence for the grandmother's claim that her granddaughter is smarter.

Sarah's class	Two generations ago
4.00	3.72
3.50	3.00
3.00	2.50
2.40	2.00

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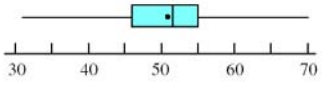
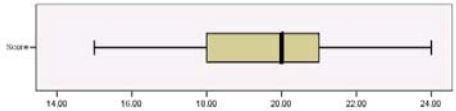
Box Plots

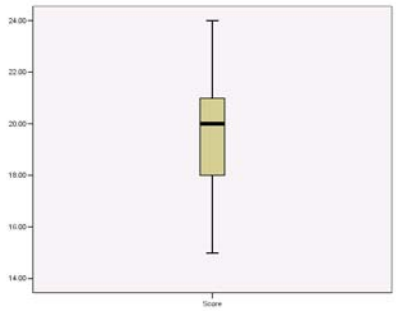
- Spatz version vs. SPSS version
- Spatz box plot: need mean, median, 25th & 75th percentiles, min & max



Personal Control scores



SPSS box plot



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Group differences

- Cohen's d
  - Gives us a systematic way of describing the magnitude of differences between groups
  - Formula for d

$$d = \frac{\left|\overline{X}_1 - \overline{X}_2\right|}{\sigma}$$

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Cohen's interpretive guidelines - d

- Small effect sizes (**d** = .2): generally effects of this magnitude are not considered "visible to the naked eye." Example: average difference in height between 15-and 16-year-old girls (about .5 in.)
- Medium effect sizes (**d** = .5): effects of this magnitude can be thought of as being "visible to the naked eye." Example: height difference between 14- and 18-year-old girls (about 1 in.)
- Large effect sizes (**d** = .8): effects at and above this point are generally grossly perceptible, representing large differences between groups. Example: height difference between 13- and 18-year-old girls

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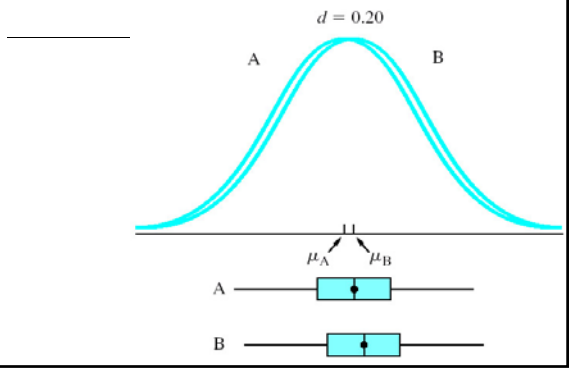
Differences between distributions



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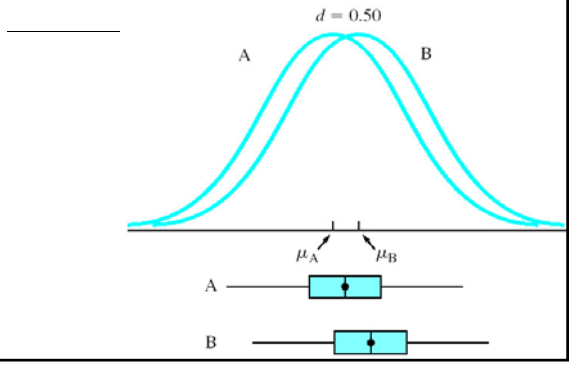

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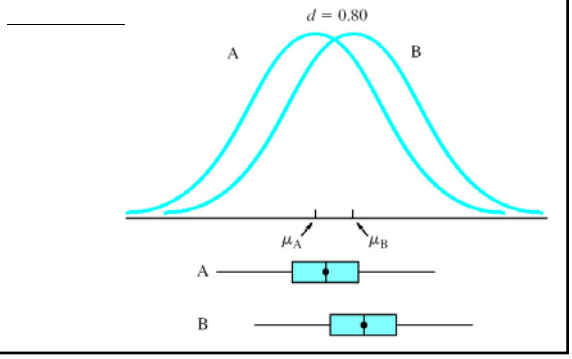

Descriptive Statistics Report

- Study of noise vs. quiet test conditions
  - Enter data and create box plots and descriptive statistics (use SPSS explore procedure)
  - Write - descriptive statistics report

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