# DATA ANALYSIS

Research Methods

Fall 2015

# DATA ANALYSIS

- What type of data do you have?
  - Quantitative
    - Surveys
    - Database information
    - Organizational data
  - Qualitative
    - Interview
    - Notes
    - Observations
    - Policies, organizational data
- Data determines type of analysis
  - Quantitative Analysis
  - Qualitative Analysis

# QUANTITATIVE ANALYSIS

- Can turn data into numbers if desired
  - Can count instances of behaviors
  - Can turn basic info into numbers
    - Male/Female, Occupation, Hometown
    - I.e. Female=1, Police officer=4, NY =2
  - Can develop numbers for code categories
    - What are the biggest issues at John Jay?
      - Tuition is too high X
      - Cafeteria food is not good
      - Books costs too much X
      - Advisors are never available
      - Not enough financial aid X
    - Could make “Financial Concerns” = “1”
  - If develop numerical code categories will need to create a **cobebook** to keep track

# QUANTITATIVE ANALYSIS

TABLE 14-3 **Nonacademic Concerns Coded as "Administrative" or "Facilities"**

| | Academic | Administrative | Facilities |
|---|---|---|---|
| Tuition is too high | | X | |
| Not enough parking spaces | | | X |
| Faculty don't know what they are doing | X | | |
| Advisors are never available | X | | |
| Not enough classes offered | X | | |
| Cockroaches in the dorms | | | X |
| Too many requirements | X | | |
| Cafeteria food is infected | | | X |
| Books cost too much | X | | |
| Not enough financial aid | | X | |

# FROM DATA TO INSIGHT: STATISTICS

- We've done our research and gathered data.

  ***Now what?***

- We can use **statistics**, *which are tools for organizing, presenting, analyzing, and interpreting data.*

## The Need for Statistical Reasoning

- A first glance at our observations might give a misleading picture.
- Value of statistics:
  1. To present a more accurate picture of our data (e.g. the scatterplot) than we could see otherwise.
  2. To help us reach valid conclusions from our data; statistics are a crucial critical thinking tool.

# QUANTITATIVE ANALYSIS

- Numerical data often analyzed using statistic software programs
  - SPSS, SAS, R

- Statistical Analyses
  - Univariate Analysis: analysis of a single variable
    - Example: mean, median, mode, frequencies, distributions
    - Frequency distribution: number of times attributes of a variable were observed in the sample
      - I.e. 51% of the sample is female
      - Gives a count or percentage to describe the sample

# Measures of central tendency

***Are you looking for just ONE NUMBER to describe a population?***

***Options:***

| Mode | Mean (arithmetic "average") | Median (middle person's score, or 50th percentile) |
| --- | --- | --- |
| • the most common level/number/ score | • the sum of the scores, divided by the number of scores | • the number/level that half of people scored above and half of them below |

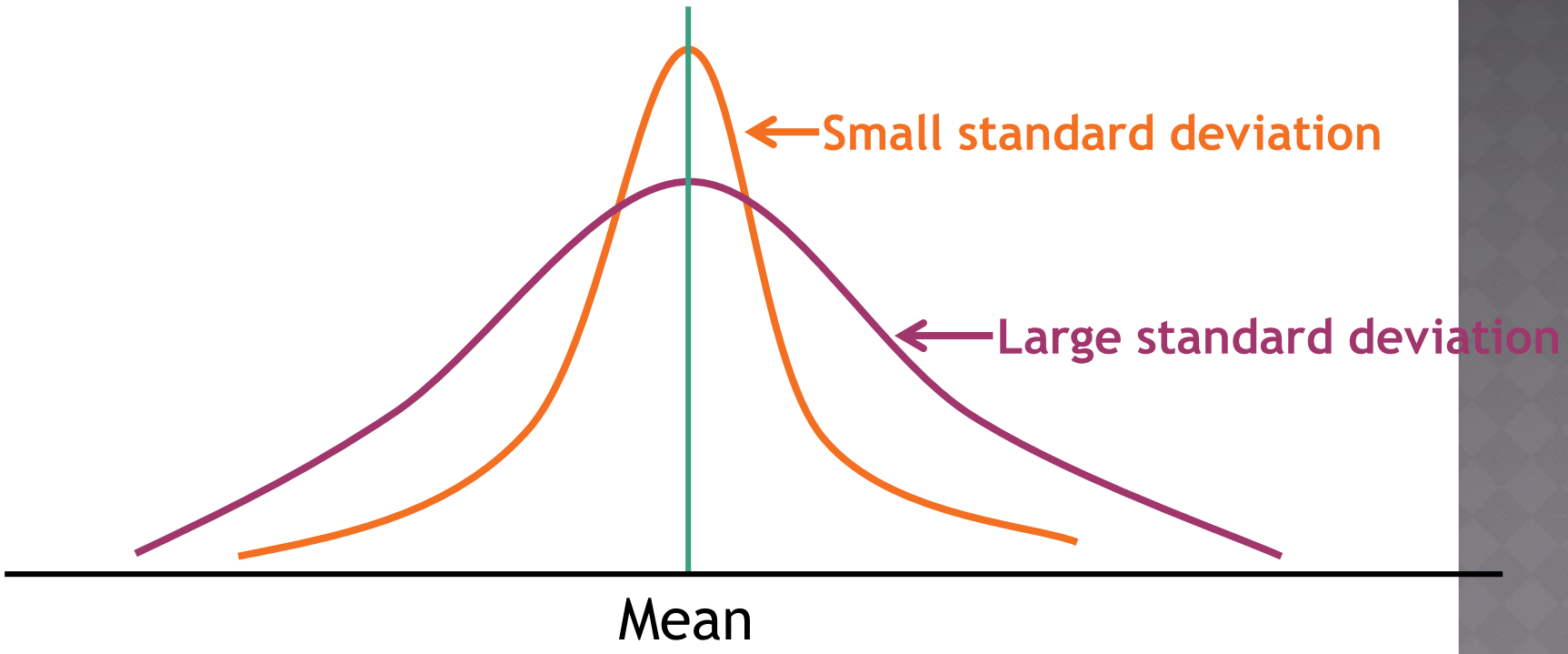
# Measures of central tendency

**Descriptive Statistics**

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|
| height | 27 | 58.00 | 75.00 | 66.8148 | 4.37684 |
| shoe | 29 | 5.50 | 14.00 | 9.0172 | 2.30869 |
| age | 28 | 18.00 | 27.00 | 20.1786 | 2.45030 |
| Valid N (listwise) | 26 | | | | |

# Measures of variation:
## *how spread out are the scores?*

- **Range:** the difference between the highest and lowest scores in a distribution
- **Standard deviation:** a calculation of the average distance of scores from the mean



# QUANTITATIVE ANALYSIS

- Univariate Analyses
  - Describes the sample
  - Example: What is the average income of the sample?
- Bivariate Analyses
  - **Focuses on relationships** between variables
  - Seeks to find relationships between variables
  - Often looking for cause/effect relationships of independent and dependent variables
  - How does education level relate to average income?
- Multivariate Analyses
  - Looks at multiple relationships between variables
  - Example: What are the effects of *age*, *gender*, and *income* on religiosity?

# QUALITATIVE ANALYSIS

- In a qualitative analysis, you do not convert data into numbers
- Can use coding methods to look for patterns and relationships: **Grounded Theory Methods (GTM)**
- Can write **Memos** to summarize data into coherent ideas; often used with GTM
- Can use **Conversational Analysis** to deeply analyze details of a conversation including pauses, silences, and utterances
- Can use **Concept Mapping**, a graphical display of concepts, codes, and their relations to illuminate patterns and theories

# QUALITATIVE ANALYSIS

- Qualitative Analysis
  - Examination and interpretation of non-numerical observations and data
  - Main goal of qualitative analysis = *Discovering Patterns*
- Grounded Theory Methods
  - Begins with observations and seeks to discover patterns
  - Uses a *constant comparative method*: always comparing cases
  - Attempting to find patterns in observations
  - Use patterns to describe larger phenomenon
- Thematic Analysis
  - A way of looking for patterns and themes in qualitative data

# CODING

- What is a code?
  - Word or phrase that describes a passage of text
  - Classifies and categorizes your data
  - A “code” tries to capture the main idea of a statement or phrase uttered by your participant

- First: Line-by-Line Coding
  - Choose word or phrase from *each line* that best captures the Main Idea

- Open Coding
  - Use 2-3 line-by-line codes to come up with a code that captures the main idea of the sentence, phrase, utterance or passage

# CODING

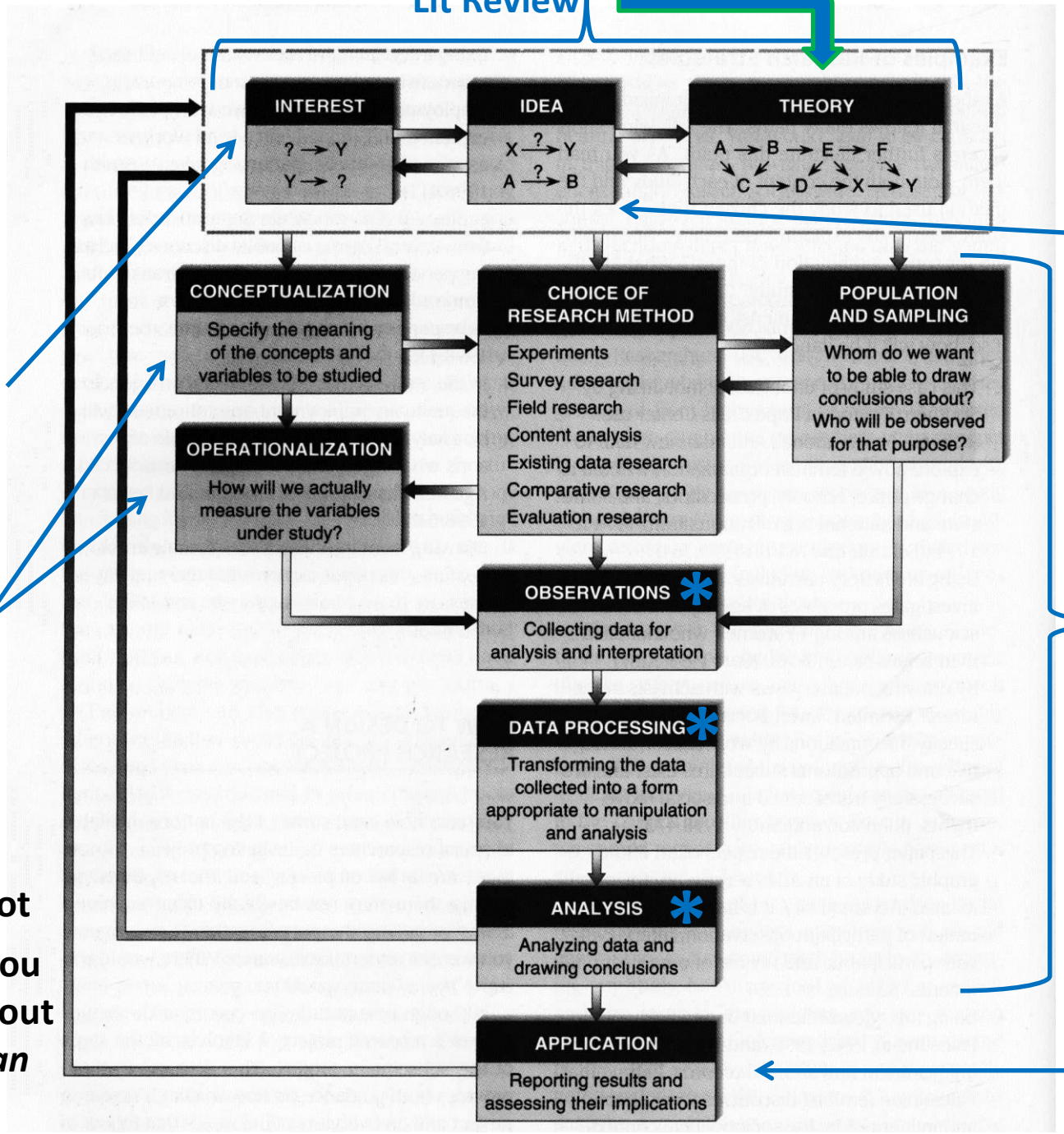
- Coding for Patterns
  - Open coding has reveals topics that are covered in your interview
  - Looking at open codes across a couple interviews you may see common ideas or topics
  - Patterns may begin to emerge

- Axial Coding
  - Once you have several interviews and you begin to see patterns in the open codes **you can begin to identify more general, unifying concepts**
  - Use code to create categories
    - CODES [politics, funding, lack of support, administration, Zero tolerance] =
    - CATEGORY [Problems with Education system]

- Other methods take transcripts and code in new and different ways

# DESIGNING A RESEARCH PROPOSAL

- Topic and Question
- Hypothesis
- Conceptualization
  - Specify the variables to be studied
- Operationalization
  - How exactly will you measure the variables?
- Choice of Research Method
  - Quantitative or Qualitative
- Population and Sampling
  - Who?
- Measurement & *Data Collection**
  - *How?*
- *Data Analysis**
  - Type of analysis
  - Focus of analysis (indicated by operationalization of variables




Research Question Paper

Topic Paper

Research Question Paper

Research Proposal: Methods Section

Research Proposal: Conclusion

* You will not do this but you will write about what you *plan to do*