

Questionnaires and Surveys: Analyzing Data

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Where We Left Off

- We've identified a **target population**
- We randomly selected names from the **target population**
- We have distributed the questionnaire to members of our target population
- We have retrieved the questionnaire; the returned questionnaires become our **sample population**.

Now, we need to analyze our results.

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Analyzing Data: What We Care About

The goal of a statistical questionnaire is to attempt to understand **patterns** and **trends** within the data. We also want to be able to offer **predictions about the total population**.

We will calculate the following values in order to look for these patterns:

- Mean
- Median
- Standard Deviation
- Normal Distribution

- Plotting Data

Warning: **Math Ahead!**

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Analyzing Data: Our Example

We will use our backpack example in order to understand how to analyze data.



We sent out **384** questionnaires, but received back only **20** of them (**n=20**). We asked various questions in order to determine what people generally carry around with them, and their backpack preferences.

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Analyzing Data: Applying Confidence

Recall Confidence **Interval** and Confidence **Level** from last class.



How much would you expect to pay for this backpack?

9.99, 19.99, 29.99, 39.99, 49.99

our data: 9.99, 9.99, 9.99, 9.99, 9.99, 19.99, 19.99, 19.99, 19.99, 19.99, 19.99, 19.99, 29.99, 29.99, 29.99, 29.99, 29.99, 29.99, 39.99, 39.99, 39.99

7 of 20 (or 35%) respondents selected 19.99; thus, we are **95%** sure that between **14%** and **56%** of all 15.5 million college students will pay 19.99 for our backpack.

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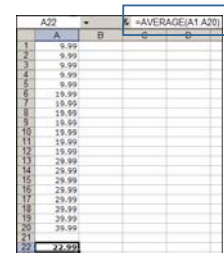
Analyzing Data: Mean

The **mean** is the numerical average of a set of numbers.

To calculate the mean:

1. Add up the values
2. Divide by the number of values

In excel, you can use **=AVERAGE()**



A22	=	B	=AVERAGE(A1:A20)
1	9.99		
2	9.99		
3	9.99		
4	9.99		
5	9.99		
6	19.99		
7	19.99		
8	19.99		
9	19.99		
10	19.99		
11	19.99		
12	19.99		
13	29.99		
14	29.99		
15	29.99		
16	29.99		
17	29.99		
18	39.99		
19	39.99		
20	39.99		
21			
22			22.35

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Analyzing Data: Normal Distribution



How much would you expect to pay for this backpack?

9.99, 19.99, 29.99, 39.99, 49.99

our data: 9.99, 9.99, 9.99, 9.99, 9.99, 9.99, 19.99, 19.99, 19.99, 19.99, 19.99, 19.99, 29.99, 29.99, 29.99, 29.99, 29.99, 29.99, 39.99, 39.99, 39.99, 39.99

mean value: \$22.99
median value: \$19.99
standard deviation: \$10.31



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Analyzing Data: Normal Distribution



How much would you expect to pay for this backpack?

9.99, 19.99, 29.99, 39.99, 49.99

Thus, if our sample population adequately represents a normal distribution, **68%** of all college students would expect to pay between **\$12.68** and **\$35.67** for our backpack.



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Analyzing Data: Summary

The goal of a statistical questionnaire is to attempt to understand **patterns** and **trends** within the data. We also want to be able to offer **predictions about the total population**.

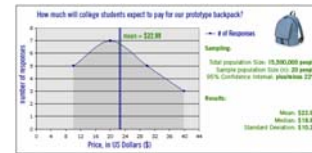
We calculated these values in order to look for patterns:

- Mean
- Median
- Standard Deviation
- Normal Distribution

Now, we want to visualize this data.

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Visualizing Data : An Example

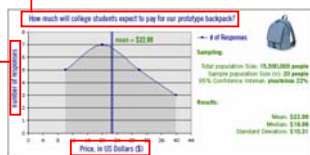


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Visualizing Data : An Example

A succinct title that clearly explains what is being visualized

(y) axis labeled to clearly explain what is shown on this axis



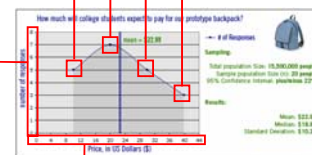
(x) axis labeled to clearly explain what is shown on this axis; include unit label (\$) as appropriate

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Visualizing Data : An Example

Each data point is well articulated and placed on the graph

units are clearly labeled

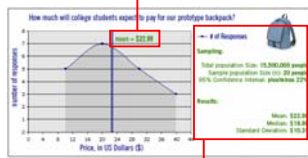


units are clearly labeled

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Visualizing Data : An Example

Include the **mean** on the graph

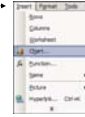


A key, that includes your **total population size**, your **sample population size** (n), your **95% Confidence Interval**, **Mean**, **Median** and **Standard Deviation**.

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Visualizing Data : How do you make it?

1. Start with Excel.
 - a. Enter your Data
 - b. Organize you Data (generally, into Quantity of Responses vs. Variable Being Responded To)
 - c. Create a XY Scatter Plot Chart
2. Revise and extend your Chart in Photoshop
 - a. Add color, as appropriate
 - b. Add key, including **total population size**, your **sample population size** (n), your **95% Confidence Interval**, **Mean**, **Median** and **Standard Deviation**.
3. Repeat for each question in your questionnaire that has yielded relevant data



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Let's try it.

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