

SOCIAL MATH

Inspiring Behavior Change in Your Community

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Overview

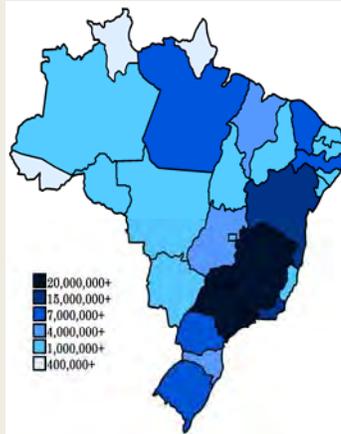


- Measurement types used in Epidemiology
- What is social math
- How can social math help with public health messaging
- Creating effective public health messaging
- Describe infographics

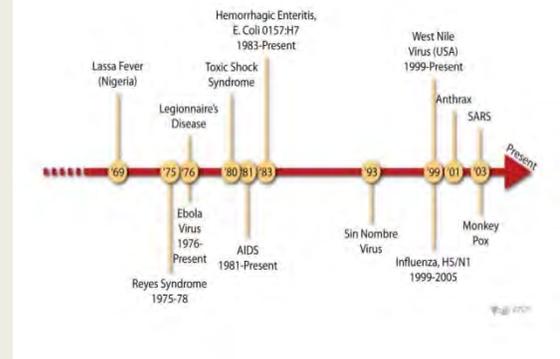
What is epidemiology?



Person



Place



Time

**The description, quantification, identification of determinants, and control/prevention of diseases in populations.

Absolute vs. Relative Measures

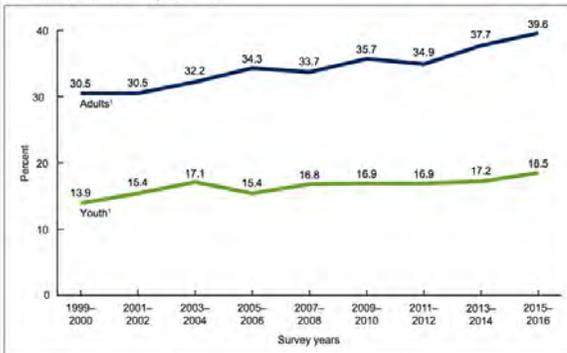
- **Absolute:** based on the **difference** between two measures of disease frequency
 - E.g., *There were 10 more car fatalities among men compared to women*
- **Relative:** based on the **ratio** of two measures of disease frequency
 - E.g., *There were 2 times the number of car fatalities among men compared to women.*



Crude vs. Adjusted Measures

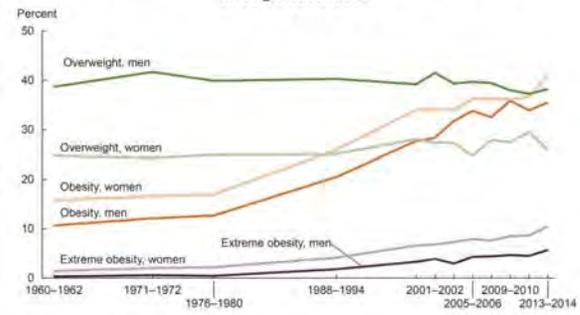
- Crude measurements are a direct comparison of numbers
- Adjusted measurements are comparison of numbers within specific characteristic group

Figure 5. Trends in obesity prevalence among adults aged 20 and over (age adjusted) and youth aged 2–19 years: United States, 1999–2000 through 2015–2016



*Significant increasing linear trend from 1999–2000 through 2015–2016.
 NOTES: All estimates for adults are age adjusted by the direct method to the 2000 U.S. census population using the age groups 20–39, 40–59, and 60 and over.
 Access data table for Figure 5 at: http://www.cdc.gov/nchs/data/figures/5/050509_100916.pdf.
 SOURCE: NCHS, National Health and Nutrition Examination Survey, 1999–2016.

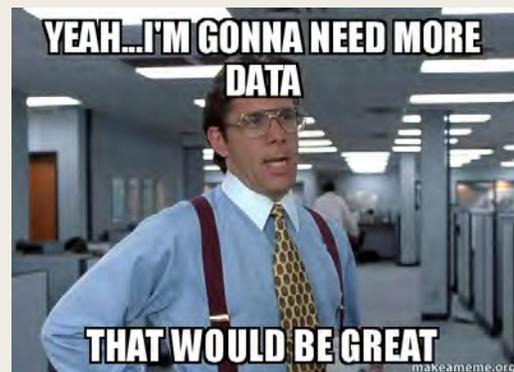
Trends in adult overweight, obesity, and extreme obesity among men and women aged 20–74: United States, 1960–1962 through 2013–2014

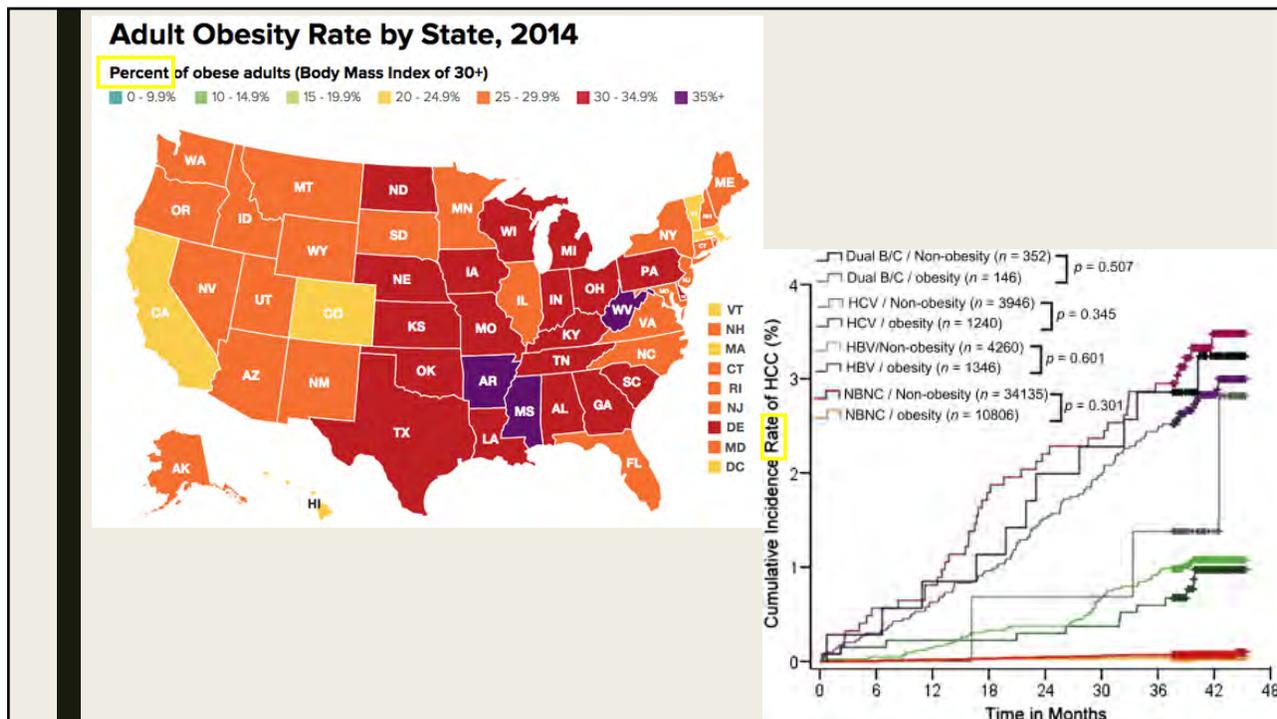


NOTES: Age-adjusted by the direct method to the year 2000 U.S. Census Bureau estimates using age groups 20–39, 40–59, and 60–74. Overweight is body mass index (BMI) of 25 kg/m² or greater but less than 30 kg/m²; obesity is BMI greater than or equal to 30; and extreme obesity is BMI greater than or equal to 40. Pregnant females were excluded from the analysis.
 SOURCES: NCHS, National Health Examination Survey and National Health and Nutrition Examination Surveys

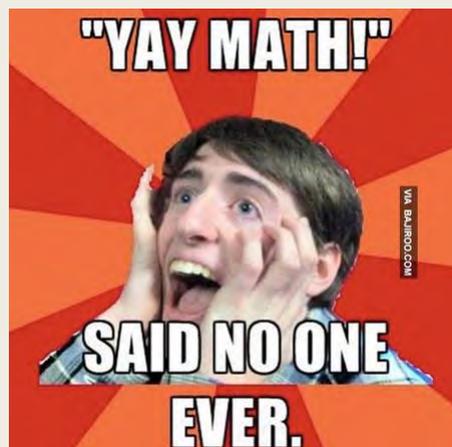
Presentation of Disease Data

- Counts
- Ratio
 - Proportion and percentage
 - Rate
- Trends





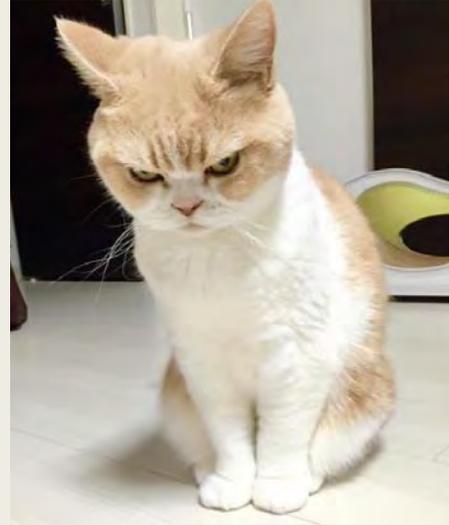
Social Math



Why don't people listen to me???

- Usually: Public health experts provide data about health behaviors or programs and expect people to “fall in line..”
- Concerned that people:
 1. *Don't support programming*
 2. *Ignore communication and advice*

Why aren't they changing their behaviors???



Source: Dealy, A. 2013. *Social Math: Bringing Your Program to Life*. Office of Juvenile Justice and Delinquency Prevention. Retrieved from: https://www.wcasa.org/file_open.php?id=973

Think about the messaging:

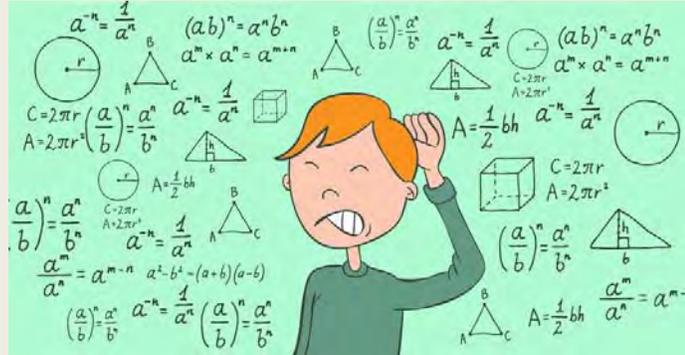
- Is there something wrong with the way we are delivering our message?
- Is there something wrong with the message itself?



Source: Dealy, A. 2013. *Social Math: Bringing Your Program to Life*. Office of Juvenile Justice and Delinquency Prevention. Retrieved from: https://www.wcasa.org/file_open.php?id=973

What is "Social Math"?

- Making large numbers comprehensible (DIGESTIBLE and COMPELLING) by inserting them into a context that is MEANINGFUL to the audience.
- Make the messaging more appealing to your audience



Source: Yocco, V., and A. Pulli. (2016). Social Math: A Method to Make Complex Data Meaningful. Bulletin of the Association for Information Science and Technology. 52:5; 23-26.

What is "Social Math"?

- "A way of using data to tell a story..."

Once upon a time, there were chili cheese fries with so many calories that you had to walk from Bismarck to Fargo just to burn them all off!



Source: Yocco, V., and A. Pulli. (2016). Social Math: A Method to Make Complex Data Meaningful. Bulletin of the Association for Information Science and Technology. 52:5; 23-26.

Data needs context

- Raw data is GREAT, but without context it can often seem confusing or difficult to understand.

DATA[count] :

In 2014, approximately 49,159 adults in North Dakota were living with diagnosed diabetes. About 18,961 had undiagnosed diabetes. More than 202,000 people had prediabetes. For a total of 270,316 people in North Dakota being affected by diabetes.

Source: Diabetes in North Dakota: 2016. Retrieved from:
https://www.ndhealth.gov/NutrPhyAct/Publications/2016_Diabetes_Burden_Report.pdf

GOAL: Reduce the prevalence of diabetes in North Dakota.

Source: Dealy, A. 2013. Social Math: Bringing Your Program to Life. Office of Juvenile Justice and Delinquency Prevention. Retrieved from:https://www.wcasa.org/file_open.php?id=973

Stories need data

- Simply having anecdotal information can provide context, but without data, there is no direction.



Source: Dealy, A. 2013. Social Math: Bringing Your Program to Life. Office of Juvenile Justice and Delinquency Prevention. Retrieved from:https://www.wcasa.org/file_open.php?id=973

Data + Context = Meaning

- In 2014, more than 270,000 [count] people in North Dakota were affected in some way by diabetes. That's enough to fill the Fargodome more than 14 times* [relative comparison] .

*Note: Based on 19,000 capacity of the Fargodome.



Source: Dealy, A. 2013. Social Math: Bringing Your Program to Life. Office of Juvenile Justice and Delinquency Prevention. Retrieved from: https://www.wcasa.org/file_open.php?id=973

Social math can make messages “click” with your target audience (provide context) by framing them with:

- Familiar numbers broken down by TIME
 - How would you break this down into a more manageable/understandable number using TIME:
Average salary of childcare provider - \$23,030/year [ratio] in May of 2017 (Bureau of Labor Statistics)
- Familiar numbers broken down by PLACE
 - How would you break this down into a more manageable/understandable number using a PLACE:
16,130 [count] children in ND were food insecure in 2015 (Feeding America)



Sources: Centers for Disease Control and Prevention. (2008). Adding Power to Our Voices: A Framing Guide for Communicating About Injury. Bureau of Labor Statistics, Occupational Employment Statistics, Occupational Employment and Wages: Childcare workers. Retrieved from: <https://www.bls.gov/oes/current/oes399011.htm> Feeding America. Child Food Insecurity in North Dakota. Retrieved from: <http://map.feedingamerica.org/county/2015/child/north-Dakota>.

Social math can make messages “click” with your target audience by framing them with:

- Dramatic events
 - *How would you break this down into a more manageable/understandable number with a **DRAMATIC EVENT**:*
37,461 [count] people died in MV crashes in the US in 2016 (NHTSA)

- Costs that are smaller and more understandable
 - *How would you break this down into a more manageable/understandable number with a **MORE UNDERSTANDABLE COSTS**:*
Total costs of diagnosed diabetes in the United States in 2017 was \$327 billion [count] (American Diabetes Association)



Sources: Centers for Disease Control and Prevention. (2008). Adding Power to Our Voices: A Framing Guide for Communicating About Injury. National Highway Traffic Safety Administration. (2017). 2016 Fatal Motor Vehicle Crashes: Overview. DOT HS 812 456. American Diabetes Association. The Cost of Diabetes. Retrieved from: <http://www.diabetes.org/advocacy/news-events/cost-of-diabetes.html>

**North Dakota Vehicle Crashes,
Fatalities and Injuries, 2007-2016**

Year	Crashes	Fatalities	Injuries
2007	16,229	111	4,180
2008	16,387	104	4,247
2009	17,673	140	4,462
2010	17,076	105	4,687
2011	18,823	148	5,018
2012	18,356	170	5,311
2013	18,977	148	5,365
2014	16,134	135	5,278
2015	15,077	131	4,917
2016	15,017	113	4,614

The number of motor vehicle crashes in North Dakota peaked in 2013 at 18,977. By 2016, the number of motor vehicle crashes had decreased to 15,017, with 113 motor vehicle-related fatalities and 4,614 injuries.

Turn to the person next to you and answer this question:

How could this be presented differently (words, visual)?

- Familiar numbers or costs
- Dramatic events
- Costs that are smaller and more understandable
- Current numbers from other issues

Source: 2016 North Dakota Crash Summary. Retrieved from: <https://www.dot.nd.gov/divisions/safety/docs/crash-summary.pdf>

EVERY
35 MINUTES
one motor vehicle
crash occurred (ND 2016)



EVERY
2 HOURS
one person was injured
in a crash (ND 2016)

EVERY
3 DAYS
one person died
in a crash (ND 2016)

[ratio]

Source: 2016 North Dakota Crash Summary. Retrieved from: <https://www.dot.nd.gov/divisions/safety/docs/crash-summary.pdf>

- A large movie theater popcorn is very unhealthy as it contains 1,640 calories, 126 grams of fat, and 73 grams of saturated fat. Movie-goers should try to make healthier choices.
- Feel free to use your phone!

Turn to the person next to you and answer this question:

How could this be presented differently using social math (words, visual)?

- Familiar numbers or costs
- Dramatic events
- Costs that are smaller and more understandable
- Current numbers from other issues

Source: Myfitnesspal. <https://www.myfitnesspal.com/food/calories/regal-cinema-large-buttered-popcorn-517046438?v2=false>

The
BUTTERED
POPCORN
example
[absolute
comparison]



1640
calories
73 grams
saturated fat

1100
calories
16 grams
saturated fat

CHOOSE HEALTHIER OPTIONS!



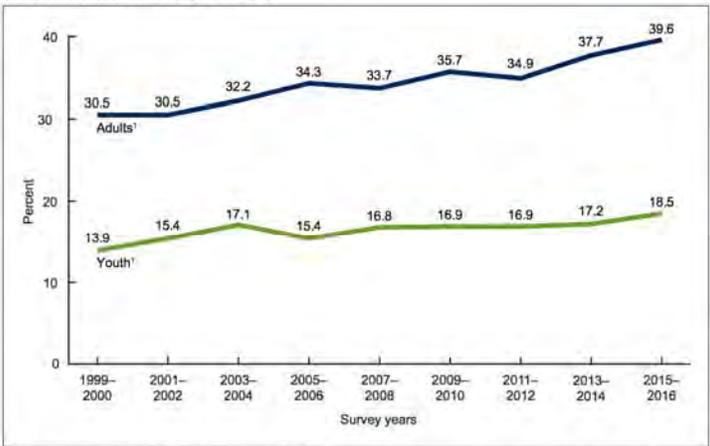
Source: Yocco, V., and A. Pulli. (2016). Social Math: A Method to Make Complex Data Meaningful. Bulletin of the Association for Information Science and Technology. 52:5; 23-26.

Creating Effective Messages with Social Math

#1 Define your issue and your audience!

-E.g., The rates of childhood obesity are increasing across America.

Figure 5. Trends in obesity prevalence among adults aged 20 and over (age adjusted) and youth aged 2-19 years: United States, 1999-2000 through 2015-2016



Survey years	Adults (%)	Youth (%)
1999-2000	30.5	13.9
2001-2002	30.5	15.4
2003-2004	32.2	17.1
2005-2006	34.3	15.4
2007-2008	33.7	16.8
2009-2010	35.7	16.9
2011-2012	34.9	16.9
2013-2014	37.7	17.2
2015-2016	39.6	18.5

*Significant increasing linear trend from 1999-2000 through 2015-2016.
NOTES: All estimates for adults are age adjusted by the direct method to the 2000 U.S. census population using the age groups 20-39, 40-59, and 60 and over.
Access data table for Figure 5 at: https://www.cdc.gov/nchs/data/behavioralrfsd/58_table.pdf
SOURCE: NCHS, National Health and Nutrition Examination Survey, 1999-2016

Source: Yocco, V., and A. Pulli. (2016). Social Math: A Method to Make Complex Data Meaningful. Bulletin of the Association for Information Science and Technology. 52:5; 23-26.

Creating Effective Messages with Social Math

#2 Determine the focus of your data – ONE topic
Keep it focused!

-E.g., Focus: ways to avoid childhood obesity



Source: Yocco, V., and A. Pulli. (2016). Social Math: A Method to Make Complex Data Meaningful. Bulletin of the Association for Information Science and Technology. 52:5; 23-26.

Creating Effective Messages with Social Math

#3 If you don't already have data – find/use RELIABLE data!

-E.g., Governmental websites or well known hospitals are good, reliable sources.



North Dakota State Nutrition, Physical Activity, and Obesity Profile Adolescent Statistics

Dietary Behaviors⁵

- 35.3% of adolescents reported consuming fruit less than one time daily.
- 37.2% of adolescents reported consuming vegetables less than one time daily.

Physical Activity⁵

- 24.7% of adolescents were physically active at least 60 minutes per day on all 7 days in the past week.

Overweight and Obesity⁵

- 15.1% of adolescents were overweight.
- 13.5% of adolescents had obesity.

Source: Yocco, V., and A. Pulli. (2016). Social Math: A Method to Make Complex Data Meaningful. Bulletin of the Association for Information Science and Technology. 52:5; 23-26.

Creating Effective Messages with Social Math

#4 Find meaningful comparisons for your specific audience.

What would be MOST persuasive to that audience, and what comparison would best deliver your message?

-E.g., 18,000 of 67,000 North Dakota children ages 10-17 are considered overweight or obese. This is the same as **720 classrooms full of children.**



Source: Yocco, V., and A. Pulli. (2016). Social Math: A Method to Make Complex Data Meaningful. Bulletin of the Association for Information Science and Technology. 52:5; 23-26.

Creating Effective Messages with Social Math

#5 Tell your audience what you want them to do! Inspire action.

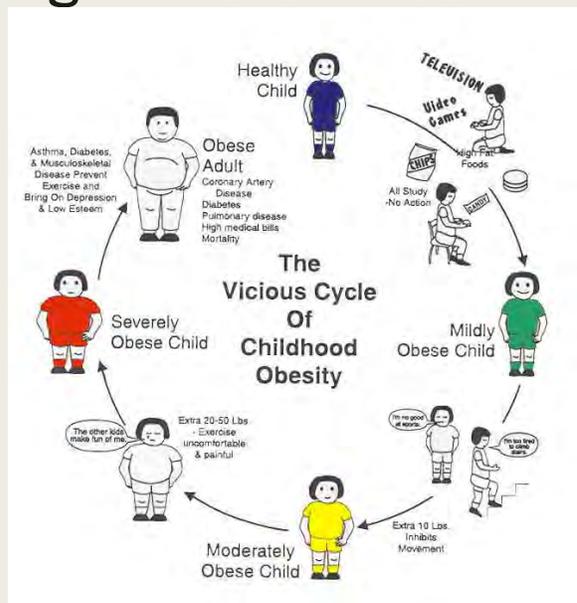
- Several ways to avoid obesity.



Source: Yocco, V., and A. Pulli. (2016). Social Math: A Method to Make Complex Data Meaningful. Bulletin of the Association for Information Science and Technology. 52:5; 23-26.

Creating Effective Messages with Social Math

#6 Turn your story into a visualization.



Source: Yocco, V., and A. Pulli. (2016). Social Math: A Method to Make Complex Data Meaningful. Bulletin of the Association for Information Science and Technology. 52:5; 23-26.

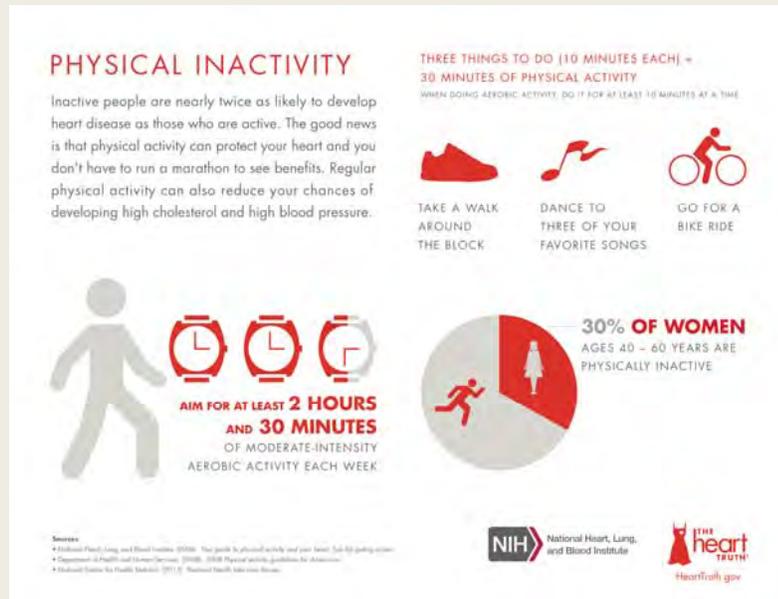
Infographics

- Presents information in an easy-to-understand format.
- Can communicate complicated information relatively quickly



Infographics – Ready, set, go!

- Data
- Audience
- Internet access
- Your creativity!



Online Infographic Tools

- www.InfographicsArchive.com - digital library offering existing infographics
- www.piktochart.com - online infographics creation tool
- www.tableausoftware.com/public/community - online infographics creation tool
- Infogr.am - online infographics creation tool
- www.wordle.net - word cloud creation tool

However, simply selecting a “fun, familiar reference” may not always be appropriate.

Get into a group of 2-3 people

Think of this statement focusing on the problem of children not getting enough exercise:

A newly released study conducted by the U.S. Department of Education found that first graders on average spent 45 minutes each school day in recess and physical education, about the same amount of time it takes to watch two episodes of "SpongeBob Squarepants."

"Calories In, Calories Out, Food and Exercise in Public Elementary Schools, 2005." US Department of Education.

In your group, take a few minutes to answer the following questions:

1. *Who is the target audience of this statement? How might this be interpreted differently in a different audience?*
2. *Is this statement useful? Why/why not?*
3. *What would you change about the statement?*
4. *What is this statement trying to say?*

Source: Benjamin, D. (2007). Doing Social Math: Case Study in Framing Food and Fitness. <http://www.frameworksinstitute.org/ezone40.html>

IN SUMMARY:

- Data is GOOD
- Data without CONTEXT can be confusing
- Making the connection between what your audience NEEDS to understand (data/numbers) and a context that can make the data understandable is a GOOD THING!

THANK YOU!