

Stat 150 - Day 8

Human Development Trends in Gapminder

Today you will learn how to use the gapminder software to conduct analyses like those shown by Hans Rosling in the video that you have watched of his TED lecture. This handout will lead you through one of the analyses that he presented. As you carry out this analysis, try to concentrate on two things:

- Learning to use the gapminder graphing software
- Learning to interpret the graphs to answer and generate interesting questions

Later you will be asked to work with a (randomly assigned) partner to conduct analyses of your own choosing.

Open Internet Explorer, and then go to: www.gapminder.org. Notice the slogan: “unveiling the beauty of statistics for a fact-based world view.” Then click on the “Gapminder World” link to access the graphing tool. For future reference, notice that you can find help, including a video tutorial, using the links on the left side of the page.

Example 1: Lifespan and Income

Dr. Rosling suggested that countries with higher incomes tend to have longer lifespans. He also raised interesting questions about whether it's easier for a country to increase its wealth or increase its health. You will re-analyze his data to investigate questions such as:

- Is there a relationship between income and lifespan? Is it positive as speculated?
- Has the relationship between income and lifespan grown stronger or weaker, or remained essentially unchanged, over the past 50 years?
- Does this relationship differ in various regions of the world?
- How have individual countries changed with regard to lifespan and income over these decades?

(a) Keep life expectancy on the y -axis and income per person on the x -axis. Notice that the default scale for the income variable is logarithmic. Click where it says “log” next to the x -axis and change the scale to linear (lin). Does the scatterplot reveal an association between these variables in 2007? Describe the direction, strength, and form of this association.

(b) Now change the scale on the x -axis back to logarithmic. How does this change the form of the association between the variables? [Note that the values are not changing, just the scaling.]

(c) Notice that the colors indicate regions of the world (mouse over the map to see the region names). Comment on any patterns that the scatterplot reveals with regard to region.

(d) Now change the year (using the slider at the bottom of the screen) to 1800. How was the world different in terms of lifespan and income back then? Comment on each variable separately and on the association between them.

(e) Now click the “play” button to watch changes over the decades. Comment on how these variables, and the association between them, have changed over the decades. Also comment on whether some regions have seen more dramatic changes than others. [Notice that you can adjust the speed if you’d like, using the arrow to the right of the “play” button.]

(f) Now select the United States. You can do this in one of three ways: Figure out which bubble corresponds to the U.S. and click on it, or select the “map” mode rather than the chart mode at the top and then click on the U.S., or select the U.S. from the country list along the right side. Does the U.S. (in 2007) have the highest income and longest life expectancy? If not, identify the countries with the highest value for each variable.

(g) Now make sure that the “trails” feature, near the right edge of the year slider, is checked. Click “play” and observe how the U.S. has changed on these variables over the decades. Would you say that the U.S. has changed more in income or life expectancy over the last 30 years? In which direction(s) has it changed? Has it moved consistently in one direction? How does the life expectancy of the U.S. compare to other countries with similar income per capita?

(h) Now un-select the U.S. and focus instead on China. Comment on how it has changed over the last 30 years on these variables. How does the life expectancy of the China compare to other countries with similar income per capita?

(i) Repeat for South Africa.

(j) Repeat for the United Arab Emirates.

(k) Would you say that these three countries have increased their health more than their wealth over the past three decades, or have they increased their wealth more than their health?

(l) Select another country that you find interesting, either because it has an extreme value in one of these variables, or because it does not fit the pattern of association, or because it has changed dramatically over these decades. Describe what makes this country interesting.

Example 2: Lifespan and Fertility

Dr. Rosling suggested that most people think of the industrialized world as having long lifespans and small families, with the so-called third world having short lifespans and large families.

(a) Using the pull-down menu next to the variable, change the variable on the x -axis to children per woman (fertility rate). Describe the association between these variables (in 2007). Also comment on any trends that you notice with regard to geographic region.

(b) Use the “play” button to observe how the world has changed with regard to these variables, focusing on the past 3 decades. Comment on what you learn.

(c) Focus on three countries: United States, China, and Rwanda. Describe how these countries have changed on these variables over the decades.

(d) Do the data and graphs provide evidence to support the belief that the industrialized world (mostly Europe and the Americas) has long lifespans and small families, while the so-called third world (mostly Africa and south Asia) having short lifespans and large families? If that is not true recently, was it true in the past? Explain how you are deciding.