

GEOG 5201 Geovisualization

Lab 2: Bivariate Mapping

Part 1: Guided Exercise

Visualizing two (or more) geographic attributes is an effective approach to explore the relationship between these variables. The objective of this lab is to visually explore the relationship between physical activity and obesity in males using bivariate mapping. The health data applied in this lab come from the [Global Burden of Disease \(GBD\) project](#) supported by the Institute for Health Metrics and Evaluation (IHME) at the University of Washington. The geographic data used are the [TIGER/Line Shapefiles](#) provided by the United States Census Bureau.

Activities

1. Loading data into ArcGIS Pro
 - a. Add TIGER/Line Shapefile (abbreviated TIGER shapefile)
 - i. Load the county-level TIGER shapefile (“*tl_2021_us_county*”) under folder “*tl_2021_us_county*”
 - b. Add GDB health data worksheets (abbreviated GDB worksheets)
 - i. Double click “*IHME_county_data_LifeExpectancy_Obesity_PhysicalActivity_NATIONAL.xlsx*”, and click both “*Obesity\$*” and “*Physical Activity\$*” worksheets to load them
2. Joining the GDB worksheets to the TIGER shapefile
 - a. Open the Attribute Table of the TIGER shapefile and compare it with the two GDB worksheets. Notice that the values in the *NAME* field of the TIGER shapefile match those in the *County* field of the GDB worksheets
 - b. Now we start joining the ‘*Physical Activity\$*’ worksheet to the TIGER shapefile. Right-click the TIGER shapefile, point to Joins and Relates, and click Add Join
 - i. For Input Table, accept *tl_2021_us_county*
 - ii. For Input Join Field, choose *NAME*
 - iii. For Join Table, choose ‘*Physical Activity\$*’
 - iv. For Join Table Field, choose *County*
 - v. Click Validate Join
 - c. Repeat 2-b to join the *Obesity\$* worksheet to the TIGER shapefile
 - d. Open the Attribute Table of the TIGER shapefile and check if both physical activity and obesity data are linked to it
3. Bivariate mapping I: bivariate choropleth map
 - a. Right-click the TIGER shapefile, and click Symbology
 - b. In the Symbology pane, change Primary Symbology to Bivariate Colors
 - i. For Field 1, choose *Male sufficient physical activity prevalence, 2011* (%)*
 - ii. For Field 2, choose *Male obesity prevalence, 2011* (%)*
 - iii. For Method, accept *Quantile*
 - iv. For Color scheme, choose one as you see fit
 - v. Click Template, go to Properties tab, set Outline color to No color, and click Apply
4. Bivariate mapping II: combining proportional and choropleth symbols
 - a. Right-click the TIGER shapefile, and click Copy

- b. Right-click Map, and click Paste
 - c. Right-click the pasted TIGER shapefile, and click Symbology
 - d. In the Symbology pane, change Primary Symbology to Proportional Symbols
 - i. For Field, choose *Male sufficient physical activity prevalence, 2011* (%)*
 - ii. Click Template, go to Properties tab, set Outline color to No color, and click Apply
 - iii. For Minimum size, set to 1.00
 - iv. For Maximum size, set to 5.00
 - e. In the Symbology pane, go to Vary symbology by attribute tab, and expand Color
 - i. For Field, choose *Male obesity prevalence, 2011* (%)*
 - ii. For Color scheme, choose one as you see fit (I personally prefer Yellow to Red in this context)
5. Share the two bivariate maps on ArcGIS Online. Make sure the web map is publicly viewable

Assignment

Note: Submit your responses to the following questions on the course website. Be sure to have all your answers and file(s) ready before starting your submission. You are allowed only one attempt to submit your responses.

1. (5 pts) How do you think physical activity and obesity in males relate by looking at these bivariate maps?
2. (5 pts) Compare two bivariate maps. Which one do you think better reflects such a relationship?
3. (5 pts) Input the link to your web maps here.

Part 2: Unguided Exercise

In this exercise, you are expected to create a bivariate map and publish it on ArcGIS Online, using data that are of interest to you.

About data

There will be several unguided labs during this course that help you create your visualizations using the learned materials (both in lectures and labs). This is a general guide about how to determine your topics and the data used.

1. The data topic can be anything that you are interested in. Your potential data topics include but are not limited to:
 - a. Health: COVID-19, cancer, drug overdose
 - b. Food: food accessibility, inequality
 - c. Hazard: wildfire, hurricane, tornado, earthquakes
 - d. Transportation: traffic accidents, traffic mortality
 - e. Social-economic: income inequality, poverty
 - f. Crime

