Statistics & Probability in the Media

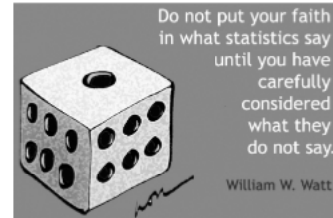What is the connection between statistics and probability?

Probability predictions come from statistical analysis of data

Where are statistics and probability are used in everyday life?

- *advertisers (newspapers, magazines, internet, TV)*
- *government*
- *the media (tv shows, news, weather)*

Statistics and probability are used to provide information and often this information is meant to influence you. Graphs can be drawn and statements can be made to create false impressions. For this reason, it is important to make sure you have a good understanding of the graph or data so that you are not misled.

Do not put your faith in what statistics say until you have carefully considered what they do not say.

William W. Watt

Things to consider when statistics and probability are used:

Misuse of language	- The words *average* or *typical* are sometimes used without identifying whether the number used is the mean, median, or mode. - Survey questions can be biased. - Relevant information can be left out if it does not get across the desired information.
Distorted visuals	- In some pictographs or 3-D graphs, the sizes of parts of the graph can make numbers appear greater or less than they are. - When axes do not start at 0, it is easy to conclude that differences between numbers are greater than they are. - Statistics can be fabricated or exaggerated and may not come from mathematical analysis.
Questionable Sources	- Do the data come from a random, unbiased sample: What is the population? How was the sample chosen? When, where and how was the survey conducted? What were the questions in the survey - where they biased? - The word *expert* implies that a person has a great deal of knowledge. Ask what make makes a person an expert and whether they are an expert in the appropriate field? - It is important to distinguish whether the presented data facts or opinions. Just because people believe something doesn't make it true.

Example 1

Examine the following statistics and determine where they try to mislead.

a. 4 out of 5 doctors recommend *Sparkle Toothpaste* for your family.

what doctors? — dentists would be better

b. *Taylor Towels* are 30% stronger.

stronger than what? — they might be less strong than another brand.

c. Lee earned $1000 a week selling our product door-to-door. you can too!

How many doors did he have to knock on?

d. CDs on sale, from $8.99.

this is min price, what's the max?

e. Last year there were 55 motorcycle accidents involving people ages 16 to 30 and only 25 motorcycle accidents involving people over 30. People under 30 are careless motorcycle drivers.

what is the # of motorcycle drivers in each age group? there are more younger people with motorcycle better to quote %

f.
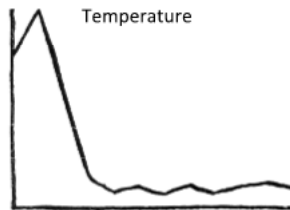
no scale, change by 1° OR 20°?

"He's right! When you look at it that way, it's not so bad!"

www.CartoonStock.com GRAPHICS DEPT

AH YES – THOSE GRAPHS REALLY DO DISGUISE THIS YEAR'S TRUE RESULTS. WELL DONE, HODGSON!

Name: _____

Example 2

GM's OnStar service is a wireless communication system between a central call centre and an OnStar enabled car, allowing drivers to call for help or ask for other services. The volume of monthly OnStar activity reported follows:

- 1,000 airbag deployment calls
- 300 crash notifications
- 11,000 emergency service calls
- 5,400 'Good Samaritan' calls; Orange Alerts; someone in trouble etc.
- 325 stolen vehicle location assists
- 41,000 remote unlock calls
- 24,000 requests for roadside assistance
- 329,000 requests for route assistance
- 412,025 total calls

Determine the probability of each type of call occurring.

TYPE OF CALL	NUMBER OF CALLS	TOTAL CALLS	PROBABILITY OF CALL
airbag deployment	1000		0.24%
crash notifications	300		0.07%
emergency service	11000		2.7%
'Good Samaritan'; Orange Alerts; someone in trouble	5400	412,025	1.3%
stolen vehicle location assists	325		0.08%
remote unlock	41000		10%
roadside assistance	24000		5.8%
route assistance	329000		80%

a. Based on what you've seen in the media what type of headline might you see in a newspaper based on the statistics given above?

"GM car owners are driving lost 80% of the time"
"GM car owners lock their keys in their car 10% of the time"
"GM car owners have fewer accidents"

b. How accurate might those headlines be based on what you know about statistics?

Not accurate statements → not all GM cars have the service
→ not comparing to all car types out there
→ "% of time" should be "% of calls made"

Name: _____

Example 3

Compare each set of graphs. Which is each misleading? Why?

	GRAPH 1	GRAPH 2	MISLEADING BECAUSE . . .
a.			Graph 2, Scale of y-axis makes the change in bar heights look more drastic
b.			Graph 1, scale doesn't begin at zero, looks like house prices tripled when they didn't.
c.			Graph 1, no scale at all. Also year 1995 looks bigger because of perspective when it's equal to yr 1997
d.			Graph 2, pictures not same size, appears like more people own horses. Also both graphs do not show no pets at all.