



# URS 410 Urban Empirical Research

<sup>1</sup><sub>2</sub> $\Sigma$ <sub>3</sub>

- Z & T Tests
- Research Proposals



## Z & T Tests

- Determine if sampling process was proper
- Determine if two samples are different



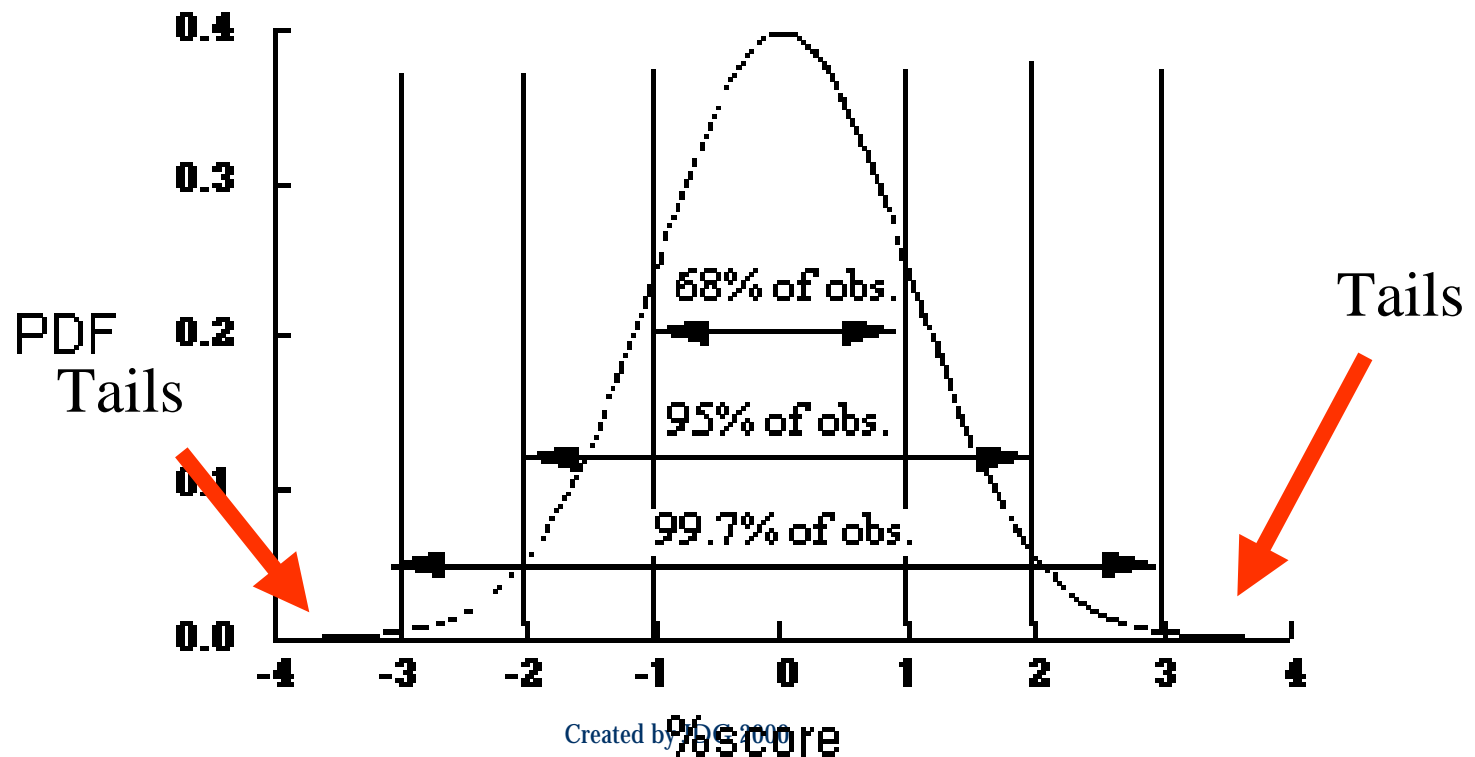
## **Statistical Significance:** Based On Normal Distribution

- A sample (or more appropriately it's standardized mean) is statistically significant based on its position within a normal distribution



Depending on  $\alpha$ , statistically significant values can only be observed in the tails of a normal bell curve

- “Tails” are located beyond 3 Std. Deviations above and below the observed mean
- Tests can stuff all of  $\alpha$  in one or two tails





## Z Test

$$Z = \frac{\bar{X} - \mu}{\sigma / \sqrt{n}}$$

$(\sigma / \sqrt{n}) =$  standard error of the estimate)

After obtaining a value, the test-score is compared to the ‘critical value’ necessary to determine significance

-See **Table F** in reserve notes



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$H_0$  = Sample was properly selected  
 $\mu$  = 2507  
 $\sigma$  = 1278  
 $\bar{X}$  = 1916  
 $N$  = 110  
 $\alpha$  = .01

$$Z = \frac{1916 - 2507}{1278 / \sqrt{110}} = \frac{-591}{121.8} = -4.85$$

(Note: Rounding makes a difference)

Critical Value = 2.325



## T-Tests

- Similar to Z-Tests
  - but includes a measure of degrees of freedom
    - $df = (n-1)$
- Can be used to test one or two samples
- The test statistic is different depending on whether...
  - the variance is unknown, but assumed to be equal to population
  - the variance is unknown, but NOT assumed to be equal to population



## T-Test: One Sample

$$t = \frac{\bar{X} - \mu}{\sigma / \sqrt{n-1}}$$

-Is 4.5% close enough to 5%

H<sub>0</sub> = 4.5% is not significantly different than 5%

$\mu$  = 5.0% (constant policy standard)

$\bar{X}$  = 4.5%

s = 1.3

N = 15

df = 14

$\alpha$  = .01

$$t = \frac{4.5 - 5.0}{1.3 / \sqrt{15-1}} = \frac{-.5}{.347} = -1.44$$

(Note: Rounding results in different number)

Critical Value = 2.624

See Table E in reserve notes  
for critical values



## Two-Sample T-Test

1. Population variance unknown, assumed to be equal

$$t = \frac{(\bar{X}_1 - \bar{X}_2)}{\sqrt{\frac{N_1 s_1^2 + N_2 s_2^2}{N_1 + N_2 - 2}} * \sqrt{\frac{N_1 + N_2}{N_1 N_2}}}$$

2. Population variance unknown, NOT assumed to be equal

$$t = \frac{(\bar{X}_1 - \bar{X}_2)}{\sqrt{\frac{s_1^2}{N_1 - 1} + \frac{s_2^2}{N_2 - 1}}}$$

3. Degrees of Freedom

$$df = N_1 + N_2 - 2$$



## Two Sample T-Test

Region 1      Region 2

$N_1 = 35$        $N_2 = 28$

$\bar{X}_1 = 10.8$        $\bar{X}_2 = 7.4$

$s_1 = 4.1$        $s_2 = 3.7$

df: 61

Assumed: 3.41

Not Assume: 3.42



## Research Proposal

Before writing a proposal it is important to understand that:

- *A PROPOSAL IS A CONTRACT*
  - it anchors subsequent research, but does not dictate it *per se*
- *RESEARCH IN PLANNING IS NOT RESEARCH IN PRACTICE*
  - sometimes research is a complete failure
- *THE MOST THOUGHTFUL RESEARCH USES A ‘GARBAGE CAN APPROACH’*
  - Ultimately, the goal is to answer the question, understand a process, or describe a phenomena as outline in a proposal
  - Sometimes called a ‘mixed methodology’



## What's In It? What Order?

### Introduction

#### 1. Introduce

- topic
- associated literature

#### 2. Road Map

- present proposal organization



## What's In It? What Order?

### Topic-Case Study Background

#### 1. What is it?

- A town, an industry
- rough demography or description

*ex: As a working class community, residents of “Y” have historically struggled to access local political power.*

#### 2. Why is it relevant?

- Rationale

*ex: By investigating anti-siting initiatives among suburban community-based organizations in Montgomery County, researchers will be better positioned to understand the many political geographies of suburban America.*



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What's In It? What Order?

## Literature: Conceptual

1. who's done similar research?

- Be sure to note the “Big Names” and “Big Articles”

2. How do they frame their analysis

- Philosophical perspective
  - do they use data to understand, class relations to explain...



## What's In It? What Order?

### **Literature: Conceptual**

3. Identify how your proposed study of “Y” fits in with previous research and perspectives

Does it come directly for the suggestions for further research offered by researchers?

4. What's your contribution or why your research is different?

A different location, a different philosophy of science



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## What's In It? What Order?

### Research Question/Objective

- Immediately after reviewing the literature, explicitly state your research question
- The research question **MUST** be ‘drawn from’ the literature review you just wrote

*for example, As Bentson's work suggests, income may not be directly related to educational attainment in some specialized populations, such as new immigrants with little capacity to speak English. This research will investigate the observable relationship between education and income among new members (less than 1 year residents of the US) of the Dayton, OH Macedonian community.*

### Hypothesis?

- State it, if you have one

*ex: Within Dayton's Macedonian community, the co-variance (correlation, to be discussed later) of income and educational attainment among new residents will not be direct.*



## What's In It? What Order?

### Methods

#### 1. Literature Review (mini-review)

- how have others done it?
  - Data Collection
  - Description, Synthesis, and/or Analysis

#### 2. Yours Methods

- How are you going to collect describe & analyze data?
  - BE EXPLICIT

*ex: Data on total value added will be obtained from the 1992 and 1997 Economic Censuses. The U.S. Census' County Business Patterns will be used to determine total March 1991 payroll for Montgomery County businesses.*



## What's In It? What Order?

### **Expected Observations, Conditions, or Outcomes**

- You expect to see “X”
  - re-state hypothesis, if you have one



## What's In It? What Order?

### Timeline

- Try to be specific, how long will it take to...
  - do background research?
  - deliver a survey?
  - do field work?
  - write up results?
  - prepare final presentation & paper?



## What's In It? What Order?

### Conclusion/Summary

- mention specific case
  - *“In Dayton, OH....”*
- mention literature & contribution
  - *“within the context of the geography of producer services...”*
- mention research question/objective
  - *‘investigates...:’*
- mention methods
  - *“based on survey results”*
- mention expected outcomes
  - *“may demonstrate that income....”*
- mention timeline
  - *“Over the next year,....”*