

Resources for Student Projects

t-Test Project Resources

Statistics
ERAU - Worldwide

EMBRY-RIDDLE
Aeronautical University
WORLDWIDE

*With thanks to
Brad Bailey, Sherry L. Hix, and Dianna Spence;
North Georgia College & State University for
the use of materials developed under
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Frequently Asked Questions

- “Where can I get data for my project?”
- “What would be a good research question?”
- “What projects have other students done?”



Sources of Data: 3 Categories

- Use data from a file that your instructor will provide
 - The easiest and fastest way given course time constraints.
- Find data on the Internet
 - Lots of good data available, but you have to find it.
- Physically go out and record data
 - e.g., measure items, time events with a stopwatch, look at prices, look at nutrition labels
 - You will learn more—but it will take more time!

1. Use Data from a File

- This will be the fastest but least rewarding way to get the data you need.
- Your instructor will tell you which files you can use and make the files available to you.
- Later modules will contain more detailed instructions on what you need to do to complete the project.

1. Use Data from a File

- Two files you can use are in the ERAU MATH 211/222 StatCrunch Group. They are:
 - Delta Airline Data
 - Southwest Airline Data
- You can also explore some of the other files in the ERAU MATH 211/222 StatCrunch Group.

2. Use Internet Data Sources

- There is a LOT of data available on the internet.
- The following five slides suggest some internet sources you might want to explore if you choose to use data from the internet for your project.
- Later modules will contain more detailed instructions on what you need to do to complete the project.

2. Use Internet Data Sources

I. Government/Community Websites

- ◉ Census Bureau:

<http://www.census.gov/>

- ◉ Bureau of Justice Statistics:

<http://bjs.ojp.usdoj.gov/index.cfm?ty=daa>

- ◉ City Data Site:

<http://www.city-data.com/>

- ◉ State and county statistics sites
- ◉ State and national Dept.'s of Education
- ◉ County tax assessment records

2. Internet Data Sources

II. Restaurants: Nutrition Info

- ◉ Applebees:

http://www.applebees.com/downloads/nutritional_info.html

- ◉ Arby's:

[http://www.arbys.com/nutrition/Arbys Nutrition Website.pdf](http://www.arbys.com/nutrition/Arbys_Nutrition_Website.pdf)

- ◉ Burger King:

http://www.bk.com/cms/en/us/cms_out/digital_assets/files/pages/NutritionInformation.pdf

- ◉ McDonalds:

<http://nutrition.mcdonalds.com/nutritionexchange/nutritionfacts.pdf>

- ◉ Ruby Tuesday's:

<http://www.rubytuesday.com/assets/menu/pdf/informational/nutrition.pdf>

- ◉ Your favorite place to eat?

2. Internet Data Sources

III. Sports Data

- Sports Statistics Data Resources (Gateway)

[http://www.amstat.org/sections/SIS/Sports Data Resources/](http://www.amstat.org/sections/SIS/Sports%20Data%20Resources/)

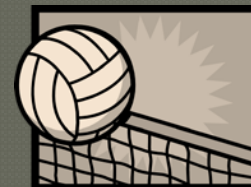
- General Sports Reference Site

www.sports-reference.com

- NFL Historical Stats:

<http://www.nfl.com/history>

- Individual team sites



2. Internet Data Sources

IV. Retail/Consumer (General)

- Cost/Prices

e.g., Kelley Blue Book: <http://www.kbb.com/>

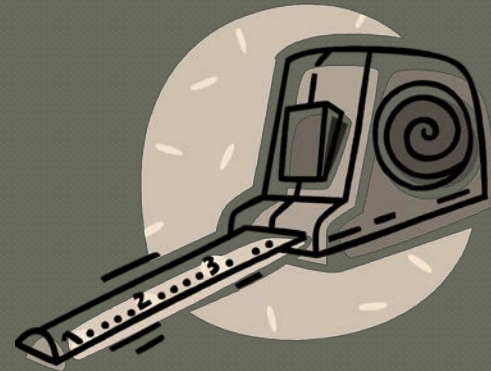


- Consumer Report ratings

<http://www.consumerreports.org/cro/index.htm>

- Product Specifications

- e.g., size measurements,
time/speed measurements,
MPG for cars



2. Internet Data Sources

V. Aviation Data

- Bureau of Transportation Statistics:

http://www.transtats.bts.gov/databases.asp?Mode_ID=1&Mode_Desc=Aviation&Subject_ID2=0

- Federal Aviation Agency

<http://www.faa.gov>



3. Collect Data Yourself

- This would be the most beneficial way to complete the project in terms of actually learning statistics!
- It will also be the most time-consuming.
- The slides that follow give some ideas you might use.
- If you have an idea, ask your instructor!

Sample Student Projects

● Matched Pairs t-Test:

- 2-tailed: H_a predicting that on average, students' rating of Coke and Pepsi would be different.
- t statistic = 2.62
- P value = 0.0116 (2-tailed)
- Conclusion: Evidence that on average, students rated the two drinks differently (Coke was rated higher)

Participant	Coke	Pepsi
#1	8	9
#2	7	5



Sample Student Projects

- t-Test for 2 independent samples:
 - 1-tailed: H_a predicting that on average fruit drinks have higher sugar content per ounce than fruit juices
 - t statistic = -0.14
 - P value = 0.5555
 - Conclusion: Sample data did not support H_a . No evidence that on average, fruit drinks have more sugar than fruit juices.



Sample Student Projects

- One Sample t-Test :

- 1-tailed:

- H_a predicting that the average purebred Boston Terrier puppy in the U.S. costs more than \$500

- Stratified sample representing different regions of the country

- t statistic = 1.73

- P value= 0.0449

- Conclusion: Evidence at 0.05 significance level that on average, purebred Boston Terrier puppies are priced higher than \$500.00 in the U.S.



Sample Student Projects

- t-Test for 2 independent samples:
 - 1-tailed: H_a predicting that in local state parks, oak trees have greater circumference than pine trees on average
 - t statistic = 4.78
 - P value = 7.91×10^{-6}
 - Conclusion: Strong evidence that in local state parks oak trees are bigger than pine trees on average.
 - Lurking variable identified and discussed: age of trees (and possible reasons that oak trees were older)



Sample Student Projects

● Matched Pairs t-Test:

- 1-tailed: H_a predicting on average, Wal-Mart prices would be lower than Target prices for identical items
- t statistic = .4429
- P value = 0.3294
- Conclusion: Mean price difference not significant; insufficient evidence that Wal-Mart prices are lower.

Item	WalMart	Target
64-oz. Mott's Juice	2.79	2.89
12-oz LeSeur Peas	1.19	1.08



Finding a Project

- Look at resources for collecting data
- Look at sample projects
- Think about your own interests



Sample Student Projects

t -Test Project

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